RESPONSE AND DEVELOPMENT WORK PLAN

AREA A: SUB-PARCEL A3-1
TRADEPOINT ATLANTIC
SPARROWS POINT, MARYLAND

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TABLE OF CONTENTS

1.0 Introduction 1
2.0 Site Description and History 4
2.1. Site Description 4
2.2. Site History 5
3.0 Environmental Site Assessment Results 7
3.1. Phase I Environmental Site Assessment (ESA) Results 7
3.2. Phase II Investigation Results – Sub-Parcel A3-1 8
3.2.1. Summary of Soil Sample Results 9
3.2.2. Summary of Groundwater Results 10
3.3. Additional Investigations 10
3.3.1. Pre-Design Investigation and Interim Measures Work Plan 10
3.3.2. Supplemental Soil Delineation Results 12
3.3.3. Hexavalent Chromium Re-Sampling 13
3.3.4. Light Non-Aqueous Phase Liquid (LNAPL) Delineation 13
3.4. Human Health Screening Level Risk Analysis (SLRA) 14
3.4.1. Analysis Process 14
3.4.2. Sub-Parcel A3-1 Development Area SLRA Results and Risk Characterization 17
3.4.3. Evaluation of Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Criteria 24
3.5. Soil Migration Assessment for NAPL and Elevated Oil & Grease 27
3.6. Management of PCB-Contaminated Media 29
3.7. Groundwater Quality Assessment 29
3.7.1. Analysis Process 29
3.7.2. Sub-Parcel A3-1 Development Area Groundwater Screening Results 30
4.0 Proposed Site Development Plan 33
5.0 Development Implementation Protocols 40
5.1. Response Phase 40
5.1.1. Lead and Oil & Grease Contaminated Media Excavation and Disposal 40
5.1.2. Cadmium Contaminated Media Excavation and Disposal 40
5.1.3. LNAPL Contaminated Media Excavation and Disposal 40
5.1.4. Trench Installation 40

TABLE OF CONTENTS
(CONT.)

5.1.5. Stockpile Controls 41
5.1.6. Water Management 41
5.1.7. Erosion and Sediment Control 41
5.1.8. Health and Safety 41
5.2. Development Phase 42
5.2.1. Soil Excavation and Utility Trenching 42
5.2.2. Soil Sampling and Disposal 44
5.2.3. Fill 45
5.2.4. Sediment/Erosion Control 45
5.2.5. Dust Control 45
5.3. Water Management 47
5.3.1. Groundwater PAL Exceedances 47
5.3.2. Dewatering 47
5.4. Health and Safety 48
5.5. Institutional Controls (Future Land Use Controls) 48
5.6. Post Remediation Requirements 49
5.7. Construction Oversight 50
6.0 Permits, Notifications and Contingencies 51
7.0 Implementation Schedule 52

TABLE OF CONTENTS
(CONT.)

FIGURES

Figure 1	Area A & B Parcels	Following Text
Figure 2	Parcel Development Area	Following Text
Figure 3A	Soil Boring Parcel Index Figure	Following Text
Figure 3B	Risk Assessment Exposure Units	Following Text
Figure 4	Groundwater Sample Locations (Shallow)	Following Text
Figure 5	Groundwater Sample Locations (Intermediate)	Following Text
Figure S-1(1)	Soil VOC Exceedances (Sheet 1)	Following Text
Figure S-2	Soil SVOC Exceedances	Following Text
Figure S-3(1)	Soil PCB Exceedances (Sheet 1)	Following Text
Figure S-4	Soil Oil & Grease Exceedances	Following Text
Figure S-5	Soil Inorganic Exceedances	Following Text
Figure GW-1	Groundwater VOC Exceedances (Shallow)	Following Text
Figure GW-2	Groundwater VOC Exceedances (Intermediate)	Following Text
Figure GW-3	Groundwater SVOC Exceedances (Shallow)	Following Text
Figure GW-4	Groundwater SVOC Exceedances (Intermediate)	Following Text
Figure GW-5	Groundwater TPH/Oil & Grease Exceedances (Shallow)	Following Text
Figure GW-6	Groundwater Inorganic Exceedances (Shallow)	Following Text
Figure GW-7	Groundwater Inorganic Exceedances (Intermediate)	Following Text
Figure 6	RW-052-SB/RW-055-SB Delineation	Following Text
Figure 7	RW-021-SB Delineation	Following Text
Figure 8	Cadmium Exclusion Zones	Following Text
Figure GW-8	Vapor Intrusion Criteria Exceedances	Following Text
Figure GW-9	Ambient Water Quality Criteria Exceedances	Following Text
Figure 9(a/b)	Environmental Capping Detail	Following Text
Figure 10	Enhanced GW Monitoring Network: Proposed Shallow Zone	Following Text
Figure 11	Enhanced GW Monitoring Network: Proposed Intermediate/Lower Zone	Following Text

TABLE OF CONTENTS
(CONT.)

TABLES

Table 1	Organic Compounds Detected in Soil	Following Text
Table 2	Inorganics Detected in Soil	Following Text
Table 3	Organic Compounds Detected in Groundwater	Following Text
Table 4	Inorganics Detected in Groundwater	Following Text
Table 5(a/b/c)	Soil Screening XRF Results	Following Text
Table 6	Soil Delineation TCLP Results	Following Text
Table 7	COPC Screening Analysis	Following Text
Table 8	Development Area Assessment of Lead	Following Text
Table 9	Exposure Point Concentrations – Surface Soil	Following Text
Table 10	Exposure Point Concentrations – Sub-Surface Soil	Following Text
Table 11	Exposure Point Concentrations – Pooled Soil	Following Text
Table 12	Risk Ratios – Composite Worker Surface Soil	Following Text
Table 13	Risk Ratios – Composite Worker Sub-Surface Soil	Following Text
Table 14	Risk Ratios – Composite Worker Pooled Soil	Following Text
Table 15	Risk Ratios – Construction Worker Surface Soil	Following Text
Table 16	Risk Ratios – Construction Worker Sub-Surface Soil	Following Text
Table 17	Risk Ratios – Construction Worker Pooled Soil	Following Text
Table 18(a/b)	Vapor Intrusion Criteria Comparison (Individual/Cumulative)	Following Text
Table 19	Ambient Water Quality Criteria Comparison	Following Text

TABLE OF CONTENTS (CONT.)

APPENDICES

Appendix A Request Letter from Tradepoint Atlantic ..... Following Text
Appendix B Pre-Design Investigation Soil and Groundwater Data ..... Following Text
Appendix C Construction Worker SSLs – Calculation Spreadsheet ..... Following Text
Appendix D Health and Safety Plan ..... Following Text
Appendix E Civil Permit Drawings ..... Following Text
Appendix F Stormwater Management Drawings (*preliminary*) ..... Following Text
Appendix G Response Measures Sediment and Erosion Control Plan ..... Following Text
Appendix H Utility Excavation NAPL Contingency Plan ..... Following Text
Appendix I Containment Remedy Operations and Maintenance Plan ..... Following Text

ELECTRONIC ATTACHMENTS

Soil Laboratory Certificates of Analysis ..... Electronic Attachment
Soil Data Validation Reports ..... Electronic Attachment
Groundwater Laboratory Certificates of Analysis ..... Electronic Attachment
Groundwater Data Validation Reports ..... Electronic Attachment
Soil ProUCL Input Tables (formatted soil analytical data) ..... Electronic Attachment
Soil ProUCL Output Tables ..... Electronic Attachment
Lead Evaluation Spreadsheet ..... Electronic Attachment

1.0 INTRODUCTION

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared this Response and Development Work Plan for a portion (the Development Area or Site) of the Tradepoint Atlantic property that has been designated as Area A, Sub-Parcel A3-1. Parcel A3 is approximately 64 acres of the approximately 3,100-acre former steel mill property located in Sparrows Point, Maryland. Parcel A3 is shown on **Figure 1** and is the location of the former Rod and Wire Mill Area. The development area covered by this Response and Development Work Plan consists of 54 acres designated as Sub-Parcel A3-1, which includes all of the larger Parcel A3 with the exception of 10 acres located to the west of Riverside Drive (**Figure 2).**

The conduct of any environmental assessment and cleanup activities on the Tradepoint Atlantic property, as well as any associated development, is subject to the requirements outlined in the following agreements:

- 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 Tradepoint Atlantic property into the Maryland Department of the Environment Voluntary Cleanup Program (MDE-VCP) was submitted to MDE on September 10, 2014. The property's current and anticipated future use is Tier 3 (Industrial), and plans for the property include demolition and redevelopment over the next several years. Parcel A3 is also part of the acreage that remains subject to the requirements of 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.

In consultation with the MDE, Tradepoint Atlantic affirms that it desires to accelerate the assessment, remediation and redevelopment of certain parcels within the larger site due to current market conditions. Tradepoint Atlantic submitted a letter (**Appendix A**) requesting an expedited response plan review to achieve construction deadlines for the proposed development on this Site. To that end, the MDE and Tradepoint Atlantic agree that the Controlled Hazardous Substance (CHS) Act (Section 7-222 of the Environment Article) and the CHS Response Plan (COMAR 26.14.02) shall serve as the governing statutory and regulatory authority for completing the development activities on Sub-Parcel A3-1 and complement the statutory requirements of the Voluntary Cleanup Program (Section 7-501 of the Environment Article). Upon submission of a Site Response and Development Work Plan and completion of the

remedial activities for the sub-parcel, the MDE shall issue a "No Further Action" letter upon a recordation of an environmental covenant describing any necessary land use controls for the specific sub-parcel. At such time that all the sub-parcels within the larger parcel have completed remedial activities, Tradepoint Atlantic shall submit to the MDE a request for issuing a Certificate of Completion (COC) as well as all pertinent information concerning completion of remedial activities conducted on the parcel. Once the VCP has completed its review of the submitted information it shall issue a COC for the entire parcel described in Tradepoint Atlantic's VCP application.

Alternatively, Tradepoint Atlantic or other entity may elect to submit an application for a specific sub-parcel and submit it to the VCP for review and acceptance. If the application is received after the cleanup and redevelopment activities described in this Work Plan are implemented and a No Further Action letter is issued by the MDE pursuant to the CHS Act, the VCP shall prepare a No Further Requirements Determination for the sub-parcel.

If Tradepoint Atlantic or other entity has not carried out response and redevelopment activities described in the Work Plan, the response and redevelopment activities may be conducted under the oversight authority of either the VCP or the CHS Act, so long as those activities comport with this Work Plan.

The Development Area (Site) consists of 54 acres located east of Riverside Drive (**Figure 2**), which has been designated as Sub-Parcel A3-1. The Site is currently slated for development and use as a warehouse facility with development activities generally including grading, paving, construction of a new slab on-grade warehouse building, and lighting/security improvements.

A Phase II Investigation specific to soil and groundwater conditions was performed for the Site in accordance with the requirements outlined in the ACO as further described in the approved Phase II and Pre-Design Investigation Work Plan – Parcel A3 dated September 17, 2015. Findings from the Phase II Investigation have been presented in the Phase II Investigation Report – Area A: Parcel A3 (Revision 1) dated July 8, 2016.

This Response and Development Work Plan provides a Site description and history, summary of environmental conditions identified by the Phase I Environmental Site Assessment (ESA) and Phase II Investigations including work associated with the Parcel A3 Phase II Investigation, a human health Screening Level Risk Assessment (SLRA) conducted for the identified conditions, and engineering and institutional controls which have been designed to facilitate the planned development and address the impacts and potential human health exposures. The engineering and institutional controls include work practices and applicable protocols that are submitted for approval to support the development and use of the Site. Engineering and institutional controls approved and installed as part of this Response and Development Work Plan shall be described in closure certification documentation submitted to the MDE demonstrating that the exposure pathways on the sub-parcel are addressed in a manner that protects public health and the

environment. The remaining 10 acres of Parcel A3 located west of Riverside Drive will be addressed in future work associated with completion of the obligations of the ACO and associated VCP requirements. This work will include assessment of risks and if necessary a Response and Development Work Plan to address future land use of this area.

2.0 SITE DESCRIPTION AND HISTORY

2.1. SITE DESCRIPTION

Parcel A3 has an area of 64 acres. The location of Parcel A3 on the Tradepoint Atlantic property is shown in **Figure 1**. The Parcel is currently zoned Manufacturing Heavy-Industrial Major (MH-IM), and is not occupied. All buildings have been demolished and the parcel has been cleared of all significant vegetation.

The proposed Development Area (Site) addressed in this Response and Development Plan consist of the 54 acres of Sub-Parcel A3-1 located east of Riverside Drive (**Figure 2**). The Development Area is bounded to the west by Riverside Drive and Bear Creek, to the north by Bethlehem Boulevard and Interstate 695, and to the east by the new Federal Express warehouse facility (also known as Parcel A1). The proposed development includes covering 100% of the Development Area with paving, buildings, or landscaped soil cover. According to topographic maps provided by EAG, the Development Area is at an elevation of approximately eleven (11) feet above mean sea level (amsl). Elevations through the majority of the Development Area are fairly uniform between 10 and 12 feet. Along the western edge, outside the Development Area, the parcel slopes sharply downward to sea level at the adjacent Bear Creek shoreline. Elevations at the Site range from 10 feet amsl at Riverside Drive up to approximately 20 feet amsl at the highest point (a mound in the northwest corner). Surface runoff currently collects in low spots on the Development Area with no clear discharge location. Along the western edge of the property, runoff waters flow towards Bear Creek located just across the parcel boundary. Bear Creek is a tidal water body, which likely influences large-scale groundwater flow beneath the Site.

In general, the subsurface geology includes slag fill overlying natural soils, which include interbedded fine-grained sediments (clays and silts) and coarse grained sediments (sands). Groundwater was observed within the soil cores at initial depths ranging from 4 to 18 feet bgs across the Site. There is no groundwater use on-site or within the surrounding Tradepoint Atlantic property. Groundwater occurrence at the Site has been segregated into three horizons identified as shallow, intermediate and deep zones. The shallow water bearing zone (water table) includes piezometers screened to depths of approximately 15-feet below ground surface (bgs). The intermediate water bearing zone includes piezometers screened from approximately 20- to 30-foot depths. The deep water bearing zone is defined as those piezometers screened from approximately 50- to 75-feet bgs.

In the northern half of the Site, groundwater in the shallow zone appears to flow radially in all directions from a mounded location in the vicinity of RW10-PZM004. On the southern half of the Site, shallow groundwater appears to flow radially in all directions from a mounded location in the vicinity of RW-050-PZ. In the intermediate zone, groundwater data was available only for

the northern half of the Site. In this zone, groundwater flow is influenced by the presence of an interim measure pump and treat system and is directed toward the recovery system pumping wells. Groundwater elevations below 0 feet amsl in the intermediate zone were reported in several wells.

2.2. SITE HISTORY

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

The Rod and Wire Mill area is located in the northwestern portion of the Site, and is the location of the former mills that produced rods and wire products from the 1940s to the early 1980s. All manufacturing activities at the Rod and Wire Mill area ceased operation in the early 1980s with subsequent demolition of all structures between 1994 and 2000, based on historical aerial photos. Current ground cover includes slag aggregate that was placed in conjunction with the demolition program. Groundwater interim remedial measures are in progress within approximately 15 acres in the northernmost section of the parcel.

Manufacturing activities at the Rod and Wire Mill included leaching of zinc ore and a subsequent treatment process to remove cadmium impurities. These activities resulted in zinc and cadmium contaminated soil and groundwater. The leaching process was implemented in large tanks located inside the north end of the former Rod and Wire Mill building. In the 1950s through the early 1970s, the acidic leach residue was stored in a former pond until about 1959 when filters were installed to dewater the residues. Dewatered sludge generated from this process was temporarily stored on the ground outside the north end of the mill in the Former Sludge Bin Storage Area. Filtrate from the dewatering process was recycled to the wire plating process. Excess filtrate was discharged to the East Pond until 1971, after which it was sent to the Humphrey Creek Wastewater Treatment Plant (HCWWTP) for treatment. These operations ended in the early 1980s when the Rod and Wire Mill was shut down.

Historically, as part of a series of site investigations conducted by the then owner, Bethlehem Steel Corporation, there were various Solid Waste Management Units (SWMUs) identified in the vicinity of the Rod and Wire Mill area during the mid-1980s and on through the early 1990s. Specifically, there were eight SWMUs identified in the January 1998 Description of Current Conditions (DCC) report prepared by Rust Environmental and Infrastructure.

The identified SWMUs are listed below:

SWMU 27: Sludge Bin Storage Area
SWMU 28: Northwest Pond
SWMU 29: East Pond
SWMU 30: Rod Mill Equalization Tanks (2)
SWMU 38: Cadmium Treatment Trenches
SWMU 39: Rod Mill Scale Pits (2)
SWMU 44: Rod Mill Cooling Tower
SWMU 45: Rod Mill Trenches/Sumps

3.0 ENVIRONMENTAL SITE ASSESSMENT RESULTS

3.1. PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA) RESULTS

A Phase I ESA was completed by Weaver Boos Consultants for the entire Sparrows Point property on May 19, 2014. Weaver Boos completed site visits of Sparrows Point from February 19 through 21, 2014, for the purpose of characterizing current conditions at the former steel plant. The Phase I ESA identified particular features across the Tradepoint Atlantic property which presented potential risks to the environment. These Recognized Environmental Conditions (RECs) included buildings and process areas where releases of hazardous substances and/or petroleum products potentially may have occurred. The Phase I ESA also relied upon findings identified during a previous visual site inspection (VSI) conducted as part of the RCRA Facility Assessment (RFA) prepared by A.T. Kearney, Inc. dated August 1993, for the purpose of identifying Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) on the property. This 1991 VSI is regularly cited in the Description of Current Conditions (DCC) report prepared by Rust Environmental and Infrastructure, dated January 1998 (included with Weaver Boos' Phase I ESA). 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 their site visit. Weaver Boos made the determination to identify a feature as a REC based on historical information, observations during the site visit, and prior knowledge and experience with similar facilities.

The following RECs (cross listed as SWMUs/AOCs) were identified and targeted for further investigation within the Sub-Parcel A3-1 boundaries:

Rod Mill Remediation Area (REC 6A):

Continuing interim measures (IM) are in place for cadmium/zinc impacted groundwater as per the Consent Decree. During the site visit the existing IM remediation system was observed. Based on this information, the potential for a material release which may impact the environment is present.

[Filled] Northwest Pond (REC 6B):

Continuing interim measures are in place for cadmium/zinc impacted groundwater as per the Consent Decree. During the site visit the existing IM remediation system was observed. Based on our review of historical source information and experience, the Northwest Pond may have potentially contained hazardous substances and/or petroleum products which may have resulted in a release to the environment.

[Filled] East Pond (REC 6C):

Continuing interim measures are in place for cadmium/zinc impacted groundwater as per the Consent Decree. During the site visit the existing IM remediation system was observed. Based on this information, the potential for a material release which may impact the environment is present.

Rod Mill Trenches/Sumps (REC 6D):

The DCC Report recommended further action was needed for this item which were identified as piping designed to transport process wastewater. Based on our review of historical source information and experience, the trenches/sumps may have potentially contained hazardous substances and/or petroleum products which may have resulted in a release to the environment.

Unknown Aboveground Tank (REC 6E):

The DCC Report recommended further action was needed for this item. Based on our review of historical source information and experience, the tank may have contained hazardous substances and/or petroleum products which may have resulted in a release to the environment.

3.2. PHASE II INVESTIGATION RESULTS – SUB-PARCEL A3-1

A Phase II Investigation for soil and groundwater conditions was performed for the Site in accordance with the requirements outlined in the ACO as further described in the approved Phase II and Pre-Design Investigation Work Plan – Parcel A3 dated September 17, 2015. Findings from the Phase II Investigation are presented in the Phase II Investigation Report – Area A: Parcel A3 (Revision 1) dated July 8, 2016, and summarized in this document for all data relevant to Sub-Parcel A3-1.

The Phase II Investigation was developed to target the specific features which represented a potential release of hazardous substances and/or petroleum products to the environment, including RECs, SWMUs, and AOCs described above as well as numerous other targets defined from former operations that would have the potential for environmental contamination. The position of the RECs, SWMUs, and AOCs may have been adjusted during the field investigation based on a review of historical documents and aerial images, as appropriate. Samples were also collected at site-wide locations to ensure full coverage of the parcel.

A total of 159 soil samples (from 65 boring locations) were collected and analyzed to assess the presence or absence of contamination in Parcel A3. A total of 154 of the soil samples (from 60 boring locations shown on **Figure 3A**) were included in the proposed Sub-Parcel A3-1 Development Area. These 60 soil boring locations (along with 14 additional borings collected

during the separate Pre-Design Investigation described in Section 3.3) are shown in relation to relevant risk assessment exposure units in **Figure 3B**. Phase II Investigation soil samples were analyzed for TCL-VOCs, TCL-SVOCs, Oil & Grease, TAL-metals, hexavalent chromium, and cyanide. Select soil samples were also analyzed for TPH-DRO/GRO. Shallow soil samples (0 to 1 foot bgs) were analyzed for PCBs.

A total of 18 groundwater samples (13 shallow and 5 intermediate sample locations shown on **Figures 4** and **5**), were collected to characterize groundwater conditions in Parcel A3, all of which were within the proposed Sub-Parcel A3-1 Development Area (the RW19 well pair is located directly along the boundary). Groundwater samples were analyzed for TCL-VOCs, TCL-SVOCs, Oil & Grease, TAL-metals (total or dissolved), hexavalent chromium, and cyanide. Select groundwater samples were also analyzed for TPH-DRO/GRO.

The soil and groundwater laboratory Certificates of Analysis (including Chains of Custody) and Data Validation Reports are included as electronic attachments. The Data Validation Reports contain qualifier keys for the final flags assigned to individual results in the attached summary tables.

3.2.1. Summary of Soil Sample Results

Soil sample results for Sub-Parcel A3-1 were screened against Project Action Limits (PALs) established in the site-wide Quality Assurance Project Plan (QAPP) dated April 5, 2016, or other direct guidance from the agencies. **Table 1** and **Table 2** provide a summary of the detected organic compounds and inorganics in the soil samples submitted for laboratory analysis, and **Figure S-1** through **Figure S-5** present all soil sample results that exceeded the PALs. The tables and figures include all analytical data within the proposed development area (Sub-Parcel A3-1), and samples below the proposed building footprint are highlighted in grey. PAL exceedances within the development area consisted of five inorganic compounds (arsenic, lead, cadmium, manganese, and hexavalent chromium), three VOCS (trichloroethene, 1,2-dibromo-3-chloropropane, and 1,4-dichlorobenzene), seven SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenz[a,h]anthracene, benzo[k]fluoranthene, indeno[1,2,3-c,d]pyrene, and naphthalene), two PCBs groups (total PCBs and Aroclor 1254), and Oil & Grease.

During the completion of the Phase II soil borings associated with Sub-Parcel A3-1, soil cores were screened for evidence of possible non-aqueous phase liquid (NAPL) contamination. The screening observations were noted on the boring logs, and several sample locations had visible sheens or NAPL noted in the soil cores. The potential presence of NAPL warranted an evaluation of the potential for product mobility, discussed in Section 3.5.

3.2.2. Summary of Groundwater Results

Ten existing groundwater monitoring wells (shallow and intermediate) were sampled within the boundary of Sub-Parcel A3-1, and eight temporary shallow groundwater sample collection points were installed to facilitate the collection of additional samples. **Table 3** and **Table 4** present a summary of the organic compounds and inorganics detected in the groundwater samples, and **Figure GW-1** through **Figure GW-7** present all groundwater sample results that exceeded the PALs. Groundwater PAL exceedances consisted of 11 inorganic compounds (antimony, arsenic, cadmium, cobalt, iron, manganese, thallium, vanadium, zinc, hexavalent chromium, and cyanide), two VOCs (1,1-dichoroethane and trichloroethene), five SVOCs (benzo[a]anthracene, benzo[b]fluoranthene, pentachlorophenol, naphthalene, and 1,4-dioxane), TPH-DRO, and Oil & Grease. While the concentrations of these PAL exceedances on-site are not deemed to be a human health hazard since there is no groundwater use, proper water management is required to prevent unacceptable discharges or risks to on-site workers. The most severe impacts appeared to be caused by inorganics in the northern section of the Rod and Wire Mill. This area is currently under interim remedial measures to clean up known groundwater impacts (metals – primarily zinc and cadmium) caused by past uses of the property.

While performing inspections of select, existing groundwater monitoring wells on September 21, 2015, a light non-aqueous phase liquid (LNAPL) was discovered in shallow groundwater monitoring well RW22-PZM; which is located in the northwest portion of the Site. The thickness of the LNAPL in RW22-PZM, which is screened from 9.5 to 19.5 feet bgs, was measured with an oil-water interface probe and determined to be approximately 11 feet thick. The discovery of the LNAPL warranted additional field delineation, discussed in Section 3.3.

3.3. ADDITIONAL INVESTIGATIONS

Additional field investigations were warranted to provide supplemental information for the evaluation of Sub-Parcel A3-1 following the completion of the Phase II Investigation. The objectives of the additional investigations were to characterize current soil and groundwater conditions in the interim measures area, determine the nature and extent of three elevated soil detections (arsenic/lead) which were recommended for delineation by the agencies, to fill in a groundwater data gap for hexavalent chromium, and to delineate the extent of LNAPL discovered in RW22-PZM.

3.3.1. Pre-Design Investigation and Interim Measures Work Plan

An Interim Measure to address known impacts to groundwater is currently in operation and undergoing upgrades in the northern portion of Parcel A3. A Pre-Design Investigation (PDI) was completed concurrently with the Phase II Investigation to further characterize this portion of the Site to facilitate the design of enhancements to improve the effectiveness of the Interim Measure.

The Pre-Design Investigation included the completion of 18 additional soil borings in the northern portion of the Site. Of these 18 boring locations, 14 were completed to a total depth of 35 feet for the purpose of investigating the current extent of metals contamination. The former East Pond and former Sludge Bin Storage Area were the primary focus of the Pre-Design Investigation based upon historical reporting. The remaining four locations were geotechnical borings completed to a minimum depth of 50 feet bgs for the purpose of characterizing soils for the possible alignment of a permeable-reactive barrier (PRB) wall for the treatment of groundwater. The 14 borings completed via Geoprobe® were analyzed for TAL-metals, and a grain size analysis and soil classification was also performed. Select locations associated with the East Pond were also analyzed for their fraction of organic carbon (FOC). The four geotechnical borings were installed using hollow stem augers. Generally, samples collected using split-spoons were analyzed for FOC, while those collected with shelby tubes were analyzed for bulk density, total porosity, grain size analysis (and soil typing), and permeability. A large composite sample (56 lbs) was delivered to PeroxyChem for bench-scale testing related to the possible future design of a groundwater treatment PRB wall. A total of five existing site-wide wells in the intermediate hydrogeologic zone (included in the Parcel A3 Phase II Investigation) were included in the separate PDI. Four temporary groundwater sample collection points were also installed in the intermediate hydrogeologic zone. Groundwater samples in the PDI were analyzed for total organic carbon (TOC), total dissolved solids (TDS), biological oxygen demand (BOD), chemical oxygen demand (COD), total metals, sulfide, sulfate, ferrous iron, nitrate-N, and alkalinity. In addition, dissolved oxygen (DO), oxidation-reduction potential (ORP), and pH were collected in the field during groundwater purging. Results from this investigation are reported in the Pre-Design Investigation Rod and Wire Mill Characterization Report prepared by ARM dated June 10, 2016. The analytical results from the Pre-Design Investigation Geoprobe® borings and groundwater samples are provided in supplemental tables and figures in **Appendix B**.

A supplemental field investigation was performed by Advanced GeoServices following the completion of the Parcel A3 Phase II Investigation and Pre-Design Investigation. The purpose of this additional work was to obtain design parameters in support of the selection and design of an appropriate remedial measure to address metals contamination identified in the northern portion of Parcel A3. This work included several test pit excavations, additional soil and groundwater sample analyses, a soil-reagent treatability study, and a groundwater pH titration study. Based on the findings of the supplemental investigation, a strategy for addressing the elevated metals (cadmium and zinc) in the intermediate groundwater zone was developed. The strategy includes the construction of staggered/offset treatment trenches which will be filled with alkaline reagents (Terrabond^{MG} and limestone aggregate). These reagents will react with the acidic groundwater to create slightly alkaline conditions within the aquifer and remove dissolved cadmium and zinc from solution. The findings of the supplemental investigation and proposed treatment plan are provided in the Interim Measure Work Plan, In-Situ Groundwater Treatment prepared by Advanced GeoServices dated August 22, 2016.

3.3.2. Supplemental Soil Delineation Results

Additional investigation activities were completed to assess the magnitude and extent of elevated arsenic and lead concentrations reported in borings RW-021-SB (arsenic), and RW-052-SB and RW-055-SB (lead). Delineation levels were established for the supplementary fieldwork for arsenic and lead as 300 mg/kg and 2,000 mg/kg, respectively. This supplemental delineation fieldwork was conducted between June 27 and June 29, 2016 for each of the locations. Additionally, composite soil samples were collected and analyzed for TCLP metals to characterize the soil for potential disposal at the on-site non-hazardous industrial landfill or off-site at a permitted facility.

Following the identification of all utilities in the study area, a track-mounted Geoprobe® direct push rig was utilized to collect continuous core soil samples based on a grid interval of 25 feet; which was centered on each of the elevated soil locations. At each location, continuous core soil samples were collected to a depth of up to 10 feet bgs and screened with a hand-held X-ray fluorescence (XRF) instrument; which provided real-time results for arsenic and lead in soil. The field operator screened each 1-foot interval of the soil core and recorded the reading for arsenic/lead on a field form. Calibration of the XRF is performed in the factory, but calibration checks were completed in the field at the start of each testing period using a calibration clip and NIST Standard 2709a. The sampling grid was adjusted in the field based on the real-time detections reported by the XRF. After soil sampling or screening had been concluded at a location, each hole was backfilled with bentonite chips and down-hole soil sampling equipment was decontaminated according to procedures specified in the QAPP.

The first location to be completed for each delineation corresponded to the sample location collected during the Phase II Investigation (RW-021-SB, RW-052-SB, or RW-055-SB). Following the initial location, additional screening borings were completed based on a grid interval of 25-feet, which was modified as needed based on observed soil concentrations. Once a level below the delineation threshold for arsenic (300 mg/kg) and/or lead (2,000 mg/kg) was identified surrounding the initial location, the delineation was deemed to be complete. **Table 5** presents the results of the arsenic and lead concentrations recorded with the XRF instrument. The location of each completed soil boring was recorded using a hand-held GPS unit, and is provided on **Figure 6** or **Figure 7**. These figures show the lateral extent of the soil concentrations above the delineation levels at any sample depth.

The total surface areas for the delineations associated with soil borings RW-021-SB, RW-052-SB, and RW-055-SB were determined to be approximately 590 ft^2, 30,380 ft^2, and 390 ft^2, respectively. The impacts centered on RW-021-SB and RW-052-SB had elevated detections in soil to a maximum depth of 5 feet bgs, while the impacts associated with RW-055-SB had elevated detections to a total depth of only 3 feet bgs. Based on these depths, the volumes of soil above the delineation levels for arsenic and/or lead associated with soil borings RW-021-SB,

RW-052-SB, and RW-055-SB were conservatively estimated at approximately 110 cubic yards (cy), 5,630 cy, and 45 cy, respectively.

During delineation, soil samples were collected from each delineation area and sent to the laboratory for analysis of TCLP metals. **Table 6** presents the results of the TCLP analysis. None of the soil samples exceeded the TCLP regulatory thresholds. Thus it is not anticipated that any material would require management under hazardous waste regulations if it was determined that excavation/disposal was necessary based on a Site risk analysis (see below).

3.3.3. Hexavalent Chromium Re-Sampling

Hexavalent chromium data was rejected for several temporary groundwater sample collection points, and represented a potential data gap as part of the initial groundwater sampling for the Phase II Investigation. Re-sampling of the temporary groundwater sampling points for hexavalent chromium was completed on June 10, 2016, and the additional data for this compound has been added to **Table 4**. Two additional detections of hexavalent chromium (both flagged with a "J" qualifier) were identified following this re-sampling. Since the PAL for hexavalent chromium is well below the laboratory reporting limit, any detection is identified as a PAL exceedance. However, as noted, hexavalent chromium was only detected in two of the eight additional groundwater samples, and only at levels below laboratory quantitation limits. Therefore, the potential data gap previously identified in the Phase II investigation has been addressed and no additional evaluation of hexavalent chromium in groundwater is necessary.

3.3.4. Light Non-Aqueous Phase Liquid (LNAPL) Delineation

Four pairs of temporary piezometers were installed and inspected in the up-gradient and down-gradient directions from RW22-PZM on October 9, 2015 to delineate the extent of the LNAPL observed in the existing well. For each pair, one piezometer was screened across an apparent perched water bearing unit that was encountered at approximately 6 feet bgs (screened from 4 to 9 feet bgs), while the other piezometer was screened within the shallow hydrogeologic unit; which was encountered at a depth of approximately 14.5 feet bgs (screened from 13 to 18 feet bgs). Four soil borings were added to the Phase II Investigation sampling plan for analytical data collection (RW-076-SB through RW-079-SB), along with two additional screening borings for visual determination of the presence/absence of LNAPL (NE Boring and SW Boring). Ten additional piezometers screened from 3 to 20 feet bgs were installed at distances ranging from approximately 6 to 25 feet from RW22-PZM between July 25 and July 28, 2016.

Since February 2016, LNAPL has periodically been removed from each of the delineation piezometers following their installation and gauging. The product removal activities that were initiated in February 2016 have been effective in reducing the LNAPL mass in the subsurface around RW22-PZM, but significant mass has persisted. A limited number of LNAPL detections were identified along the boundary of the area investigated with piezometers. Mitigation or

remediation of the LNAPL impacts in the vicinity of RW22-PZM was determined to be necessary prior to issuance of a Certificate of Completion for the Site. A response plan for these LNAPL impacts was submitted under a separate cover to the agencies for their review and approval. The RW22-PZM LNAPL Excavation Plan dated February 2, 2017 provided protocols for the excavation and disposal remedy to remove LNAPL-impacted media. Well RW22-PZM was abandoned prior to excavation, with approval from the agencies.

3.4. HUMAN HEALTH SCREENING LEVEL RISK ANALYSIS (SLRA)

3.4.1. Analysis Process

A human health Screening Level Risk Analysis (SLRA) has been conducted for soils to further evaluate the Site conditions in support of the design of necessary response measures. The SLRA was completed using the validated data collected during the Phase II Investigation (provided in **Table 1** and **Table 2**) supplemented by validated analytical data from the Pre-Design Investigation (provided in **Appendix B**), the results of which were presented in the Pre-Design Investigation Rod and Wire Mill Characterization Report (Revision 0) dated June 10, 2016. The SLRA included the following evaluation process:

Identification of Constituents of Potential Concern (COPCs): Compounds that are present at concentrations at or above the EPA Regional Screening Levels (RSLs) set at a target cancer risk of 1E-6 or target non-cancer Hazard Quotient (HQ) of 0.1 were identified as COPCs to be included in the SLRA. Although the PALs (discussed in preceding sections) remain unchanged, the COPC screening levels for PAHs were modified for the SLRA based on the USEPA Integrated Risk Information System (IRIS) Recent Additions for benzo[a]pyrene dated January 19, 2017 with adjustments for PAH relative potency factors. A COPC screening analysis is provided in **Table 7** to identify compounds above the relevant screening levels in Sub-Parcel A3-1. Validated (non-rejected) results for compounds with at least one detection are included.

Identification of Exposure Units (EUs): The Sub-Parcel A3-1 Development Area was divided into two EUs; the area Inside the Building Footprint (22.5 ac) and the remaining area Outside the Building Footprint (31.1 ac).

Exposure Point Concentrations (EPCs): The COPC soil data for each exposure unit were divided into surface (0-1 ft) and subsurface (>1 ft) depths for estimation of potential exposure point concentrations. An evaluation of pooled surface and subsurface soil data was also performed. Thus, for the Development Area of Sub-Parcel A3-1 there are three soil datasets for each EU. Relevant soil data (0 to 10 feet bgs) were included from the separate Pre-Design Investigation to increase the robustness of the dataset for COPC metals. A statistical analysis was performed for each COPC dataset using the ProUCL software (version 5.0) developed by the USEPA to determine representative reasonable

maximum exposure (RME) values for the EPC for each constituent. The RME value is typically the 95% Upper Confidence Limit (UCL) of the mean. For lead, the arithmetic mean for each depth was calculated for comparison to the Adult Lead Model-based values, and individual results exceeding 10,000 were delineated for possible excavation and removal. For PCBs, all results equaling or exceeding 50 mg/kg would be delineated for excavation and removal (if applicable). All PCB results less than 50 mg/kg are included in the EPCs and risk ratio calculations.

Risk Ratios: The surface soil EPCs, subsurface soil EPCs, and pooled soil EPCs were compared to the USEPA RSLs for the Composite Industrial Worker and to site-specific Soil Screening Levels (SSLs) for the Construction Worker based on equations derived in the USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24, December 2002). The risk ratios were calculated with a cancer risk of 1E-6 and a non-cancer Hazard Quotient (HQ) of 1. Site-specific risk-based evaluations were completed for a range of potential exposure frequencies. For each exposure frequency, risk ratios for the carcinogens were summed to develop a screening level estimate of the cumulative cancer risk. The risk ratios for the non-carcinogens were segregated and summed by target organ to develop a screening level estimate of the cumulative non-cancer hazard. These calculated risk ratios were used to determine the exposure frequency that would result in risk ratios equivalent to a cumulative cancer risk of 1E-5 or hazard index of 1 for any individual target organ.

There is no potential for human exposure to groundwater for a Composite Worker since groundwater is not used on the Tradepoint Atlantic property (and is not proposed to be utilized). In the event that construction/excavation leads to a potential Construction Worker exposure to groundwater during development, health and safety plans and procedures shall be followed to limit exposure risk.

Assessment of Lead: For lead, the arithmetic mean concentrations for surface soils, subsurface soils, and pooled soils for each EU were compared to the applicable RSL (800 mg/kg) as an initial screening. If the mean concentrations for the EU were below the applicable RSL, the EU was identified as requiring no further action for lead. If a mean concentration exceeded the RSL, the mean values were compared to calculated Adult Lead Model values (ALM Version dated 6/21/2009 updated with the 8/2/2016 OLEM Directive) with inputs of 1.7 for the geometric standard deviation and a blood baseline lead level of 0.7 ug/dL. The ALM calculation generates a soil lead concentration of 2,737 mg/kg, which is the most conservative (i.e., lowest) concentration which would yield a probability of 5% of a blood lead concentration of 10 ug/dL. If the arithmetic mean concentrations for the EU were below 2,737 mg/kg, the EU was identified as requiring no further action for lead. The lead data were evaluated as both pre- and post-

delineation mean concentrations (see Section 3.3.2). The pre- and post-delineation averages are presented for each EU in **Table 8**.

Assessment of TPH-DRO/GRO and Oil & Grease: EPCs were not calculated for TPH-DRO/GRO or Oil & Grease. Instead, the individual results were compared to the PAL set to a HQ of 1 (6,200 mg/kg). Four surface samples exceeded the Oil & Grease limit with the highest detection of 14,700 mg/kg at location RW-029-SB-1. Eight subsurface samples exceeded the Oil & Grease limit with the highest detection also noted in sample RW-029-SB in the intermediate interval (6 to 7 feet bgs) with a detection of 39,000 mg/kg. TPH was not analyzed at sample location RW-029-SB in accordance with the approved sampling plan. In addition, five borings within the Development Area had physical evidence of the potential presence of NAPL in the soil cores which represent additional exceedances of the TPH/Oil & Grease PAL: RW-003-SB, RW-029-SB, RW-045-SB, RW-052-SB, and RW-056-SB. The PAL exceedances and locations with physical evidence of NAPL are identified on **Figure S-4**. An evaluation of the potential for product mobility based on these detections and response actions is presented following the SLRA in Section 3.5.

Risk Characterization Approach: For each EU, if the baseline risk ratio for each non-carcinogenic COPC or cumulative target organ does not exceed 1 (with the exception of lead), and the sum of the risk ratios for the carcinogenic COPCs does not exceed a cumulative cancer risk of 1E-5, then a no further action determination will be recommended. The primary EPC comparisons to determine the need for possible remedial action will be the Construction Worker scenario comparisons to the surface and subsurface soil EPCs, as well as the Composite Worker comparison to the surface soil EPCs. However, no further action will only be approvable if subsurface soil EPCs are compared to the Composite Worker RSLs in addition to the Construction Worker SSLs, and the cancer and non-cancer risk estimates are equal to or less than 1E-5 and 1, respectively. Pooled soil data has also been evaluated and included for discussion.

If the baseline estimate of cumulative cancer risk exceeds 1E-5, but is less than or equal to 1E-4, then capping of the EU will be considered to be an acceptable remedy for the Composite Worker. For the Construction Worker, cumulative cancer risks exceeding 1E-5, but less than or equal to 1E-4, will be mitigated via site-specific health and safety requirements. The efficacy of capping for elevated non-cancer hazard will be evaluated in terms of the magnitude of exceedance and other factors such as bioavailability of the COPC. Similarly, for lead, if the ALM results indicate that the mean concentrations would present a 5% to 10% probability of a blood concentration of 10 ug/dL for the EU, then capping of the EU would be an acceptable presumptive remedy. The mean soil lead concentrations corresponding to ALM probabilities of 5% and 10% are 2,737 mg/kg, and

3,417 mg/kg, respectively. If capping of the identified area is not proposed, additional more detailed quantitative evaluation of risk will be required for the EU. This supplemental risk evaluation may include a selective removal (excavation) remedy to reduce site-wide cancer and/or non-cancer risks to acceptable levels.

The USEPA's acceptable risk range is between 1E-6 and 1E-4. If the sum of the risk ratios for carcinogens exceeds a cumulative cancer risk of 1E-4, further analysis of site conditions will be required including the consideration of toxicity reduction in any proposal for a remedy. The magnitude of non-carcinogen hazard exceedances and bioavailability of the COPC will also dictate further analysis of site conditions including consideration of toxicity reduction in any proposal for a remedy. In addition, if the ALM indicates that the mean concentrations would present a >10% probability of a blood concentration of 10 ug/dL for the EU, further analysis of site conditions including toxicity reduction will be completed such that the probability would be reduced to less than 10% after toxicity reduction, but before capping.

3.4.2. Sub-Parcel A3-1 Development Area SLRA Results and Risk Characterization

The soil data were divided into three datasets (surface, subsurface, and pooled) for each EU in Sub-Parcel A3-1 to evaluate potential current and future exposure scenarios. The current Composite Worker will be exposed only to surface soils. However, if construction activities were to result in the placement of subsurface material over existing surface soils, a future Composite Worker could be exposed to a mixture of surface and subsurface soils. The Construction Worker may be exposed only to surface soils, but subsurface soils would be encountered for development activities that involve soil disturbances such as excavations or other intrusive earth-moving activities. The pooled data may be applicable for future development plans that involve disturbances of the surface soil, since workers would likely not be exposed solely to the subsurface soil.

The results for thallium, 1,2-dibromo-3-chloropropane, and 1,4-dichlorobenzene were eliminated as soil COPCs for risk assessment because these compounds were very infrequently detected in Sub-Parcel A3-1 based on the validated (non-rejected) Sub-Parcel A3-1 dataset collected during the Phase II Investigation. Thallium was only detected in 3% of the samples analyzed for this compound (4 samples out of 121), 1,2-dibromo-3-chloropropane was only detected in 0.8% of samples analyzed for this compound (1 sample out of 119), and 1,4-dichlorobenzene was also only detected in 0.8% of samples analyzed for this compound (1 sample out of 119). If the detection frequency of an analyte is less than 5% in a dataset with a minimum of 20 samples, the COPC can be eliminated from the risk analysis assuming the detections are not extremely high (based on agency discretion). A single detection that is extremely high could require delineation rather than elimination. In this case it is reasonable to remove these three compounds from the risk assessment based on the relatively low magnitude of the detections. Total PCBs include the

sum of all individual PCB mixtures, and the carcinogenic screening level for total PCBs is as conservative as Aroclor 1254. To avoid double-counting the carcinogenic risk associated with PCBs, Aroclor 1254 was omitted from the carcinogenic risk analysis. It was included for the purpose of evaluating non-cancer hazard. All remaining COPCs listed in **Table 7** have been retained for the risk assessment.

EPCs were calculated for each soil dataset (i.e., surface, subsurface, and pooled surface/subsurface) for each EU. ProUCL output tables (with computed UCLs) derived from the data for each COPC in soils are provided as electronic attachments, with computations presented and EPCs calculated for COPCs within each of the three datasets for each EU. The ProUCL input tables are also included as electronic attachments. The results were evaluated to identify any samples that may require additional assessment or special management based on the SLRA approach. The calculated EPCs are shown in **Table 9** (surface soils) and **Table 10** (subsurface soils). **Table 11** presents the supplemental EPCs generated from the pooled surface/subsurface soils for each EU. As indicated above, the EPCs for lead are the average (i.e., arithmetic mean) values for each dataset. The average lead concentrations for each dataset are given in **Table 8**, and an evaluation spreadsheet with the lead calculations is included in the electronic attachments.

As indicated on **Table 8**, the arithmetic mean concentration of lead exceeded the RSL of 800 mg/kg in the surface (and pooled) soils from within the future building footprint, prior to any additional delineation activities. However, the average concentration (1,842 mg/kg) did not exceed the acceptable threshold of 2,737 mg/kg (the lowest concentration calculated by the Adult Lead Model corresponding to a 5% probability of a blood lead level of 10 ug/dL) to identify the EU for no further action. Two detections of lead exceeded 10,000 mg/kg, warranting additional assessment and characterization activities (RW-055-SB-1 with 44,700 mg/kg and RW-052-SB-5 with 16,400 mg/kg). Supplemental delineation activities were completed for these two locations, along with a third location (RW-021-SB-1) to investigate elevated arsenic (492 mg/kg) based on direct agency guidance. Site EPCs did not include the XRF field screening data obtained during the supplemental delineation activities completed in the Development Area. All delineation areas were located within the proposed footprint of the future building. The delineation procedure raised the arithmetic mean concentration for subsurface lead in the future building footprint above 800 mg/kg, but none of the average lead values (pre- or post-delineation) exceeded 2,737 mg/kg. The risk analysis approach specifies that if the results of the ALM indicate that the mean concentrations would present less than a 5% probability of a blood concentration of 10 ug/dL (i.e. 2,737 mg/kg), then no further action would be warranted.

No removal of lead-impacted material is required to meet the acceptable risk criteria for leaving the material in place beneath a cap. However, as an additional conservatism, removal of the soil with a lead concentration in excess of 10,000 mg/kg is proposed to achieve a significant reduction of contaminant mass and further mitigate the risk of lead exposures for any future workers. This soil removal along with the proposed environmental capping and associated

institutional controls will be protective of future site workers for Sub-Parcel A3-1. The excavation and removal of select locations with elevated lead is presented in a separate Lead and NAPL/Oil & Grease Delineation and Excavation Work Plan dated March 1, 2017.

Composite Worker Assessment:

Risk ratios for the estimates of potential EPCs for the Composite Worker scenario for both exposure units are shown in **Table 12** (surface), **Table 13** (subsurface), and **Table 14** (pooled surface and subsurface soils). The results are summarized as follows:

Outside Building Footprint			
Worker Scenario	**Medium**	**Hazard Index (>1)**	**Total Cancer Risk**
Composite Worker	Surface Soil	none	3E-5
Composite Worker	Subsurface Soil	none	3E-5
Composite Worker	Surface & Subsurface Soil	none	2E-5

Inside Building Footprint			
Worker Scenario	**Medium**	**Hazard Index (>1)**	**Total Cancer Risk**
Composite Worker	Surface Soil	none	4E-5
Composite Worker	Subsurface Soil	none	8E-6
Composite Worker	Surface & Subsurface Soil	none	1E-5

The risk ratios indicate that the cumulative cancer risks for the Composite Worker scenario were equal to 3E-5 (Outside Building Footprint) and 4E-5 (Inside Building Footprint) for surface soils in the development area. The subsurface cumulative cancer risks were equal to 3E-5 and 8E-6 for the EUs Outside of the Building Footprint and Inside of the Building Footprint, respectively. When the pooled surface and subsurface soil data were evaluated, the carcinogenic risks were computed as 2E-5 (Outside Building Footprint) and 1E-5 (Inside Building Footprint). For the Composite Worker exposure to surface, subsurface, and pooled soils, no target organs had a cumulative non-cancer Hazard Index (HI) above 1 for either EU.

Based on the risk ratios for Sub-Parcel A3-1, environmental capping (100%) is an acceptable remedy to be protective of future Composite Workers for the surface, subsurface, and pooled exposure scenarios. The carcinogenic risk estimates for the Composite Worker did not exceed 1E-4, indicating that the proposed capping remedy will provide adequate protection from carcinogens in the soil. The non-carcinogenic hazards did not exceed the regulatory standards identified in the Risk Characterization Approach. Capping and institutional controls (to maintain the integrity of the cap) are suitable measures for the protection of the future Composite Worker for both cancer and non-cancer risks.

Construction Worker Assessment:

According to the work schedule provided by Tradepoint Atlantic, intrusive activities (i.e., activities that involve disturbance of impacted soil performed by Construction Workers outside of enclosed vehicle cabs) are expected to include the following specific milestones:

- Sanitary Sewers – 3 weeks;
- Underground Water System – 6 weeks;
- Underground Stormwater System – 12 weeks;
- Underground Sanitary Distribution – 3 weeks;
- Underground Electric Distribution – 3 weeks;

The proposed duration is indicated as 135 work days (27 weeks), but much of the work will be performed concurrently. Based on the proposed development schedule, intrusive activities will be completed within a span of 80 consecutive work days (16 weeks). Furthermore, no utility installation activities are currently proposed below the proposed building, indicating that intrusive activities will be limited to the EU Outside the Building Footprint.

A preliminary analysis indicated that the maximum allowable exposure frequency in the EU Outside the Building Footprint would be limited primarily by elevated cadmium concentrations in distinct areas of the Site (the former East Pond, Sludge Bin Storage Area, and Northwest Pond). Therefore, mitigation of cadmium impacts (via excavation and disposal) in select areas of the Site will be required to facilitate intrusive construction activities. Risk ratios were recalculated to determine the total exposure frequency that would result in potentially unacceptable risks after removal of elevated cadmium from areas of proposed intrusive activities within the identified areas.

Excluding the non-cancer hazard posed to the urinary system due to elevated cadmium, acceptable exposures below the regulatory thresholds for an individual performing intrusive activities outside of vehicle cabs in the EU Outside the Building Footprint and EU Inside the Building Footprint are estimated to be 120 work days and 60 work days, respectively. Exposure

frequencies of 120 work days and 60 work days are equivalent to 24 weeks and 12 weeks, respectively, based on an expected schedule of work for an individual who is employed on the Site (with comprehensive leave and holidays). In order for these durations to be implemented, the non-cancer hazard associated with cadmium would need to be mitigated via excavation and removal (if not done so already) in the proposed intrusive work area, discussed below. These allowable durations of 120 days and 60 days for the individual EUs would not be additive, and do not represent a maximum allowable schedule of work (i.e., 180 days) to be completed consecutively by a site worker. If the total duration of intrusive work would exceed 120 days in the EU Outside the Building Footprint or 60 days in the EU Inside the Building Footprint, the work would need to be completed by separate crews or additional health and safety protections would be required.

Risk ratios for the estimates of potential EPCs for the Construction Worker scenario (120-day and 60-day exposure frequencies for EUs Outside the Building Footprint and Inside the Building Footprint, respectively) are shown in **Table 15** (surface), **Table 16** (subsurface), and **Table 17** (pooled surface and subsurface soils). The variables entered for calculation of the site-specific SSLs (EU area, input assumptions, and exposure frequency) are indicated as notes on the tables. The spreadsheets used for computation of the site-specific 120-day and 60-day Construction Worker SSLs are included in **Appendix C**.

The results for the Construction Worker exposure scenarios evaluated for these durations are summarized as follows:

Outside Building Footprint			
Worker Scenario	**Medium**	**Hazard Index (>1)**	**Total Cancer Risk**
Construction Worker (120 work day schedule)	Surface Soil	Urinary System = 2*	3E-6
	Subsurface Soil	Urinary System = 2*	3E-6
	Surface & Subsurface Soil	none	2E-6

*The elevated HI for the urinary system is acknowledged. The hazard is caused by elevated cadmium within the former East Pond, Sludge Bin Storage Area, and Northwest Pond. Delineation and mitigative excavations will be completed along any proposed utility corridors through these areas such that a Construction Worker will not be exposed to soil containing cadmium at levels that would cause an HQ/HI above 1.

Inside Building Footprint			
Worker Scenario	**Medium**	**Hazard Index (>1)**	**Total Cancer Risk**
Construction Worker (60 work day schedule)	Surface Soil	none	2E-6
	Subsurface Soil	none	6E-7
	Surface & Subsurface Soil	none	6E-7

The carcinogenic risks for surface soils were computed to be 3E-6 (Outside Building Footprint) and 2E-6 (Inside Building Footprint) using the 120-day and 60-day exposures, respectively. For the same exposure frequencies to isolated subsurface soils, the cumulative cancer risks were computed to be 3E-6 (Outside Building Footprint) and 6E-7 (Inside Building Footprint). When the pooled surface and subsurface data were considered, the carcinogenic risks for the exposure units were equal to 2E-6 (Outside Building Footprint) and 6E-7 (Inside Building Footprint). Based on the 120-day and 60-day exposure frequencies, the carcinogenic risks for the surface, subsurface or pooled datasets evaluated for both EUs did not exceed 1E-5, the acceptable level for no further action as defined in the Risk Characterization Approach. Therefore, if the cumulative duration of intrusive construction activities in the two EUs (performed by separate crews) do not exceed these exposure durations, no additional worker protections would be required for carcinogens. Since the proposed schedule of intrusive activities is anticipated to require 80 days in the EU Outside the Building Footprint, no additional health and safety controls are required to mitigate potential carcinogenic risk.

Evaluation of the cumulative non-cancer hazards for the proposed exposures indicated that cumulative HI values exceeded 1 for surface and subsurface soils in the EU Outside the Building Footprint for the urinary system. Cumulative urinary system HI values of 2 were determined for both surface soils and subsurface soils in this EU for 120-day exposure due to elevated cadmium (the cumulative HI for pooled soils was equal to 1 for the urinary system). This assessment indicates that mitigative action is appropriate to address potential non-cancer hazard from the intrusive activities planned for Sub-Parcel A3-1 for an exposure duration of 120 days in the EU Outside the Building Footprint.

Cadmium Removal Assessment and Plan:

The estimated EPCs for cadmium in surface and subsurface soil are heavily skewed by elevated cadmium identified within the Rod and Wire Mill interim measures (IM) area, and more specifically by conditions in the former East Pond, Sludge Bin Storage Area,

and Northwest Pond. Therefore, Exclusion Zones are proposed inclusive of, and limited to, the boundaries of the former East Pond, Sludge Bin Storage Area, and Northwest Pond (**Figure 8**). Selective removal of cadmium impacted material within these Exclusion Zones will be completed, where necessary, to mitigate Construction Worker risk and achieve the schedule of 120 days in the EU Outside the Building Footprint.

A supplemental exposure scenario was evaluated to determine the resulting urinary system HI if the cadmium data within the Exclusion Zones was omitted from the risk ratio calculations. This evaluation determined that the exclusion of this data achieved an allowable cadmium exposure for the EU Outside the Building Footprint. Acceptable risk will be achieved for a Construction Worker in the EU Outside the Building Footprint if the worker is not exposed to cadmium impacted material above 934 mg/kg (the maximum concentration of cadmium equivalent to a Construction Worker HI of 1). There were no soil borings outside of the Exclusion Zones where cadmium was detected in excess of 934 mg/kg. Therefore, delineation and excavation of material with cadmium concentrations above 934 mg/kg along the proposed utility alignments will ensure that a Construction Worker is not exposed to cadmium impacted material above HI=1. The Construction Worker protection achieved by his plan is demonstrated in the table below:

Outside Building Footprint			
Worker Scenario	**Medium**	**Current Cadmium HI***	**HI after Cadmium Removal Measure^**
Construction Worker (120 work day schedule)	Surface Soil	2	1
	Subsurface Soil	2	
	Surface & Subsurface Soil	1	

*Based on current cadmium UCLs for the full EU Outside the Building Footprint
^Based on maximum cadmium exposure during intrusive utility work of 934 mg/kg.

Soil within the former Sludge Bin Storage Area has previously been excavated to 5 feet bgs and backfilled with materials approved by the MDE. Therefore, no additional excavation is anticipated to be necessary within the boundary of this defined historical feature. Since no intrusive activities (i.e., utility alignments) are proposed in the former Northwest Pond, it is not anticipated that any excavation of material will be required within the boundary of this defined historical feature. A new proposed stormwater line is proposed through the western edge of the former East Pond. Therefore, the removal of cadmium impacted material above the allowable threshold of 934 mg/kg is proposed to be protective of Construction Workers along this utility installation.

Following mitigation of cadmium impacts within areas proposed for intrusive activities within the Exclusion Zones, the general health and safety controls used by Construction Workers across the Site (level D protection) will be adequate to mitigate potential risks for the proposed work. Institutional controls will be required to be established for the protection of future Construction Workers in the event of any future development which could include breaching of the cap. These institutional controls will need to include a written notice to the MDE of any future soil disturbance activities, health and safety requirements for any excavations, and proper management and characterization of any material removed from beneath the environmental cap.

3.4.3. Evaluation of Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Criteria

Results from the SLRA indicate that a remedy of capping with institutional controls (and selective excavation and removal of cadmium impacted soil in some work areas) will be acceptable to mitigate potential current and future Composite Worker and Construction Worker risks. The proposed capping remedy was evaluated for consistency with the CERCLA Threshold Criteria and the Balancing Criteria. The Threshold Criteria assess the overall protection of human health and the environment, as well as achievement of media cleanup objectives and control of sources of releases at the Site. The Balancing Criteria assess long-term effectiveness and permanence; reduction of toxicity, mobility or volume; short-term effectiveness; implementability; cost effectiveness; and community and State acceptance.

Threshold Criteria:

Protect Human Health and the Environment: The assessment against this criterion evaluates how the remedy, as a whole, protects and maintains protection of human health and the environment. This criterion is satisfied when response actions are complete. The purpose of this remedy is to provide a protective barrier between human site users and impacted materials, and to protect the environment by preventing surface water from contacting impacted materials in place. The capping and institutional control remedy would eliminate risk to current and future industrial workers by preventing exposure to all areas of the Site where soil concentrations exceed the Composite Worker RSLs, or where the cumulative estimated risk to the Composite Worker would exceed a cancer risk of 1E-5 or a HI of 1. Groundwater does not present a human health hazard since there is no groundwater use. Implementation of the proposed use restrictions will address the residual risk and will also protect hypothetical future Construction Workers by eliminating or controlling potential exposure pathways, thus, reducing potential intake and contact of soil and groundwater COPCs by human receptors.

Achieve Media Cleanup Objective: The assessment against this criterion describes how the remedy meets the cleanup objectives, which are risk reduction, appropriate for the expected current and reasonably anticipated future land use. The objectives are to protect

workers (current and future Composite Worker and future Construction Worker) from potential exposures to Site-related soil or groundwater constituents at levels that may result in risks of adverse health effects. Given the controlled access and use restrictions, the proposed remedy will attain soil and groundwater objectives. The activity use restrictions will eliminate current and future unacceptable exposures to both soil and groundwater. The potential groundwater impacts at the Site have been addressed within this Response and Development Work Plan (and will be further discussed in a future comprehensive groundwater study).

Control the Source of Releases: In its Resource Conservation and Recovery Act (RCRA) Corrective Action proposed remedies, USEPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. Controlling the sources of contamination relates to the ability of the proposed remedy to reduce or eliminate, to the maximum extent practicable, further releases. None of the soils remaining on-site were identified as exhibiting characteristics of hazardous waste. Sampling results did not indicate localized, discernible source areas associated with the soil and groundwater conditions observed at the Site, with the possible exception of lead at three boring locations (RW-021-SB, RW-052-SB, or RW-055-SB); cadmium in the former East Pond, Sludge Bin Storage Area, and Northwest Pond; Oil & Grease in soil at several boring locations (see Section 3.5); and free-phase LNAPL in the vicinity of one permanent well (RW22-PZM). Select areas associated with lead, cadmium, Oil & Grease, and/or NAPL contamination are proposed for excavation and appropriate disposal, as described in this Response and Development Work Plan and associated Work Plan Addendums. The potential groundwater impacts at the Site have been addressed within this Response and Development Work Plan (and will be further discussed in a future comprehensive groundwater study). The proposed environmental capping will prevent contact with soil COPCs reducing potential risks to within acceptable levels for future industrial workers. The control measures included in the proposed remedy, such as Materials Management Plan requirements and groundwater use restrictions, provide a mechanism to control and reduce potential further releases of COPCs. This is achieved by eliminating the potential for groundwater use and requiring proper planning associated with intrusive activities.

Balancing Criteria:

Long-Term Reliability and Effectiveness: The assessment against this criterion evaluates the long-term effectiveness of the remedy in maintaining protection of human health and the environment after the response objectives have been met. The primary focus of this criterion is the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. The capping remedy will permanently contain the contaminated media in place. In order for the cap to

effectively act as a barrier, regular inspections will be required to determine if erosion or cracks have formed that could expose workers to contaminated soils. Institutional controls (deed restrictions) will be implemented to protect future Composite and Construction Workers against disturbances of the cap that might lead to inadvertent contact with impacted soils. The proposed remedy will maintain protection of human health and the environment over time by controlling exposure to the hazardous constituents remaining in soils and groundwater. The long term effectiveness is high, as use restrictions are readily implementable and easily maintained. Given the historical, heavily industrial uses of the Site and the surrounding area, including the presence of landfills, industrial land uses of this area and existing groundwater use restrictions are expected to continue in the long term.

Reduction of Toxicity, Mobility, or Volume of Waste: The assessment against this criterion evaluates the anticipated performance of specific technologies that a remedial action alternative may employ. The capping remedy will prevent the spread of contaminants in wind-blown dust or stormwater and will prevent infiltration through the impacted unsaturated zone from carrying contaminants to the groundwater. Thus the mobility of contaminants will be reduced by the capping remedy. The proposed response actions will include the excavation and removal of select locations with elevated soil lead, cadmium, and NAPL/Oil & Grease, as well as the excavation and removal of LNAPL-impacted media in the vicinity of RW22-PZM. The toxicity and volume of impacted material will be reduced by this removal and off-site disposal. The proposed capping remedy will avoid the short term risks associated with excavating and transporting large quantities of soil which might otherwise be removed for risk mitigation.

Short-term Effectiveness: The assessment against this criterion examines how well the proposed remedy protects human health and the environment during the construction and implementation until response objectives have been met. This criterion also includes an estimate of the time required to achieve protection for either the entire site or individual elements associated with specific site areas or threats. The capping remedy will be implemented within several months of the start of work. The results of the SLRA indicate that risks to the Construction Worker during remedy implementation are mitigated based on the proposed schedule for intrusive construction activities, combined with selective removal of cadmium impacted soil in some work areas. The short-term risk to site workers during implementation of the remedy will be low, leading to a high level of short-term effectiveness for protection of future site users and the environment. Short-term effectiveness in protecting on-site workers and the environment will be achieved through establishing appropriate management, construction, health and safety, and security procedures. Proper water management protocols will be implemented to prevent discharges offsite. Security and fences will be used to maintain controlled access

during construction of soil and cap structures to be protective of site visitors. Proper installation of the cap will be performed in accordance with design specifications.

Implementability: The assessment against this criterion evaluates the technical and administrative feasibility, including the availability of trained and experienced personnel, materials, and equipment. Technical feasibility includes the ability to construct and operate the technology, the reliability of the technology, and the ability to effectively monitor the technology. Administrative feasibility includes the capability of obtaining permits, meeting permit requirements, and coordinating activities of governmental agencies. The proposed capping remedy uses readily available standard capping techniques including asphalt/concrete paving technology in surfaced areas and a geotextile marker fabric covered by clean fill in landscaped areas.

Cost Effectiveness: The assessment against this criterion evaluates the capital costs, annual Operating and Maintenance (O&M) costs, and the net present value (NPV) of this remedy relative to other alternatives. The capping remedy has relatively low capital and O&M costs and much of the remedial costs would be incurred as part of the proposed site development, regardless of the presence of impacted soil.

State/Support Agency Acceptance: MDE has been involved throughout the Site investigation process. The proposed use restrictions included in the proposed remedy are generally recognized as commonly employed measures for long-term stewardship. Ultimately State/MDE support will be evaluated based on comments received during the public comment period.

A capping remedy with institutional controls would satisfy the CERCLA Threshold Criteria and Balancing Criteria and would do so in a manner that ensures rapid and reliable implementation and effectiveness. The remedy is cost-effective and consistent with the proposed development plan for the Site.

3.5. SOIL MIGRATION ASSESSMENT FOR NAPL AND ELEVATED OIL & GREASE

Oil & Grease by Method 9071B was being specified for each soil analysis rather than TPH-DRO/GRO at the time that the Parcel A3 Phase II Investigation Work Plan was approved. The Oil & Grease method was specified at the time as being more conservative, because it is suitable for identifying non-petroleum hydrocarbon impacts, as well as detecting petroleum impacts. There were 12 samples (from 11 boring locations) where Oil & Grease was detected above the screening level of 6,200 mg/kg. These samples include the following: RW-004-SB-5 at 12,400 mg/kg, RW-010-SB-7 at 22,300 mg/kg, RW-025-SB-1 at 8,190 mg/kg, RW-029-SB-1 at 14,700 mg/kg, RW-029-SB-7 at 39,600 mg/kg, RW-033-SB-1 at 7,200 mg/kg, RW-040-SB-1 at 7,870 mg/kg, RW-041-SB-5 at 13,700 mg/kg, RW-045-SB-5 at 6,330 mg/kg, RW-047-SB-6 at 8,630 mg/kg, RW-052-SB-5 at 7,130 mg/kg, and RW-055-SB-5 at 26,100 mg/kg.

TPH-DRO/GRO was also analyzed at two of the locations with elevated Oil & Grease (RW-010-SB and RW-033-SB), and this analysis confirmed that petroleum was not present. The maximum detection of TPH on Sub-Parcel A3-1 was 956 mg/kg DRO in sample RW-033-SB-1. The only sample location where GRO was detected was at sample location RW-033-SB-6.5 at 9.5 mg/kg. In addition, there were two locations on the parcel (RW-003-SB and RW-056-SB) where elevated Oil & Grease were not observed, but potential evidence of NAPL was noted in the soil core screening.

Soil cores were screened for evidence of possible NAPL contamination during the completion of the Phase II soil borings associated with Sub-Parcel A3-1. The screening observations were noted on the boring logs, and several sample locations had visible sheens or NAPL noted in the soil cores. Five locations had physical evidence of possible product, including RW-003-SB, RW-029-SB, RW-045-SB, RW-052-SB, and RW-056-SB. The locations with physical evidence of NAPL are identified on **Figure S-4**. Physical evidence of NAPL included the following:

- Sample location RW-003-SB had observations of NAPL in the soil core from 7.5 to 8 feet. Laboratory samples were collected from the intermediate interval in RW-003-SB from 4 to 5 feet based on the Photo Ionization Detector (PID) screening results. The intermediate interval (RW-003-SB-5) had an Oil & Grease detection of 360 mg/kg.

- Sample location RW-029-SB had observations of the appearance of NAPL in the soil core from 6 to 7 feet. Laboratory samples were collected within the corresponding 6 to 7 foot interval in RW-029-SB. The intermediate sample (RW-029-SB-7) had an Oil & Grease detection of 39,600 mg/kg.

- Sample location RW-045-SB had an observed sheen in the soil core from 2.7 to 3.2 feet. The 0 to 1 foot sample had a detection of 616 mg/kg of Oil & Grease, and the intermediate sample interval from 4 to 5 feet (just below the impacted interval) had an Oil & Grease detection of 6,330 mg/kg.

- Sample location RW-052-SB had the appearance of a black sheen and possible NAPL in the soil core from 3 to 5 feet. Laboratory samples were collected from 4 to 5 feet within the impacted interval. The intermediate sample (RW-052-SB-5) had an Oil & Grease detection of 7,130 mg/kg.

- Sample location RW-056-SB had the appearance of black water and potential NAPL in the soil core from 3 to 7 feet. Laboratory samples were collected from 4 to 5 feet within this interval, and the reported Oil & Grease result (1,050 mg/kg), was well below the screening limit.

Oil & Grease detections in excess of 6,200 mg/kg will be 1) delineated for excavation; or 2) assessed in a detailed manner relative to the development plan (plotted in comparison to all

proposed utilities and water conveyance systems); and 3) evaluated for potential NAPL mobility. This evaluation and a procedure for planned work to delineate and possibly excavate and remove soil from select locations with evidence of NAPL and/or elevated levels of potentially mobile Oil & Grease are presented in the separate Lead and NAPL/Oil & Grease Delineation and Excavation Work Plan dated March 1, 2017.

3.6. MANAGEMENT OF PCB-CONTAMINATED MEDIA

Soils or contaminated media on the Tradepoint Atlantic property containing total PCB concentrations less than 50 mg/kg may be left in place if paved or otherwise capped. The Toxic Substances Control Act (TSCA) low and high occupancy standards will not apply to structures serving as engineered barriers. All soil exceeding 50 mg/kg of total PCBs must be excavated and transported to a permitted off-site commercial landfill approved to accept TSCA-regulated remediation waste. No samples within Sub-Parcel A3-1 exceeded this regulatory threshold for PCBs, and no additional action is necessary prior to development.

3.7. GROUNDWATER QUALITY ASSESSMENT

3.7.1. Analysis Process

An evaluation of groundwater quality relative to vapor intrusion criteria and ambient surface water quality criteria has been conducted to further evaluate the significance of detected groundwater concentrations in support of the design of necessary response measures. The groundwater quality analysis was completed using the validated data collected during the Phase II Investigation. Analytical data for each individual well were compared to potentially relevant screening criteria. The groundwater quality assessment included the following evaluation process:

Comparison to Vapor Intrusion Criteria: Groundwater data were screened to determine whether individual sample results may exceed the USEPA Vapor Intrusion (VI) Screening Levels (Target Cancer Risk (TCR) of 1E-5 and Target Hazard Quotient (THQ) of 1) as determined by the Vapor Intrusion Screening Level (VISL) Calculator version 3.5.1 (https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-levels-visls). A cumulative VI risk analysis was also performed. Sample results were segregated based on cancer versus non-cancer risk, and a risk ratio was estimated for each detection by comparing the detected value to the VI TCR or THQ level. All detections were used in the evaluation of the cumulative cancer risk, and detections exceeding 10% of the THQ level were included in the evaluation of non-cancer risk. Exceedances of the cumulative criteria would be noted if the total cancer risk exceeded 1E-5 or the Hazard Index (summed by target organ) exceeded 1 for any individual sample location. The results were also analyzed based on whether the samples were collected from within or outside of the proposed building footprint. The position of the

groundwater samples inside/outside the building footprint would impact the potential vapor intrusion risk for future workers.

Comparison to Surface Water Criteria: Data from the perimeter wells and piezometers (adjacent to Bear Creek) were screened against the USEPA National Recommended Water Quality Criteria (NRWQC) (USEPA 2009) for ecological risk (Salt Water Aquatic Life Continuous Criterion Concentration) and human health risk (Consumption of Organism Only). This screening conservatively identifies parameters and locations that may present a concern with respect to discharges of groundwater to surface water; however, it should not be considered an indication of actual surface water quality in that it does not consider any mixing zone effect. Only perimeter well locations adjacent to Bear Creek were screened against the NRWQC since the results from these locations would be more representative of potential groundwater discharge to surface water. These perimeter locations include RW-011-PZ, RW-025-PZ, RW19-PZM000, RW19-PZM020, RW20-PZM000, and RW20-PZM020. For conservative purposes in this screening evaluation, total cyanide results were used as opposed to free cyanide or cyanide amenable to chlorination as is specified in the NRWQC.

3.7.2. Sub-Parcel A3-1 Development Area Groundwater Screening Results

The comparisons of the individual groundwater sample results against the screening criteria are summarized in **Table 18a/b** (Vapor Intrusion) and **Table 19** (Surface Water Quality), with the exceedances of each criteria highlighted.

The only parameter which exceeded the individual VI THQ criteria was total cyanide, which was detected above the acceptable VI limit (3.5 µg/L) at four groundwater locations (**Table 18a**). The VI risks were conservatively screened using total cyanide rather than free cyanide or cyanide amenable to chlorination. The fraction of free cyanide that would contribute to VI risk would be expected to be significantly lower than the total cyanide. All of the exceedances were noted in the shallow hydrogeologic zone. Each location was positioned outside of the proposed building footprint, with the exception of a relatively minor exceedance (18 µg/L) in RW-021-PZ. The highest detection was observed at groundwater well RW19-PZM000 (1,330 µg/L), which is located along the northwest edge of the parcel. The well and piezometer locations which exceeded the individual VI criteria due to elevated total cyanide are shown in **Figure GW-8**. None of the individual sample results exceeded the VI TCR criteria, and none of the cumulative VI cancer risks were greater than 1E-5 when the results were summed by sample location. There were three locations where the screening level estimates of cumulative VI non-cancer hazard exceeded 1 (rounded to one significant digit), each caused by the individual detections of total cyanide. The results of the cumulative VI comparisons are provided in **Table 18b**, with the exceedances highlighted.

Results from six groundwater sample locations adjacent to Bear Creek (RW-011-PZ, RW-025-PZ, RW19-PZM000, RW19-PZM020, RW20-PZM000, and RW20-PZM020) exceeded the recommended salt water surface water chronic criteria for at least one compound. Fifteen (15) analytes (total arsenic, total/dissolved aluminum, benzo[a]anthracene, benzo[a]pyrene, total cadmium, total cobalt, total copper, total cyanide, total iron, total manganese, naphthalene, total nickel, total silver, total/dissolved vanadium, and total zinc) exceeded the Aquatic Life Salt Water Chronic criteria. Cadmium, iron, manganese, nickel, silver, and zinc were detected above their criteria exclusively in the intermediate hydrogeologic zone (RW19-PZM020 and/or RW20-PZM020). Aluminum, arsenic benzo[a]anthracene, benzo[a]pyrene, total cyanide, naphthalene, and vanadium were detected above their criteria exclusively in the shallow hydrogeologic zone (RW-011-PZ, RW-025-PZ, RW19-PZM000, and/or RW20-PZM000). Each sample location with a Salt Water Chronic exceedance of arsenic, cadmium, cobalt, copper, iron, manganese, nickel, silver, and/or zinc is positioned in the northern area of the Site currently under interim remedial measures to clean up known groundwater impacts caused by elevated metals. Three perimeter sample locations were noted with total cyanide detections above the applicable criterion for surface water (1 µg/L). RW19-PZM000 and RW20-PZM000, located in the interim measures area, had observed detections of 1,330 µg/L and 215 µg/L, respectively. RW-025-PZ, located outside of the interim measures area, had a much lower total cyanide detection of 4.5 µg/L (flagged with the "J" qualifier), less than 5 times the applicable criterion.

Groundwater samples from five of the six wells adjacent to Bear Creek exceeded at least one NRWQC Human Health for Consumption of Organism Only criterion. A total of four analytes exceeded these criteria in the selected groundwater locations (total/dissolved arsenic, total thallium, total zinc, and total cyanide). Arsenic was detected above its criterion in each of the five applicable locations (RW-011-PZ, RW-025-PZ, RW19-PZM000, RW20-PZM000, and RW20-PZM020), while thallium and zinc were detected above their applicable criteria in only one location each (RW19-PZM000 and RW20-PZM020, respectively). Detections of total cyanide of 215 µg/L at RW20-PZM000 and 1,330 µg/L at RW19-PZM000, exceeded the Consumption of Organism Only criteria. The well locations adjacent to Bear Creek are indicated in **Figure GW-9**, along with a summary of the exceedances of the ambient water quality criteria. The figures indicate if exceedances of either surface water criteria were caused by total metals (wells) or dissolved metals (piezometers).

The presence and absence of groundwater impacts within the proposed development area have been adequately described. VI risks were evaluated and identified four locations which may be impacted by elevated cyanide. The VI risks were conservatively screened using total cyanide, and the fraction of free cyanide that would contribute to VI risks would be expected to be significantly lower. Based on this conservatism and since the two wells with significant elevated cyanide detections were located west of the proposed building footprint (RW19-PZM000 and RW20-PZM000), the risk associated with the vapor intrusion to indoor air pathway is de minimis

in nature. No further analysis or additional remedial action is recommended with regard to the potential for vapor intrusion within the Development Area.

The Phase II Investigation indicated that some analytes may pose potential issues for groundwater to surface water discharges (Bear Creek) based on screening against the NRWQC surface water standards (i.e., exceeded either the aquatic life or human health criteria by greater than a factor of 10). The majority of the groundwater exceedances of the surface water standards (with the exception of relatively low-level arsenic, aluminum, benzo[a]anthracene, benzo[a]pyrene, cyanide, naphthalene, and vanadium criteria exceedances in RW-011-PZ and/or RW-025-PZ) were identified within the area currently being addressed through the implementation of groundwater remedial measures. The only analyte of potential concern to surface water identified in the perimeter groundwater sampling points outside the interim measures area (i.e., in RW-011-PZ and/or RW-025-PZ) is aluminum (dissolved) at RW-025-PZ, which exceeded the Salt Water Chronic criterion by less than a factor of 20. Although exceedances were noted, it can be estimated that groundwater discharges pose minimal impact to surface water due to downgradient attenuation and the assimilation capacity and mixing process inherent to Bear Creek. This estimation is further substantiated by the findings presented in the Phase I Offshore Investigation Report for the Sparrows Point Site prepared by EA Engineering, Science, and Technology, Inc. dated March 2016. No further analysis or additional remedial action is recommended with regard to the groundwater to surface water discharge pathway from this parcel.

4.0 PROPOSED SITE DEVELOPMENT PLAN

Tradepoint Atlantic is proposing to construct a Warehouse/Distribution Center on a portion of Sub-Parcel A3-1. This development will include improvements on approximately 54 acres of land in Sub-Parcel A3-1 east of Riverside Drive. The portion of Parcel A3 west of Riverside Drive will be addressed in separate work in accordance with the requirements of the ACO that will include a Response and Development Work Plan, if necessary. The proposed future use is Tier 3B – Restricted Industrial.

Certain compounds (organics and inorganics) are present in the soils located near the surface at concentrations in excess of the PALs. Therefore, soil is considered a potential media of concern. Future adult workers and visitors could potentially contact surface soil. Future Construction Workers may contact impacted surface and subsurface soil during earth movement activities associated with future construction activities. Potential risks to future adult workers and visitors associated with impacts to soil and groundwater exceeding the PALs will be addressed through a remedy consisting of engineering controls (capping of the entire area) and institutional controls (deed restrictions). The proposed site development plan provides for a containment remedy and institutional controls that will mitigate future adult workers and visitors from contacting impacted soil at the Site.

Groundwater impacts were identified in the northern portion of the Development Area. Groundwater in this area is being addressed by Interim Measures and associated approvals to address known groundwater impacts. No significant groundwater impacts were identified outside the area being addressed by these interim measures. While the concentrations of COPCs in groundwater on-site are not deemed to be a human health hazard since there is no groundwater use, proper water management is required to prevent unacceptable discharges or risks to Construction Workers. Work practices and health and safety plans governing groundwater encountered during excavation activities will provide protection for Construction Workers associated with future excavations at the Site. Additionally, a restriction prohibiting the use of groundwater for any purpose at the Site will be included as an institutional control in the No Further Action (NFA) letter and Certificate of Completion (COC) issued by the MDE and a deed restriction prohibiting the use of groundwater will be filed.

The proposed health and safety controls outlined in Section 5.4 and the site-specific Health and Safety Plan (HASP provided in **Appendix D**) will mitigate any potential risk to Construction Workers from contacting impacted soil and groundwater at the Site. The findings of the SLRA indicated that the screening level estimates of Construction Worker cancer risks for the site-specific 120-day (Outside Building Footprints) and 60-day (Inside Building Footprints) exposure frequencies were all less than or equal to 1E-5 (the acceptable level for no further action) for the proposed development. Potential non-cancer hazards above the HI of 1 were identified in the surface and subsurface soils (EU Outside Building Footprints) for the urinary system due to elevated cadmium. Soil borings completed in the former East Pond, Sludge Bin Storage Area,

and Northwest Pond greatly influenced the computed cadmium EPCs for surface and subsurface soils. Therefore, Exclusion Zones were proposed in the SLRA for the boundaries of the former East Pond, Sludge Bin Storage Area, and Northwest Pond. Selective removal of cadmium impacted material within these Exclusion Zones will be completed, where necessary, to mitigate Construction Worker risk and achieve the allowable schedule of 120 work days in the EU Outside the Building Footprint.

The proposed Development Area, approximately 54 acres, will be capped and covered with paving, building slabs, lined detention ponds, or landscaped cap area. The cover types are indicated in **Figure 9a**. General sections showing required minimum thicknesses for each type of cover are also provided on **Figure 9b**.

Asphalt paving will cover 19.0 acres, or 35% of the Site. Heavy duty and car parking paving sections will be used in combination to cap the paved areas as shown in **Figure 9a**. The heavy duty paving section will consist of 5 inches of asphalt over a 9-inch stone base. The car parking paving section will consist of 4 inches of asphalt over a 4-inch stone base.

The building slab will cover 22.5 acres, or 42% of the Site. Approximately 250,000 cy of processed slag aggregate sourced from the Tradepoint property will be transported to the site to raise the grade such that the building foundation does not (or minimally) disturb existing surface and subsurface materials.

Lined detention ponds will cover 1.4 acres, or 3% of the Site. Detention ponds will range from 4 feet to 8 feet in depth with an impermeable liner between clean fill and native soils. See **Appendix E** for a typical detention pond section.

Landscaped capped areas will cover 11.1 acres, or 21% of the Site. Landscaped areas will consist of a minimum of 18 inches of clean fill material covered by 6 inches of clean topsoil, to provide a minimum total cover thickness of 2 feet prior to being planted. Trees will be installed with a minimum of 2 feet of clean fill around the root ball. A geotextile marker fabric will be placed between the environmental cap or clean backfill and underlying impacted soils. See **Appendix E** for a typical landscaped areas section and specifications. Drawings for the proposed parcel development are provided in **Appendix E**. Erosion and sediment controls are shown on the Erosion & Sediment Control "Overlay" sheets in the Concept Stormwater Management Plans provided in **Appendix F** (preliminary version with former building design).

The process of constructing the proposed facility involves the tasks listed below. As-built and regulatory documentation for the outlined tasks and procedures will be provided in a Sub-Parcel A3-1 Response Action Completion Report (Completion Report):

- **Response Phase**

1. Sediment and erosion control installation for remedial measures.

Installation of erosion and sediment controls, as indicated in the Response Measures Sediment and Erosion Control Plan in **Appendix G**, will be completed prior to initiating any land disturbance for the response action at the site. Soils excavated for installation of these erosion controls will be consolidated into areas to be paved to ensure that they are capped during development.

2. Enhancement of interim measures

Work will be performed to enhance treatment of groundwater. The work described in the Interim Measure Work Plan, In-Situ Groundwater Treatment (Advanced GeoServices, August 2016) will consist of the treatment of groundwater by in-situ neutralization and attenuation of metals by mineral precipitation. The locations of the proposed treatment trenches (see Section 5.1.4) are given on **Figure 9a**.

3. Mitigation of LNAPL Impacts in the Vicinity of RW22-PZM

Mitigation or remediation of the LNAPL impacts in the vicinity of RW22-PZM was determined to be necessary prior to issuance of a Certificate of Completion for the Site. Excavation and removal of free product and NAPL-impacted materials were completed in this area. Specific methods and procedures for the response actions have been provided in the separate RW22-PZM LNAPL Excavation Plan, which was reviewed by the agencies for approval independent of this Response and Development Work Plan. The separation of this document allowed for independent review and approval of the proposed response actions. RW22-PZM (abandoned prior to response actions) will not be replaced as a flush-mount well for continued long-term monitoring. The removal of free product will be verified by gauging two piezometers near the excavation limits which were installed on March 17, 2017. The installation of these piezometers was coordinated with direct input from the MDE.

4. Well relocation/abandonment

The redevelopment activities will require the re-location of the intermediate wells RW10 and RW15 which were previously utilized as pumping wells in the remedial measures area. The Interim Measure Work Plan, In-Situ Groundwater Treatment (Advanced GeoServices, August 2016) identified the monitoring wells to be left in place after development, but some updates have been made based on recent development plans. Select wells and all temporary groundwater sampling points sampled for the Phase II investigation will be properly abandoned in accordance with Code of Maryland Regulations (COMAR) prior to grading in these areas. **Figure 10** (shallow zone) and **Figure 11** (intermediate/lower zone) show the wells and temporary groundwater sampling points (piezometers) relevant to Sub-Parcel A3-1

that are to be relocated, abandoned, or retained. If any future updates are made to the proposed well and piezometer abandonment plan, the MDE will be notified.

5. Lead and Oil & Grease excavation and removal

Lead impacted material above 10,000 mg/kg is proposed for excavation to achieve a significant reduction of contaminant mass and further mitigate the risk of lead exposures for any future workers. This removal will ensure that the proposed environmental capping for Sub-Parcel A3-1, along with the proposed institutional controls, will be protective of future site workers.

Boring locations in Sub-Parcel A3-1 with elevated Oil & Grease detections and/or evidence of NAPL have been considered for further action, and assessed in a detailed manner relative to the development plan (plotted in comparison to all utilities and water conveyance systems). Locations with Oil & Grease detections in excess of 6,200 mg/kg (or with physical evidence of NAPL) will be delineated and excavated based on this protocol.

Planned actions for the delineation, excavation, and removal of locations with elevated soil detections of lead or Oil & Grease and/or evidence of NAPL are presented in the separate Lead and NAPL/Oil & Grease Delineation and Excavation Work Plan, which was reviewed by the agencies for approval independent of this Response and Development Work Plan. The separation of this document has allowed for independent review and approval of the proposed response actions.

6. Cadmium delineation, excavation and removal

Cadmium impacted material above 934 mg/kg along proposed utility corridors within the boundaries of the Exclusion Zones (**Figure 8**) is proposed for excavation to achieve an acceptable hazard index for the Construction Worker during development. This excavation and removal will ensure that a Construction Worker will not be exposed to cadmium impacted material which could potentially exceed the allowable urinary system HI of 1 for surface and/or subsurface soils.

Delineation/excavation will be required in the former East Pond, where a stormwater utility is currently proposed along the western edge running roughly southeast to northwest. Some limited removal of cadmium impacted material may have already been completed during the installation of the groundwater treatment trenches in the IM area. Soil within the former Sludge Bin Storage Area has previously been excavated to 5 feet bgs and the excavation was backfilled with materials approved by the MDE. It will not be necessary to remove additional material from the former Sludge Bin Storage Area to achieve adequate Construction Worker protection. Since no intrusive activities (i.e., utility alignments) are

proposed in the former Northwest Pond, it is not anticipated that any excavation of material will be required in this area.

Planned actions for the delineation, excavation, and removal of material with elevated cadmium along the proposed utility corridor in the East Pond will be presented in a separate Delineation and Excavation Work Plan, which will reviewed by the agencies for approval independent of this Response and Development Work Plan. Briefly, additional soil borings will be completed to a depth to be determined by the proposed vertical alignment of the utility. Soil samples will be collected and analyzed for cadmium, and any sections of the proposed alignment which exceed 934 mg/kg will be designated for excavation. A horizontal buffer (5 feet from the edges) and vertical buffer (1 foot below the alignment) will also be excavated along impacted portions of the proposed utility, and a marker fabric/liner will be installed in the excavated trench prior to backfilling with materials approved by the MDE. If the proposed utility alignment in the former East Pond is modified, or if additional utilities are added in the former East Pond or former Northwest Pond Exclusion Zones, the MDE will be notified and additional delineation/excavation activities may be warranted.

- **Development Phase**

1. Sediment and erosion control installation for development.

Installation of erosion and sediment controls, as indicated on the Erosion & Sediment Control "Overlay" sheets in the preliminary (former building design) Concept Stormwater Management Plans provided in **Appendix F**, will be done prior to any construction at the site. Disturbed soils will be replaced on-site under areas to be paved (i.e. the proposed asphalt parking lot or concrete slabs and foundations).

2. Grading and site preparation.

Site grading will involve the excavation of approximately 40,000 cy of material, (mostly associated with the construction of stormwater ponds), and the placement of 250,000 cy of processed slag aggregate material for the building and parking areas. Any material that is not suitable for compaction will be excavated and replaced with subbase material, although it is not anticipated that poor soils will be encountered. The cut-fill balance indicates that no material should need to leave the Site, unless it is determined to be unsuitable for compaction. Borrow materials will be obtained from MDE-approved common borrow-site stockpiles or processed slag aggregate, if necessary, and shall be free of organic material, frozen material, or other deleterious material. In the case that there is excess material, the spoils will be stockpiled at a suitable location in accordance with the Materials Management Plan (MMP) for the Sparrows Point Facility (Papadopulos & Associates, et al., June 17, 2015). This work will be coordinated with MDE accordingly. No excess material will leave the 3,100 acre property without prior approval from MDE.

3. Installation of underground utility and foundation structures.

Underground utilities and foundations will be installed at the grades and lines shown on the plans. Foundations for the building are anticipated to be limited to depths of less than 5 feet below grade. Soil removed from the utility and foundation excavations will be used as fill under areas that will be paved; any water removed will be collected to be sampled as described in the MMP and, if acceptable, taken to the Tradepoint Atlantic wastewater treatment plant. If analytical results indicate the presence of levels of contaminants exceeding levels acceptable for treatment at the wastewater treatment plant, the water will either be pre-treated through an on-site treatment system and retested prior to pumping to the wastewater treatment plant or will be disposed at an appropriate off-site facility.

4. Placement of subbase.

Following the installation of stormwater and electrical utilities, the site will be fine-graded and placement of subbase will commence. The building area, parking areas, and access roads will receive a 4 to 9-inch thick layer of subbase material, which will consist of processed slag.

5. Floor slabs and paving.

Much of the site will be covered with floor slabs or paving as indicated in **Figure 9a**.

The full thickness of the pavement section (i.e., asphalt cap) to be placed over the existing soils will consist of 8 inches (4 inches of subbase and 4 inches of asphalt) in the light duty areas and at least 14 inches (at least 9 inches of subbase and at least 5 inches of asphalt) in the heavy duty areas.

6. Security and lighting.

Following the completion of paving, the contractor will install site security fencing, and will install light masts and final electrical connections.

7. Stormwater management

Stormwater will be conveyed by new piping and inlets to new proposed detention ponds (**Appendix E** and **Appendix F**). Tradepoint Atlantic plans to submit a stormwater management plan to Baltimore County that describes the new stormwater management facilities. The proposed lined detention ponds will be installed following installation of the temporary sediment and erosion controls, and the new stormwater management facilities will discharge to existing stormwater outfalls permitted under the current industrial stormwater National Pollutant Discharge Elimination System (NPDES) permit.

8. Landscaping.

Areas indicated as landscaped areas on **Figure 9a** will be covered with a marker geofabric and then surfaced with a minimum of 18 inches of clean fill material covered by 6 inches of clean topsoil, to provide a minimum total cover thickness of 2 feet prior to being planted. Greater depths of clean fill material may be added based on vegetation located at each area. Trees, if present, will be installed with 2 feet of clean fill beneath the root ball as indicated on **Figure 9b**.

5.0 DEVELOPMENT IMPLEMENTATION PROTOCOLS

5.1. RESPONSE PHASE

5.1.1. Lead and Oil & Grease Contaminated Media Excavation and Disposal

Specific protocols for the delineation, excavation, and disposal of lead and Oil & Grease impacted material are presented in the separate Lead and NAPL/Oil & Grease Delineation and Excavation Work Plan, which was reviewed by the agencies for approval independent of this Response and Development Work Plan. The separation of this document allowed for independent review and approval of the proposed response actions. An Excavation Completion Report specific to the removal of Lead and NAPL/Oil & Grease impacted material in Sub-Parcel A3-1 will be submitted to the agencies to summarize the completed remedial activities.

5.1.2. Cadmium Contaminated Media Excavation and Disposal

Specific protocols for the delineation, excavation, and disposal of cadmium impacted material will be presented in a separate Delineation and Excavation Work Plan, which will reviewed by the agencies for approval independent of this Response and Development Work Plan. The separation of this document allowed for independent review and approval of the proposed response actions. An Excavation Completion Report specific to the removal of cadmium impacted material in the Exclusion Zones will be submitted to the agencies to summarize the completed remedial activities.

5.1.3. LNAPL Contaminated Media Excavation and Disposal

Specific protocols for the excavation and disposal of materials impacted by LNAPL in the vicinity of RW22-PZM are presented in the separate RW22-PZM LNAPL Excavation Plan, which was reviewed by the agencies for approval independent of this Response and Development Work Plan. The separation of this document allowed for independent review and approval of the proposed response actions. An Excavation Completion Report specific to the removal of LNAPL impacted material in the vicinity of RW22-PZM will be submitted to the agencies to summarize the completed remedial activities.

5.1.4. Trench Installation

Treatment trenches have been installed as described in the Interim Measure Work Plan, In-Situ Groundwater Treatment (Advanced GeoServices, August 2016). All details of work done in accordance with the Interim Measure Work Plan will be submitted to the Agency's in a separate Completion Report. The treatment trenches were designed to be approximately 35 feet deep and 3 feet wide. Actual dimensions may have been modified based on field conditions and field equipment to facilitate installation of the reagent materials. An excavator was used to install the

treatment trenches. The trenches were constructed in approximately 50 to 100 foot long sections. Each section was excavated and backfilled 20 feet with the final reagent mix, and the remaining trench was backfilled up to the last 2 feet with soil spoils from the trench before the next section was started. Two feet of clean fill was placed at the end of the day to help avoid subsurface materials getting mixed into the clean fill. The non-reagent backfill was placed in a controlled area and managed appropriately. A materials management area was set up to stockpile and mix the reagents. Excess soil spoils from the trenches were also staged in this area pending TCLP testing to determine if the materials could be disposed of in the on-site landfill or whether they needed to be disposed off-site. Soil spoils not backfilled into the trenches were tested every 100 cy for TCLP metals. All soil spoils that were determined to be non-hazardous were disposed of at the on-site landfill.

5.1.5. Stockpile Controls

Individual stockpiles will remain covered whenever they are not being used to minimize dust and prevent them from becoming wet. A weighted cover system shall be used to keep the covers in place. Each stockpile will be covered at the end of each day.

5.1.6. Water Management

A 20,000 gallon frac tank and associated pumps and hoses will be set up next to the Materials Management Area on-site prior to the start of the treatment trench installation as a contingency measure in the event groundwater seepage into the trenches needs to be controlled.

Any groundwater or stormwater that must be removed during excavation will be pumped to a portable tank for transport to the Humphreys Creek Wastewater Treatment Plant, pending any required analytical testing (see Section 5.3.2).

5.1.7. Erosion and Sediment Control

Erosion and sediment controls will be established for the lead excavation and treatment trench installation in accordance with the Sediment and Erosion Control Plan for Response Measures provided in **Appendix G**. These response actions are anticipated to create relatively large areas of soil disturbance which require the project specific sediment and erosion controls specified in this attachment. The cadmium, NAPL, and Oil & Grease excavations are located within the limit of disturbance for overall site development, with controls specified below. Additional erosion and sediment controls may be necessary depending on the extent of excavation.

5.1.8. Health and Safety

A site-specific Health and Safety Plan (HASP; **Appendix D**) has been developed and is attached to this plan to present the minimum requirements for worker health and safety protection for the

project. The existing HASP will be followed by the prime remediation contractor. The remediation contractor will develop, as necessary, addendums to the existing site HASP.

5.2. DEVELOPMENT PHASE

This plan presents protocols for the handling of soils and fill materials in association with construction of the warehouse facility of Sub-Parcel A3-1. In particular, this plan highlights the minimum standards for construction practices and managing potentially contaminated materials to reduce potential risks to workers and the environment.

Several exceedances of the PALs were identified in soil samples across the Site. The PALs are set based on EPA's RSLs for industrial soils, or other direct guidance from the MDE. Because PAL exceedances can present potential risks to human health and the environment at certain concentrations, this plan presents material management and other protocols to be followed during the work to adequately mitigate such potential risks for material remaining on-site during the development phase. Following completion of the SLRA, the results indicated that 120-day (Outside Building Footprints) and 60-day (Inside Building Footprints) Construction Worker exposure frequencies are acceptable once select removal of cadmium impacted material is completed in certain areas of the Site to mitigate hazards related to potential cadmium exposure. Based on these conclusions, Exclusion Zones are proposed for the EU Outside the Building Footprint corresponding to the boundaries of the former East Pond, Sludge Bin Storage Area, and Northwest Pond (**Figure 8**). The removal of cadmium impacted material above 934 mg/kg (if not already completed) will be required within any areas proposed for intrusive activities (i.e utility trenching) within these Exclusion Zones to allow the Construction Workers to proceed with the 120 work day allowable limit.

5.2.1. Soil Excavation and Utility Trenching

A pre-excavation meeting shall be held to address proper operating procedures for working on-site and monitoring excavations and utility trenching/installations in potentially contaminated material. This meeting shall consist of the construction manager and any workers involved with excavation and/or utility work. During the pre-excavation meeting, all workers shall review the proposed excavation and trenching locations and associated utility inverts in conjunction with existing boring locations to identify areas of potentially elevated petroleum concentrations that may be mobilized by the utility installation. These areas will include wells/piezometers impacted with NAPL (RW22-PZM), and borings which had evidence of free-phase NAPL in the soil cores (RW-003-SB, RW-029-SB, RW-045-SB, RW-052-SB, and RW-056-SB) and/or elevated analytical detections of Oil & Grease (RW-004-SB, RW-010-SB, RW-025-SB, RW-029-SB, RW-033-SB, RW-040-SB, RW-041-SB, RW-045-SB, RW-047-SB, RW-052-SB, and RW-055-SB). Impacted material associated with these borings has been excavated during the response phase of development. The site-specific Health and Safety Plan for the project shall also be reviewed and discussed.

Key soil excavation and capping activities will be monitored through daily inspections by the environmental professional (EP). Soil excavation and removal activities will occur during utility trenching, light pole and inlet/manhole installation, and stormwater pond construction. In general, and based on the existing sampling information, all excavated materials are expected to be suitable for replacement on the Site beneath the proposed capped areas. However, the EP will monitor all soil excavation activities for signs of potential contamination that may not have been previously identified (as described below).

To the extent practical, all excavation activities should be conducted in a manner to minimize double or extra handling of materials. Any stockpiles shall be kept within the Site footprint, and in a location that is not subjected to concentrated stormwater runoff. Stockpiles shall be managed as necessary to prevent the erosion and off-site migration of stockpiled materials, and in accordance with the applicable provisions of the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. Soil designated for replacement on-site which does not otherwise exhibit evidence of contamination (as determined by the EP) may be managed in large stockpiles (no size restriction) as long as they remain within the erosion and sediment controls.

Utility trenches are to be over-excavated to a minimum of one foot on all sides of the proposed utility. All utility trenches will be backfilled with bedding and backfill materials approved by the MDE. Additional preventative measures will be required if evidence of petroleum contamination is encountered, to prevent the discharge to, or migration of, petroleum product along a utility conduit. Contingency measures have been developed to ensure that utilities will be constructed in a manner that will prevent the migration of any encountered NAPL, and that excavated material will be properly managed. The Utility Excavation NAPL Contingency Plan (**Appendix H**) provides protocols to be followed if NAPL is encountered during the construction activities. Preventative measures to prevent the spread of petroleum product will be conducted in accordance with this plan.

The EP will monitor all soil excavation and utility trenching activities for signs of potential contamination that may not have been previously identified. In particular, soils will be monitored with a hand-held PID for potential VOCs, and will also be visually inspected for the presence of staining, petroleum waste materials, or other indications of contamination that may be different than what was already characterized. If screening of excavated materials by the EP indicates the presence of conditions of potential concern (i.e., sustained PID readings greater than 10 ppm, visual staining, unsuitable waste materials, etc.), such materials shall be segregated for additional sampling and special management. Excavated material exhibiting possible evidence of contamination should be placed in stockpiles (not to exceed 500 cy) on polyethylene sheeting and covered with polyethylene sheeting to minimize potential exposures and erosion when not in use. Stockpiled materials will be sampled in accordance with waste disposal requirements, and properly transported to an appropriate permitted disposal facility. Plans for analysis of segregated soils for any use other than disposal must be submitted to the MDE for approval.

Excavated material that is visibly impacted by NAPL will be segregated and managed in accordance with the requirements specified in the Utility Excavation NAPL Contingency Plan. Excavated material with indicators of possible NAPL contamination will also be containerized or placed in a stockpile (not to exceed 500 cy) on polyethylene sheeting and covered with polyethylene sheeting until the material can be analyzed for TPH/Oil & Grease and PCBs (total) to characterize the material for appropriate disposal. The MDE will be notified if such materials are encountered during excavation or utility trenching activities.

5.2.2. Soil Sampling and Disposal

Excavated materials that are determined by the EP to warrant sampling and analysis because of elevated PID readings or other indicators of potential contamination that has not previously been characterized shall be sampled and analyzed to determine how the materials should be managed. If excavated and stockpiled, such materials should be covered with a polyethylene tarp to minimize potential exposures and erosion. A sampling work plan including a description of the material, estimated volume and sampling parameters will be submitted and approved by MDE. All excavated soil, except for the soils being excavated for removal as part of the response phase (elevated lead, cadmium, and NAPL/Oil & Grease), may be considered for use as on-site fill below the proposed asphalt parking lot or concrete slabs and foundations depending on the analytical results. All supplemental data will be incorporated into the SLRA for the particular exposure unit where the excavated material would be placed. Following recalculation of the risk ratios, if the cancer risk is less than 1E-4, and the non-cancer risk (evaluated in terms of the magnitude of the exceedance and other factors such as bioavailability of the COPC) is acceptable, the excavated soil will be replaced under paved areas of the Site. Otherwise, the materials will be sampled to determine if they would be classified as hazardous waste.

Materials excavated from within the Exclusion Zones during utility trenching or other intrusive activities shall be segregated for additional sampling. These materials will be sampled and analyzed to determine 1) if they are a characteristic hazardous waste; and 2) if not hazardous waste, if replacement of the materials onsite within the Exclusion Zones (under areas to be paved) would result in potentially unacceptable risks to a future Composite Worker. Materials from the Exclusion Zones will be stockpiled on polyethylene sheeting or concrete and covered with a polyethylene tarp to minimize potential exposures and erosion.

Soil material that is determined to be a hazardous waste shall be shipped off-site in accordance with applicable regulations to an appropriate and permitted RCRA disposal facility. Soil material shall be taken to the on-site landfill (Greys) for proper disposal if the concentrations of excavated sampled materials indicate that the materials are not hazardous, but still are not suitable for reuse. The quantities of all unsuitable materials that require disposal either off-site or at the on-site landfill, if any, will be recorded and identified in the Completion Report.

5.2.3. Fill

According to the cut/fill analysis performed by the design engineer, approximately 250,000 cy of processed slag aggregate from the Tradepoint property will be used as compacted sub-base for this project. Soil excavated on the parcel has been deemed to be suitable for re-use as fill below the paved areas of the Site, with the exception of the material identified to be removed from the site during the response phase (elevated lead and Oil & Grease). As seen in **Table 12** through **Table 14**, the risk ratios for COPCs in the development area indicate that soil contaminant concentrations do not exceed acceptable risk for a Composite Worker in capped areas of the Site. These materials are considered suitable for use as on-site fill below the proposed asphalt parking lot or concrete slabs and foundations. All over-excavated utility trenches and landscaped areas will be backfilled with bedding and backfill approved by the MDE. Any clean fill material imported to the site will be screened according to MDE guidance for suitability.

5.2.4. Sediment/Erosion Control

Erosion and sediment controls will be installed prior to commencing work, as shown on the preliminary Erosion & Sediment Control "Overlay" sheets in the Concept Stormwater Management Plans (**Appendix F**) and in accordance with 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. The Sediment and Erosion Control will be approved by the Baltimore County Soil Conservation District. In addition, the following measures will be taken to prevent contaminated soil from exiting the Site:

- Stabilized construction entrance will be placed at site entrance.
- A dry street sweeper will be used as necessary on adjacent roads, and the swept dust will be collected and properly managed.
- Accumulated sediment removed from super silt fence, and sediment traps if applicable, shall be periodically removed and returned to the site for containment below the proposed asphalt cap or building.

5.2.5. Dust Control

Overall dust control methods shall include:

- Daily site wetting and dust suppression of active work areas. Overspraying of water shall be avoided in order to prevent erosion or sediment control complications.
- Reduced vehicle speeds.
- Minimizing drop heights.
- Stabilizing exposed surfaces as soon as possible.

General construction operations, including removal of existing foundations or utilities, soil excavation and transport, soil grading, trenching for utilities, and cap construction activities will be performed at the Site. These activities are anticipated to be performed in areas of soil impacted with COPCs. To limit worker exposure to contaminants borne on dust and windblown particulates, dust control measures will be implemented, if warranted when the above activities are performed in areas with impacted soil. The action level proposed for the purpose of determining the need for dust suppression techniques (e.g. watering and/or misting) and/or continuous monitoring during the response and development activities on Site will be 3.0 mg/m³. The lowest of the site-specific dust action levels, OSHA PELs, and ACGIH TLV was selected as the proposed action level.

If visible dust is generated in the breathing zone, air monitoring will be implemented as follows:

- At the start of intrusive activities;
- Periodically during intrusive activities (15-minute intervals);
- When contaminants other than those previously identified are being handled;
- When a different type of operation is initiated or conditions change;
- If personnel are working in areas with obvious particulate contamination; and
- If a sufficient reasonable interval has passed so that exposures may have significantly changed.

Air monitoring will be performed using a ThermoElectron Corporation Personal Data RAM 1000AN dust monitor or equivalent real-time air monitoring device. If the action level (3.0 mg/m³) is exceeded as a result of conditions occurring at the Site, operations will be stopped and dust suppression implemented. The background dust concentration will be utilized to evaluate whether Site activities are the source of the action level exceedance. Background concentrations will be based on measurements over a minimum of a one hour period at the upwind Site boundary. This upwind data will be used to calculate a time weighted average background dust concentration. The background dust concentration may need to be recalculated periodically during the work day, based on changed upwind conditions. Operations may be resumed once monitoring indicates that dust concentrations are below the action level.

As applicable, air monitoring will be conducted during response and development implementation activities in the immediate work zones and surrounding areas to assess levels of exposure to Site workers, establish that the work zone designations are valid, and verify that respiratory protection being worn by personnel, if needed, is adequate. Concurrent with the work zone air monitoring, perimeter air monitoring will also be performed to ensure contaminants are not migrating off-site. Perimeter monitoring will include monitoring along the perimeter of the Site, including both the downwind and upwind portions of the Site. The

concentration measured in the downwind portion of the Site shall not exceed the concentration in the upwind portion. If exceedances attributable to Site conditions are identified downwind for more than five minutes, dust control measures and additional monitoring will be implemented. The dust suppression measures may include wetting or misting through use of a hose connected to an available water supply or a water truck stationed on Site.

Dust control measures will be implemented as described above to address dust generated as a result of construction and response activities conducted on Site. However, based on the nature of the area and/or on-going activities surrounding the Site, it is possible that windblown particulates may come from surrounding areas. As discussed above, the dust concentration in the upwind portion of the Site will be considered when monitoring dust levels in the work zone. A pre-construction meeting will be held to discuss the potential of windblown particulates from other activities impacting the air monitoring required for this response plan. Site contact information will be provided to address the possibility of upwind dust impacts.

Monthly progress reports will be submitted to the agencies to document the observed dust exposure concentrations during response and development activities.

5.3. WATER MANAGEMENT

This plan presents the protocols for handling of any groundwater or surface water that needs to be removed to facilitate construction of the warehouse facility.

5.3.1. Groundwater PAL Exceedances

Eighteen groundwater sampling points are located within the boundary of Sub-Parcel A3-1. Samples from these groundwater wells/piezometers indicated several PAL exceedances. These exceedances include inorganic compounds that consist of antimony, arsenic, cadmium, cobalt, iron, manganese, thallium, vanadium, zinc, hexavalent chromium, and cyanide; VOCs that consist of trichloroethene and 1,1-dichoroethane; SVOCs that consist of benzo[a]anthracene, benzo[b]fluoranthene, pentachlorophenol, naphthalene, and 1,4-dioxane; TPH-DRO; and Oil & Grease. While the concentrations of these COPCs are not deemed to be a human health hazard since there is no on-site groundwater use, proper water management is required to prevent unacceptable discharges or risks to on-site workers.

5.3.2. Dewatering

Dewatering during construction will likely be necessary for underground utility work and stormwater pond/sediment trap excavation. If dewatering is required, it shall be done in accordance with all local, state and federal regulations.

Water that collects in excavations due to intrusion of groundwater, stormwater, and dust control waters will be sampled and, if determined to be acceptable, will be pumped to the Humphrey

Creek Waste Water Treatment Plant (Water Treatment Plant). The limitations and sampling protocols for water pumped to Water Treatment Plant comply and are in accordance with NPDES Permit No. 90-DP-0064; I. Special Conditions; A.4 – A.9; Effluent Limitations and Monitoring Requirements.

Water from excavations will be sampled and analyzed for the following suite of analyses prior to being pumped to the Water Treatment Plant:

- Total metals by EPA Method 6020A
- PCBs by EPA Method 8082
- SVOCs by EPA Method 8270C
- VOCs by EPA Method 8260B
- TPH-DRO by EPA Method 8015B
- Oil & Grease by EPA Method 1664

The Water Treatment Plant is designed to treat most potential site chemicals. If analytical results of water sampled from basements indicate the presence of levels of contaminants exceeding levels acceptable for treatment at the Water Treatment Plant, the water will either be pre-treated through an on-site treatment system and retested prior to pumping to the Water Treatment Plant or will be disposed at an appropriate off-site facility.

5.4. HEALTH AND SAFETY

A site-specific Health and Safety Plan (**Appendix D**) has been developed and is attached to this plan to present the minimum requirements for worker health and safety protection for the project. All contractors working on the site must prepare their own Health and Safety Plan that provides a level of protection at least as much as that provided by the attached Health and Safety Plan. Alternately, on-site contactors may elect to adopt the Health and Safety Plan provided.

Prior to commencing work, the contractor must conduct an on-site safety meeting for all personnel. All personnel must be made aware of the Health and Safety Plan. Detailed safety information shall be provided to personnel who may be exposed to COPCs. Workers will be responsible for following safety procedures to prevent contact with potentially contaminated soil or groundwater.

5.5. INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS)

Long-term conditions related to future use of the Site will be placed on the development and response plan approval, No Further Action (NFA) letter, and Certificate of Completion (COC). These conditions are anticipated to include the following:

- A restriction prohibiting the use of groundwater for any purpose at the Site and a requirement to characterize, containerize, and properly dispose of groundwater in the event of deep excavations encountering groundwater.
- Notice to MDE prior to any future soil disturbance activities at the Site below areas designated for engineering controls. This written notice will be required at least 15 days prior to any planned excavation activities at the Site that will penetrate through the cap.
- Requirement for a HASP in the event of any future excavations at the Site.
- Complete appropriate characterization and disposal of any future material excavated from beneath the cap in accordance with applicable local, state and federal requirements.
- Implementation of inspection procedures and maintenance of the containment remedies as outlined the following section.

The responsible party will file the above deed restrictions as defined by the MDE VCP in the NFA Letter and COC. The proposed paved areas are subject to the proposed response action containment remedy and the maintenance requirement. The Site will be subject to the groundwater use restriction.

The Tenant will be required to sign onto the Environmental Covenant with restriction in the NFA. TPA will notify the Tenant of this requirement and will provide MDE with contact information for the Tenant prior to issuance of the NFA Letter.

5.6. POST REMEDIATION REQUIREMENTS

Post remediation requirements will include compliance with the conditions specified in the NFA Letter, COC, and the deed restrictions recorded for the Site. Deed restrictions will be recorded within 30 days after receipt of the final NFA Letter.

Maintenance requirements will include maintenance of the capped areas to minimize degradation of the cap and exposure to the underlying soil. An Operations and Maintenance Plan (O&M Plan) for the capped areas is included in **Appendix I**. The O&M Plan includes the inspection protocols and a maintenance schedule.

The responsible party will perform cap maintenance inspections, perform maintenance of the cap, and retain cap inspection records. Areas of the pavement cap that have degraded to a Pavement Condition Index (PCI) of 4.0 will be repaired within 30 days of discovery. MDE shall be notified within 10 business days of any repairs that are the result of a PCI of 4.0 or greater or if damage to the landscaped capped area(s) exceeds one foot in diameter and/or two feet in depth. The notification will include documentation of the conditions being repaired and the location of the repair.

In addition, MDE will be provided with a written notice at least 15 days prior to any planned excavation activities at the Site that will penetrate through the cap. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation, health and safety protocols (as required), clean fill source (as required), and proposed characterization and disposal requirements.

5.7. CONSTRUCTION OVERSIGHT

Construction Oversight by an EP will ensure and document that the project is built as designed and appropriate environmental and safety protocols are followed.

Upon completion, the EP will certify that the project is constructed in accordance with this Development Plan. Records shall be provided to document:

- Daily Observations of Construction Activities during site grading
- Compliance with Soil Screening requirements
- Proper Cap Thickness and Construction
- Proper Water Management

6.0 PERMITS, NOTIFICATIONS AND CONTINGENCIES

The participant and their contractors will comply with all local, state and federal laws and regulations by obtaining any necessary approvals and permits to conduct the activities contained herein.

A grading permit is required if the proposed grading disturbs over 5,000 square feet of surface area or over 100 cubic yards of earth. A grading permit is required for any grading activities in any watercourse, floodplain, wetland area, buffers (stream and within 100 feet of tidal water), habitat protection areas or forest buffer areas (includes forest conservation areas). Sediment and Erosion Control Plans will be submitted to and approved by the Baltimore County Soil Conservation District prior to initiation of land disturbance for remediation or development.

There are no wetlands identified within the project area and no work will be performed beyond the shoreline so no permits are required from the MDE Water Resources Administration.

Contingency measures will include the following:

1. the MDE will be notified immediately of any previously undiscovered contamination, previously undiscovered storage tanks and other oil-related issues, and citations from regulatory entities related to health and safety practices; and

2. any significant change to the implementation schedule will be noted in the progress reports to MDE.

7.0 IMPLEMENTATION SCHEDULE

The proposed implementation schedule is shown below. Progress reports will be submitted to MDE upon completion of each milestone shown below.

Task	**Proposed Completion Date**
Interim Measure Work Plan Approval	August 25, 2016
Response and Development Plan Approval	May 1, 2017
Remedial Phase	
Installation of Erosion and Sediment Controls for Remediation	October 2016
Mobilization & Site Preparation	October 2016
Excavation of LNAPL Impacts in the Vicinity of RW22-PZM (Start)	February 6, 2017
Delineation/Excavation of NAPL/Oil & Grease Contaminated Soil (Start)	February 16, 2017
Excavation of Lead Contaminated Soil (Start)	April 3, 2017
Excavation of Cadmium Contaminated Soil within Exclusion Zone Utility Trenches (Start)	June 1, 2017
Interim Measures	
RW10 and RW15 Intermediate Well Relocation	January 2017
New Monitoring Wells Installation	January 2017
Treatment Trench Installation	January 13, 2017
RW15 Intermediate Well Abandonment	February 6, 2017
Remaining Monitoring Wells Abandonment (including RW10 Intermediate)	April 28, 2017

Development Phase

Installation of Erosion and Sediment Controls for Development	April 14, 2017
Completion of site preparation/grading	May 22, 2017
Underground Utilities Sanitary Sewers – 3 weeks; Underground Water System – 6 weeks; Underground Stormwater System – 12 weeks; Underground Sanitary Distribution – 3 weeks; and Underground Electric Distribution – 3 weeks	July 7, 2017
Installation of paving	October 30, 2017
Installation of buildings	November 21, 2017
Submittal of Completion Report/Notice of Readiness for Use*	January 1, 2018
Request for a NFA from the MDE	February 1, 2018
Recordation of institutional controls in the land records office of Baltimore County	Within thirty days of receiving the approval of NFA from the MDE
Submit proof of recordation with Baltimore County	Upon receipt from Baltimore County

*Notice of Readiness for Use shall be prepared by Professional Engineer registered in Maryland and submitted with the Completion Report to certify that the work is consistent with the requirements of this Development Plan and the Site is suitable for occupancy and use.

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

August 1, 2016

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

Figure 1

P:\EnviroAnalytics Group\160443M EAG_TPA Redevelopment\Drwg\A3\Site Development\Figure 2 - Site Development Figure.dwg Plotted: January 18, 2017

Figure 2	drawing title: PARCEL A3 SITE DEVELOPMENT PLAN	designed JMA	scale 1" = 200'	ARM Group Inc. Earth Resource Engineers and Consultants www.armgroup.net
		checked TNP	date 1/18/2017	
		drawn JMA	project no. 160443M-1-1	
	project title: SPARROWS POINT AREA A ENVIROANALYTICS GROUP	SPARROWS POINT BALTIMORE COUNTY, MARYLAND	0 200 400 SCALE IN FEET	

Sheet 1

RW-004-SB
RW-002-SB
RW-003-SB
RW-005-SB
RW-001-SB
RW-078-SB
RW-017-SB
RW-039-SB
RW-077-SB
RW-036-SB
RW-037-SB
RW-079-SB
RW-006-SB
RW-007-SB
RW-035-SB
RW-076-SB
RW-008-SB
RW-034-SB
RW-040-SB
RW-055-SB
RW-047-SB
RW-044-SB
RW-045-SB
RW-052-SB
RW-049-SB
RW-054-SB
RW-053-SB
RW-038-SB
RW-010-SB
RW-046-SB
RW-048-SB

Sheet 2

RW-056-SB
RW-009-SB
RW-033-SB
Parcel A3
RW-032-SB
RW-043-SB
RW-042-SB
RW-018-SB
RW-031-SB
RW-011-SB
RW-029-SB
RW-016-SB
RW-030-SB
RW-050-SB
RW-027-SB
RW-013-SB
RW-028-SB

Sheet 3

RW-041-SB
RW-015-SB
RW-019-SB
RW-012-SB
RW-021-SB
RW-051-SB
RW-023-SB
RW-026-SB
RW-022-SB
RW-014-SB
RW-025-SB
RW-020-SB
RW-024-SB

Development Area

Parcel A3 (Rod & Wire Mill)
Phase II Soil Boring Parcel Index Figure

June 5, 2017

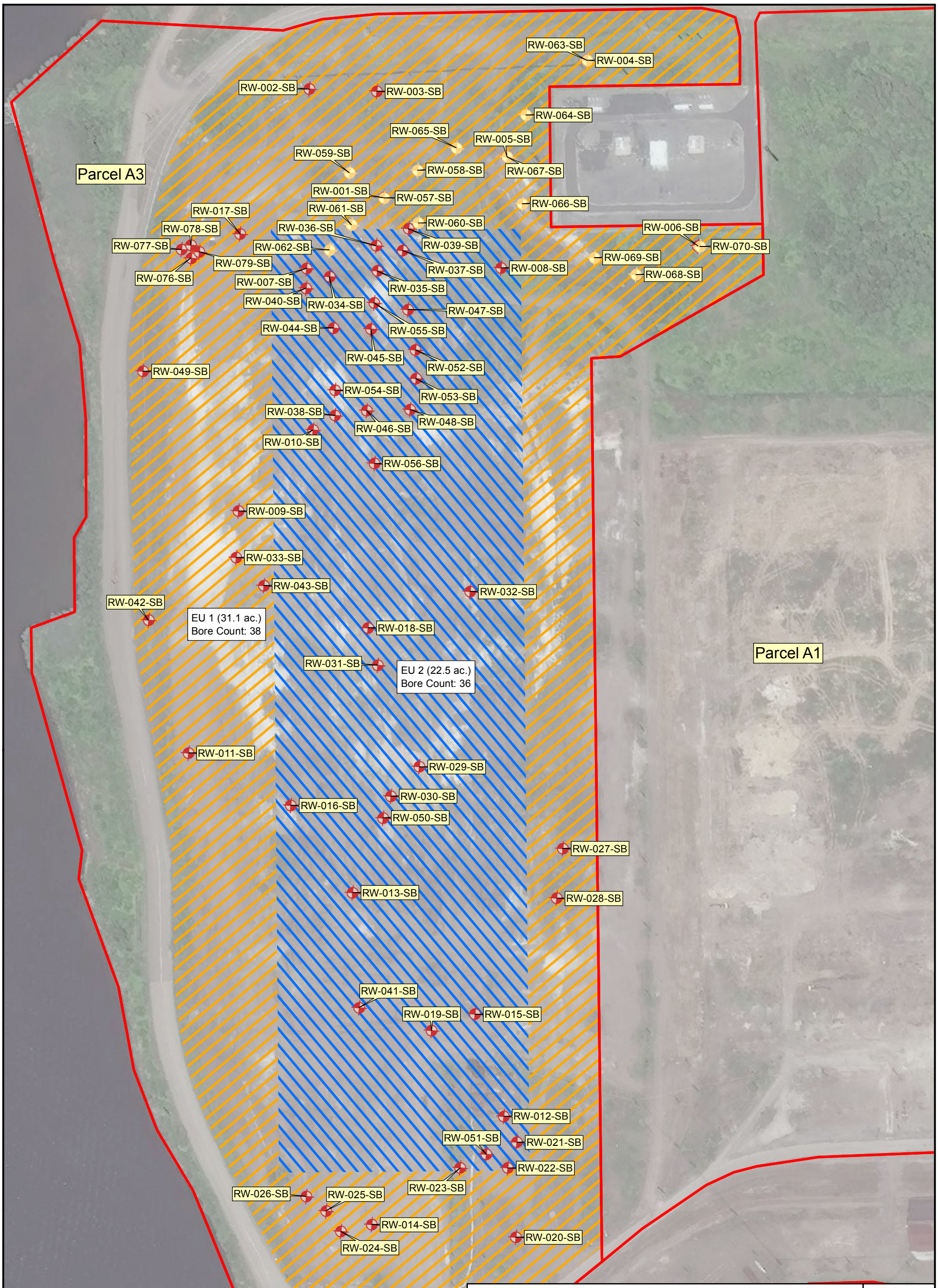
Figure 3A

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300
Feet

Phase II Soil Boring
Index Boundary
Parcel A3 (RWM) boundary


Parcel A3
Parcel A1
RW-063-SB
RW-004-SB
RW-002-SB
RW-003-SB
RW-064-SB
RW-065-SB
RW-005-SB
RW-059-SB
RW-067-SB
RW-058-SB
RW-001-SB
RW-057-SB
RW-066-SB
RW-017-SB
RW-061-SB
RW-078-SB
RW-036-SB
RW-060-SB
RW-006-SB
RW-077-SB
RW-062-SB
RW-039-SB
RW-070-SB
RW-079-SB
RW-037-SB
RW-069-SB
RW-008-SB
RW-076-SB
RW-007-SB
RW-035-SB
RW-068-SB
RW-040-SB
RW-034-SB
RW-047-SB
RW-044-SB
RW-055-SB
RW-045-SB
RW-049-SB
RW-052-SB
RW-054-SB
RW-053-SB
RW-038-SB
RW-046-SB
RW-048-SB
RW-010-SB
RW-056-SB
RW-009-SB
RW-033-SB
RW-043-SB
RW-032-SB
RW-042-SB
EU 1 (31.1 ac.)
Bore Count: 38
RW-018-SB
RW-031-SB
EU 2 (22.5 ac.)
Bore Count: 36
RW-011-SB
RW-029-SB
RW-030-SB
RW-016-SB
RW-050-SB
RW-027-SB
RW-013-SB
RW-028-SB
RW-041-SB
RW-019-SB
RW-015-SB
RW-012-SB
RW-051-SB
RW-021-SB
RW-022-SB
RW-023-SB
RW-026-SB
RW-025-SB
RW-014-SB
RW-024-SB
RW-020-SB
Parcel A3 (Rod & Wire Mill)
Risk Assessment Exposure Units
June 5, 2017
Figure
3B
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Phase II Soil Boring
PDI Soil Boring
Parcel Boundary
EU1
EU2


RW-002-PZ
RW07-PZM004
RW02-PZM000
RW-006-PZ
RW19-PZM000
RW10-PZM004
RW20-PZM000
RW-048-PZ
RW-011-PZ
Parcel A3
RW-050-PZ
RW-027-PZ
RW-021-PZ
RW-025-PZ
Development Area
Parcel A3 (Rod & Wire Mill)
Groundwater Sample Locations (shallow)
June 30, 2016
Figure
4
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
62.5
125
250
Feet
Existing Site-wide Well (Shallow)
Phase II Piezometer (Shallow)
Parcel A3 (RWM) boundary

Parcel A3 (Rod & Wire Mill)
Groundwater Sample Locations (intermediate)
June 30, 2016

Figure 5

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 62.5 125 250
Feet

Existing Site-wide Well (Intermediate)

Parcel A3 (RWM) boundary

Parcel A3

Development Area

RW-004-SB-1
RW-004-SB-5

RW-002-SB-1
RW-002-SB-4.5

RW-003-SB-1
RW-003-SB-5

RW-005-SB-1
RW-005-SB-5

RW-001-SB-1
RW-001-SB-5

RW-039-SB-1
RW-039-SB-5

RW-078-SB-1
RW-078-SB-5

RW-017-SB-1
RW-017-SB-6

RW-034-SB-1
RW-034-SB-5

RW-036-SB-1
RW-036-SB-4

RW-037-SB-1
RW-037-SB-8

RW-077-SB-1
RW-077-SB-5

RW-079-SB-1
RW-079-SB-5

RW-007-SB-1
RW-007-SB-5

RW-006-SB-1
RW-006-SB-5

RW-076-SB-1
RW-076-SB-6

RW-035-SB-1
RW-035-SB-5

RW-008-SB-1
RW-008-SB-5

RW-040-SB-1
RW-040-SB-6

RW-055-SB-1
RW-055-SB-5
RW-055-SB-7
1,4-Dichlorobenzene: 39.8

RW-047-SB-1
RW-047-SB-6
1,2-Dibromo-3-chloropropane: 0.24 J
RW-047-SB-10

RW-045-SB-1
RW-045-SB-5

RW-044-SB-1
RW-044-SB-5

RW-052-SB-5

RW-049-SB-1
RW-049-SB-5

RW-054-SB-1
RW-054-SB-5

RW-053-SB-1
RW-053-SB-5

RW-038-SB-1
RW-038-SB-5

RW-046-SB-1
RW-046-SB-5

RW-048-SB-1
RW-048-SB-5

RW-010-SB-1
RW-010-SB-7
Trichloroethene: 6.1
RW-010-SB-10

Parcel A3 (Rod & Wire Mill)
Phase II Soil Boring VOC Exceedances (mg/kg)
All Sample Depths
September 7, 2016

Figure S-1 (1)

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 37.5 75 150
Feet

Phase II Soil Boring
Parcel A3 (RWM) boundary

RW-004-SB-1
Benzo[a]pyrene: 0.51

RW-004-SB-5
Benzo[a]anthracene: 4.3
Benzo[a]pyrene: 3.9
Benzo[b]fluoranthene: 9.2
Dibenz[a,h]anthracene: 0.96

RW-004-SB-10

RW-002-SB-1

RW-002-SB-4.5

RW-003-SB-1

RW-003-SB-4.5

RW-003-SB-5

RW-005-SB-1

RW-005-SB-5

RW-001-SB-1

RW-001-SB-5

RW-017-SB-1

RW-017-SB-6

RW-078-SB-1
Benzo[a]pyrene: 0.85

RW-078-SB-5

RW-007-SB-1
Benzo[a]pyrene: 1.9
Benzo[b]fluoranthene: 3.0
Dibenz[a,h]anthracene: 0.4

RW-007-SB-5

RW-036-SB-1

RW-036-SB-4

RW-039-SB-1

RW-039-SB-5

RW-037-SB-1

RW-037-SB-8

RW-006-SB-1
Benzo[a]pyrene: 0.44

RW-006-SB-5

RW-077-SB-1

RW-077-SB-5

RW-079-SB-1
Benzo[a]pyrene: 2.0
Benzo[b]fluoranthene: 3.1
Dibenz[a,h]anthracene: 0.39

RW-079-SB-5

RW-034-SB-1

RW-034-SB-5

RW-035-SB-1
Benzo[a]pyrene: 1.4
Benzo[b]fluoranthene: 5.4

RW-035-SB-5

RW-008-SB-1

RW-008-SB-5

RW-076-SB-1
Benzo[a]pyrene: 1.6
Dibenz[a,h]anthracene: 0.41

RW-076-SB-6

RW-040-SB-1
Benzo[a]anthracene: 9.6
Benzo[a]pyrene: 7.6
Benzo[b]fluoranthene: 11.4
Dibenz[a,h]anthracene: 1.4
Indeno[1,2,3-c,d]pyrene: 3.8

RW-040-SB-6

RW-055-SB-1
Benzo[a]pyrene: 0.42

RW-055-SB-5

RW-055-SB-7
Benzo[a]pyrene: 1.6
Dibenz[a,h]anthracene: 0.33
Naphthalene: 28.6

RW-047-SB-1

RW-047-SB-6

RW-044-SB-1
Benzo[a]pyrene: 0.39

RW-044-SB-5

RW-045-SB-1

RW-045-SB-5
Benzo[a]anthracene: 4.0
Benzo[a]pyrene: 3.9
Benzo[b]fluoranthene: 5.5
Dibenz[a,h]anthracene: 0.89

RW-045-SB-10

RW-052-SB-1
Benzo[a]pyrene: 0.64

RW-052-SB-5
Benzo[a]anthracene: 14.7
Benzo[a]pyrene: 10.8
Benzo[b]fluoranthene: 17.0
Dibenz[a,h]anthracene: 2.7
Indeno[1,2,3-c,d]pyrene: 6.2
Naphthalene: 23.4

RW-049-SB-1
Benzo[a]pyrene: 0.41

RW-049-SB-5

RW-054-SB-1
Benzo[a]pyrene: 0.65

RW-054-SB-5

RW-053-SB-1

RW-053-SB-5

RW-038-SB-1

RW-038-SB-5

RW-046-SB-1
Benzo[a]pyrene: 1.7
Benzo[b]fluoranthene: 2.9

RW-046-SB-5

RW-048-SB-1

RW-048-SB-5

RW-010-SB-1

RW-010-SB-7

RW-056-SB-1

RW-056-SB-5

RW-009-SB-1
Benzo[a]pyrene: 0.52

RW-009-SB-5

RW-033-SB-1
Benzo[a]anthracene: 6.8
Benzo[a]pyrene: 6.7
Benzo[b]fluoranthene: 10.7
Dibenz[a,h]anthracene: 1.1
Indeno[1,2,3-c,d]pyrene: 2.9

RW-033-SB-6.5

RW-043-SB-1

RW-043-SB-8
Naphthalene: 75.0

RW-043-SB-10

RW-032-SB-1

RW-032-SB-5

RW-042-SB-1
Benzo[a]pyrene: 0.55

RW-042-SB-5

RW-018-SB-1

RW-018-SB-5

RW-031-SB-1

RW-031-SB-6

Parcel A3

Development Area

RW-011-SB-1
Benzo[a]pyrene: 1.9
Benzo[b]fluoranthene: 2.9
Dibenz[a,h]anthracene: 0.45

RW-011-SB-5
Benzo[a]anthracene: 3.2 J
Benzo[a]pyrene: 2.9 J
Benzo[b]fluoranthene: 4.4
Dibenz[a,h]anthracene: 0.33

RW-030-SB-1

RW-030-SB-5

RW-029-SB-1

RW-029-SB-7
Benzo[a]pyrene: 3.4

RW-016-SB-1

RW-016-SB-4
Benzo[a]pyrene: 1.6
Dibenz[a,h]anthracene: 0.36

RW-050-SB-1

RW-050-SB-4.5

RW-027-SB-1
Benzo[a]anthracene: 5.2
Benzo[a]pyrene: 3.8
Benzo[b]fluoranthene: 9.3
Dibenz[a,h]anthracene: 1.1
Indeno[1,2,3-c,d]pyrene: 2.9

RW-027-SB-5

RW-013-SB-1

RW-013-SB-5

RW-028-SB-1

RW-028-SB-5

RW-015-SB-1

RW-015-SB-5
Benzo[a]anthracene: 23.1
Benzo[a]pyrene: 16.7
Benzo[b]fluoranthene: 23.6
Dibenz[a,h]anthracene: 1.3
Indeno[1,2,3-c,d]pyrene: 3.4

RW-015-SB-10

RW-041-SB-1

RW-041-SB-5
Benzo[a]pyrene: 0.74

RW-019-SB-1
Benzo[a]pyrene: 0.5

RW-019-SB-4

RW-012-SB-1

RW-012-SB-5

RW-021-SB-1
Benzo[a]pyrene: 0.41

RW-021-SB-6

RW-051-SB-1

RW-051-SB-5

RW-023-SB-1

RW-023-SB-5

RW-022-SB-1

RW-022-SB-8.5

RW-020-SB-1
Benzo[a]pyrene: 0.81

RW-020-SB-4.5
Benzo[a]anthracene: 8.1
Benzo[a]pyrene: 6.5
Benzo[b]fluoranthene: 15.2

RW-020-SB-7
Benzo[a]anthracene: 60.9 J
Benzo[a]pyrene: 42.8 J
Benzo[b]fluoranthene: 76.3 J
Benzo[k]fluoranthene: 36.0 J
Dibenz[a,h]anthracene: 0.48 J

RW-026-SB-1

RW-026-SB-5

RW-025-SB-1
Benzo[a]pyrene: 0.52

RW-025-SB-5

RW-014-SB-1

RW-014-SB-5

RW-024-SB-1

RW-024-SB-6

Parcel A3 (Rod & Wire Mill)
Phase II Soil Boring SVOC Exceedances (mg/kg)
All Sample Depths
September 7, 2016

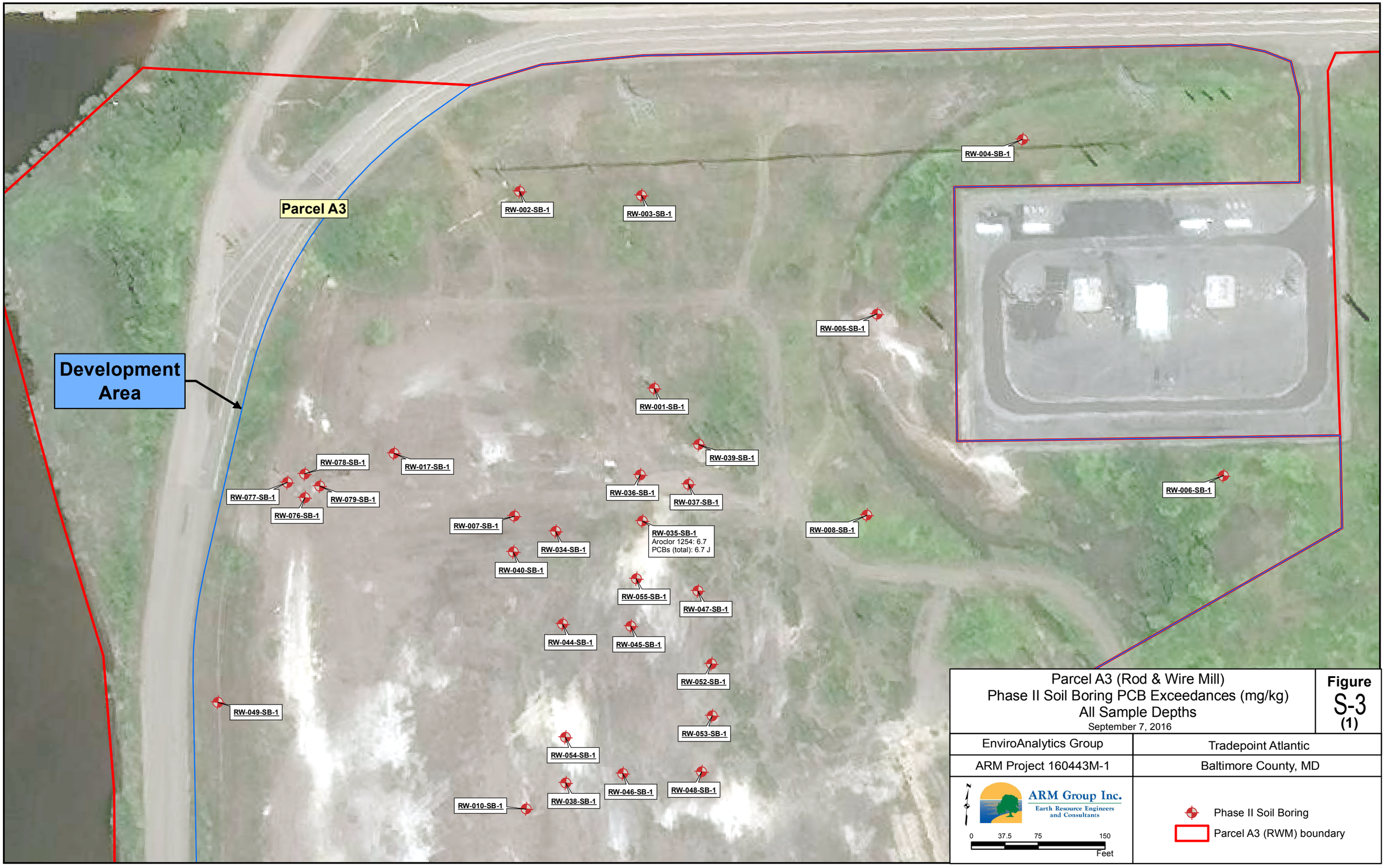
Figure
S-2

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 30 60 120
Feet

Phase II Soil Boring
Parcel A3 (RWM) boundary



Parcel A3 (Rod & Wire Mill)
Phase II Soil Boring PCB Exceedances (mg/kg)
All Sample Depths
September 7, 2016

Figure S-3 (1)

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 37.5 75 150
Feet

Phase II Soil Boring
Parcel A3 (RWM) boundary

RW-004-SB-1
RW-004-SB-5
OG: 12,400

RW-002-SB-1
RW-002-SB-4.5

RW-003-SB-1
RW-003-SB-5

RW-005-SB-1
RW-005-SB-5

RW-001-SB-1
RW-001-SB-5

RW-078-SB-1
RW-078-SB-5

RW-017-SB-1
RW-017-SB-6

RW-077-SB-1

RW-079-SB-1
RW-079-SB-5

RW-036-SB-1
RW-036-SB-4

RW-039-SB-1
RW-039-SB-5

RW-037-SB-1
RW-037-SB-8

RW-006-SB-1
RW-006-SB-5

RW-007-SB-1
RW-007-SB-5

RW-034-SB-1
RW-034-SB-5

RW-035-SB-1
RW-035-SB-5

RW-008-SB-1
RW-008-SB-5

RW-040-SB-1
OG: 7,870
RW-040-SB-6

RW-055-SB-1
RW-055-SB-5
OG: 26,100
RW-055-SB-7

RW-047-SB-1
RW-047-SB-6
OG: 8,630

RW-044-SB-1
RW-044-SB-5

RW-045-SB-1
RW-045-SB-5
OG: 6,330

RW-052-SB-1
RW-052-SB-5
OG: 7,130

RW-049-SB-1
RW-049-SB-5

RW-054-SB-1
RW-054-SB-5

RW-046-SB-1
RW-046-SB-5

RW-053-SB-1
RW-053-SB-5

RW-010-SB-1
RW-010-SB-7
OG: 22,300

RW-038-SB-1
RW-038-SB-5

RW-048-SB-1
RW-048-SB-5

RW-056-SB-1
RW-056-SB-5

RW-009-SB-1
RW-009-SB-5

RW-033-SB-1
OG: 7,200
RW-033-SB-6.5

RW-043-SB-1
RW-043-SB-8

RW-032-SB-1
RW-032-SB-5

RW-042-SB-1
RW-042-SB-5

RW-018-SB-1
RW-018-SB-5

RW-031-SB-1
RW-031-SB-6

RW-011-SB-1
RW-011-SB-5

RW-029-SB-1
OG: 14,700
RW-029-SB-7
OG: 39,600

RW-030-SB-1
RW-030-SB-5

RW-016-SB-1
RW-016-SB-4

RW-050-SB-1
RW-050-SB-4.5

RW-027-SB-1
RW-027-SB-5

RW-013-SB-1
RW-013-SB-5

RW-028-SB-1
RW-028-SB-5

Development Area

RW-041-SB-1
RW-041-SB-5
OG: 13,700

RW-019-SB-1
RW-019-SB-4

RW-015-SB-1
RW-015-SB-5

RW-012-SB-1
RW-012-SB-5

RW-021-SB-1
RW-021-SB-6

RW-051-SB-1
RW-051-SB-5

RW-023-SB-1
RW-023-SB-5

RW-022-SB-1
RW-022-SB-8.5

RW-026-SB-1
RW-026-SB-5

RW-025-SB-1
OG: 8,190
RW-025-SB-5

RW-014-SB-1
RW-014-SB-5

RW-024-SB-1
RW-024-SB-6

RW-020-SB-1
RW-020-SB-4.5

Parcel A3 (Rod & Wire Mill)
Phase II Soil Boring O&G Exceedances (mg/kg)
All Sample Depths
November 4, 2016

Figure
S-4

EnviroAnalytics Group | Tradepoint Atlantic
ARM Project 160443M-1 | Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

N

0 30 60 120
Feet

- Phase II Soil Boring (OG)
- Phase II Soil Boring (TPH/OG)
- Phase II Soil Boring (OG/Evidence of NAPL)
- Parcel A3 (RWM) boundary

RW-004-SB-1
Arsenic: 6.3

RW-004-SB-5
Arsenic: 19.4

RW-004-SB-10
Arsenic: 10.3 J

RW-002-SB-1
Arsenic: 34.4
Lead: 1,080

RW-002-SB-4.5
Arsenic: 152

RW-003-SB-1
Arsenic: 23.0
Cadmium: 2,340
Lead: 1,230

RW-003-SB-5
Arsenic: 11.8

RW-003-SB-10
Arsenic: 137 J

RW-005-SB-1
Arsenic: 142
Cadmium: 2,240 J

RW-005-SB-5
Arsenic: 5.9

RW-001-SB-1
Arsenic: 26.5 J

RW-001-SB-5

RW-036-SB-1
Arsenic: 3.8
Lead: 2,650

RW-036-SB-4
Arsenic: 3.3

RW-036-SB-10
Arsenic: 8.5 J

RW-039-SB-1
Arsenic: 4.6

RW-039-SB-5
Arsenic: 3.7

RW-039-SB-10
Arsenic: 14.8 J

RW-078-SB-1
Arsenic: 13.7 J
Lead: 1,420

RW-078-SB-5
Arsenic: 32.4 J

RW-078-SB-10
Arsenic: 3.1

RW-077-SB-1
Arsenic: 5.1 J

RW-077-SB-5
Arsenic: 132 J
Lead: 3,980

RW-077-SB-10

RW-017-SB-1

RW-017-SB-6

RW-007-SB-1
Arsenic: 5.2

RW-007-SB-5
Arsenic: 6.2

RW-007-SB-10
Arsenic: 20.5 J

RW-034-SB-1

RW-034-SB-5

RW-037-SB-1
Arsenic: 4.5
Lead: 1,090

RW-037-SB-8
Arsenic: 12.3

RW-037-SB-10
Arsenic: 7.0 J

RW-035-SB-1
Arsenic: 6.3
Lead: 3,670

RW-035-SB-5

RW-006-SB-1
Arsenic: 11.2 J

RW-006-SB-5
Arsenic: 6.0 J

RW-076-SB-1
Arsenic: 29.6 J

RW-076-SB-6
Arsenic: 3.0 J

RW-079-SB-1
Arsenic: 5.7 J
Manganese: 27,700

RW-079-SB-5

RW-055-SB-1
Arsenic: 4.3
Lead: 44,700

RW-055-SB-5
Arsenic: 3.6

RW-055-SB-7
Arsenic: 6.2
Lead: 2,860

RW-055-SB-10
Arsenic: 4.0 J

RW-008-SB-1

RW-008-SB-5
Arsenic: 3.6

RW-008-SB-10
Arsenic: 12.2 J

RW-040-SB-1
Arsenic: 9.3 J
Lead: 3,230 J

RW-040-SB-6
Arsenic: 6.6 J

RW-040-SB-10
Arsenic: 7.9 J

RW-047-SB-1
Arsenic: 4.1

RW-047-SB-6

RW-044-SB-1
Arsenic: 4.1

RW-044-SB-5
Arsenic: 4.6

RW-044-SB-10

RW-045-SB-1
Manganese: 30,200

RW-045-SB-5
Arsenic: 4.6

RW-045-SB-10

RW-052-SB-1
Arsenic: 5.7
Lead: 1,050

RW-052-SB-5
Arsenic: 4.0
Lead: 16,400

RW-049-SB-1

RW-049-SB-5
Arsenic: 5.6 J

RW-049-SB-10
Arsenic: 7.6 J

RW-054-SB-1
Arsenic: 4.6
Lead: 979

RW-054-SB-5

RW-046-SB-1
Arsenic: 5.9
Lead: 1,670

RW-046-SB-5

RW-053-SB-1

RW-053-SB-5
Arsenic: 7.3

RW-053-SB-10
Arsenic: 9.0 J

RW-010-SB-1
Arsenic: 3.4

RW-010-SB-7

RW-038-SB-1
Lead: 924

RW-038-SB-5

RW-048-SB-1
Arsenic: 4.1
Lead: 1,730 J

RW-048-SB-5

RW-009-SB-1
Arsenic: 3.1
Manganese: 28,200 J

RW-009-SB-5
Arsenic: 4.0

RW-009-SB-10
Arsenic: 14.4 J

RW-056-SB-1
Manganese: 30,000 J

RW-056-SB-5

RW-033-SB-1
Arsenic: 6.9

RW-033-SB-6.5
Arsenic: 9.6

RW-033-SB-10
Arsenic: 6.0 J

RW-043-SB-1

RW-043-SB-8

RW-018-SB-1
Arsenic: 3.6
Chromium VI: 7.7
Manganese: 30,500

RW-018-SB-5
Arsenic: 4.4

RW-032-SB-1

RW-032-SB-5
Arsenic: 11.6

RW-032-SB-10
Arsenic: 10.0

RW-042-SB-1
Arsenic: 9.0 J

RW-042-SB-5

RW-031-SB-1
Arsenic: 4.0
Chromium VI: 11.1
Manganese: 27,900

RW-031-SB-6

Parcel A3

Development Area

RW-011-SB-1
Arsenic: 12.9

RW-011-SB-5
Arsenic: 169

RW-029-SB-1
Arsenic: 17.5

RW-029-SB-7
Arsenic: 3.6

RW-016-SB-1
Manganese: 30,000

RW-016-SB-4
Arsenic: 6.7

RW-050-SB-1
Arsenic: 3.3
Manganese: 28,900

RW-050-SB-4.5
Arsenic: 16.5

RW-030-SB-1
Arsenic: 6.3
Manganese: 27,100

RW-030-SB-5
Arsenic: 7.0

RW-030-SB-10
Arsenic: 11.9

RW-027-SB-1
Arsenic: 4.7

RW-027-SB-5
Arsenic: 6.9

RW-027-SB-10

RW-028-SB-1
Arsenic: 4.2

RW-028-SB-5
Arsenic: 5.6

RW-013-SB-1
Arsenic: 4.1
Manganese: 35,200

RW-013-SB-5
Arsenic: 9.7

RW-013-SB-10
Arsenic: 7.0

RW-041-SB-1
Manganese: 29,200

RW-041-SB-5
Arsenic: 5.6
Lead: 845

RW-019-SB-1
Arsenic: 7.0

RW-019-SB-4
Arsenic: 32.2
Manganese: 54,000

RW-019-SB-10

RW-015-SB-1
Arsenic: 5.9

RW-015-SB-5
Arsenic: 5.4

RW-015-SB-10

RW-012-SB-1
Arsenic: 6.9

RW-012-SB-5
Arsenic: 4.4

RW-012-SB-8
Arsenic: 5.7 J

RW-021-SB-1
Arsenic: 492

RW-021-SB-6
Arsenic: 4.6

RW-021-SB-10
Arsenic: 3.8

RW-051-SB-1
Arsenic: 4.4
Manganese: 29,800

RW-051-SB-5
Arsenic: 9.4

RW-051-SB-10
Arsenic: 26.6 J

RW-022-SB-1
Arsenic: 39.2

RW-022-SB-8.5
Arsenic: 11.1

RW-026-SB-1

RW-026-SB-5

RW-023-SB-1
Arsenic: 5.8

RW-023-SB-5
Arsenic: 4.8

RW-023-SB-10
Arsenic: 4.3

RW-014-SB-1
Chromium VI: 7.8 J-
Manganese: 28,100 J

RW-014-SB-5

RW-020-SB-1
Arsenic: 6.0
Lead: 832

RW-020-SB-4.5

RW-025-SB-1
Arsenic: 4.6

RW-025-SB-5
Arsenic: 4.3

RW-024-SB-1

RW-024-SB-6

Parcel A3 (Rod & Wire Mill) Phase II Soil Boring Inorganic Exceedances (mg/kg) All Sample Depths September 7, 2016	**Figure** S-5
EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 30 60 120
Feet

Phase II Soil Boring
Parcel A3 (RWM) boundary

RW-002-PZ

RW07-PZM004
1,1-Dichloroethane: 4.8

RW02-PZM000

RW19-PZM000

RW10-PZM004

RW-006-PZ

RW20-PZM000

RW-048-PZ

Parcel A3

RW-011-PZ

RW-050-PZ
Trichloroethene: 6.2

RW-027-PZ

RW-021-PZ

RW-025-PZ
1,1-Dichloroethane: 40.7

Development Area

Parcel A3 (Rod & Wire Mill)
Groundwater VOC Exceedances (ug/L)
Shallow Hydrogeologic Zone
September 7, 2016

Figure
GW-1

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300
Feet

Existing Site-wide Well (Shallow)
Phase II Piezometer (Shallow)
Parcel A3 (RWM) boundary

Parcel A3 (Rod & Wire Mill)
Groundwater VOC Exceedances (ug/L)
Intermediate Hydrogeologic Zone
September 7, 2016

Figure
GW-2

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300
Feet

Existing Site-wide Well (Intermediate)
Parcel A3 (RWM) boundary

RW-002-PZ
Benzo[a]anthracene: 0.018 J

RW02-PZM000

RW07-PZM004

RW10-PZM004
Naphthalene: 1.5
Pentachlorophenol: 2.2 J

RW19-PZM000

RW-006-PZ
Benzo[a]anthracene: 0.03 J

Parcel A3

RW20-PZM000
1,4-Dioxane: 0.53

RW-048-PZ
1,4-Dioxane: 0.73
Benzo[a]anthracene: 0.018 J

RW-011-PZ
Benzo[a]anthracene: 0.054 J
Benzo[b]fluoranthene: 0.043 J
Naphthalene: 6.4

RW-050-PZ
Benzo[a]anthracene: 0.018 J

RW-027-PZ
1,4-Dioxane: 0.92

RW-021-PZ
1,4-Dioxane: 0.53

RW-025-PZ
1,4-Dioxane: 0.53
Benzo[a]anthracene: 0.035 J
Naphthalene: 1.1

Development Area

Parcel A3 (Rod & Wire Mill)
Groundwater SVOC Exceedances (ug/L)
Shallow Hydrogeologic Zone
September 7, 2016

Figure
GW-3

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300
Feet

Existing Site-wide Well (Shallow)
Phase II Piezometer (Shallow)
Parcel A3 (RWM) boundary

Parcel A3 (Rod & Wire Mill)
Groundwater SVOC Exceedances (ug/L)
Intermediate Hydrogeologic Zone
September 7, 2016

Figure
GW-4

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

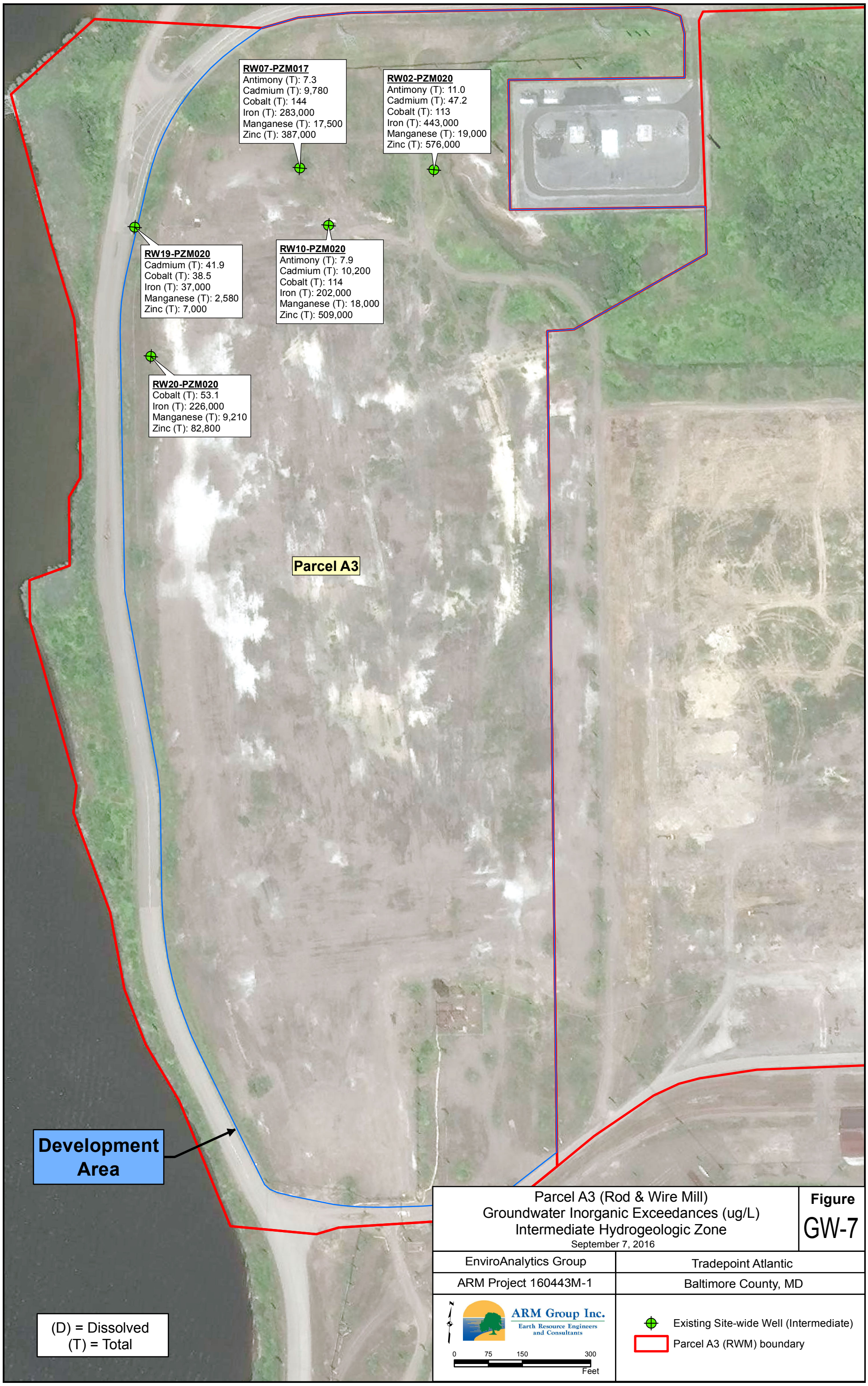
ARM Group Inc.
Earth Resource Engineers and Consultants

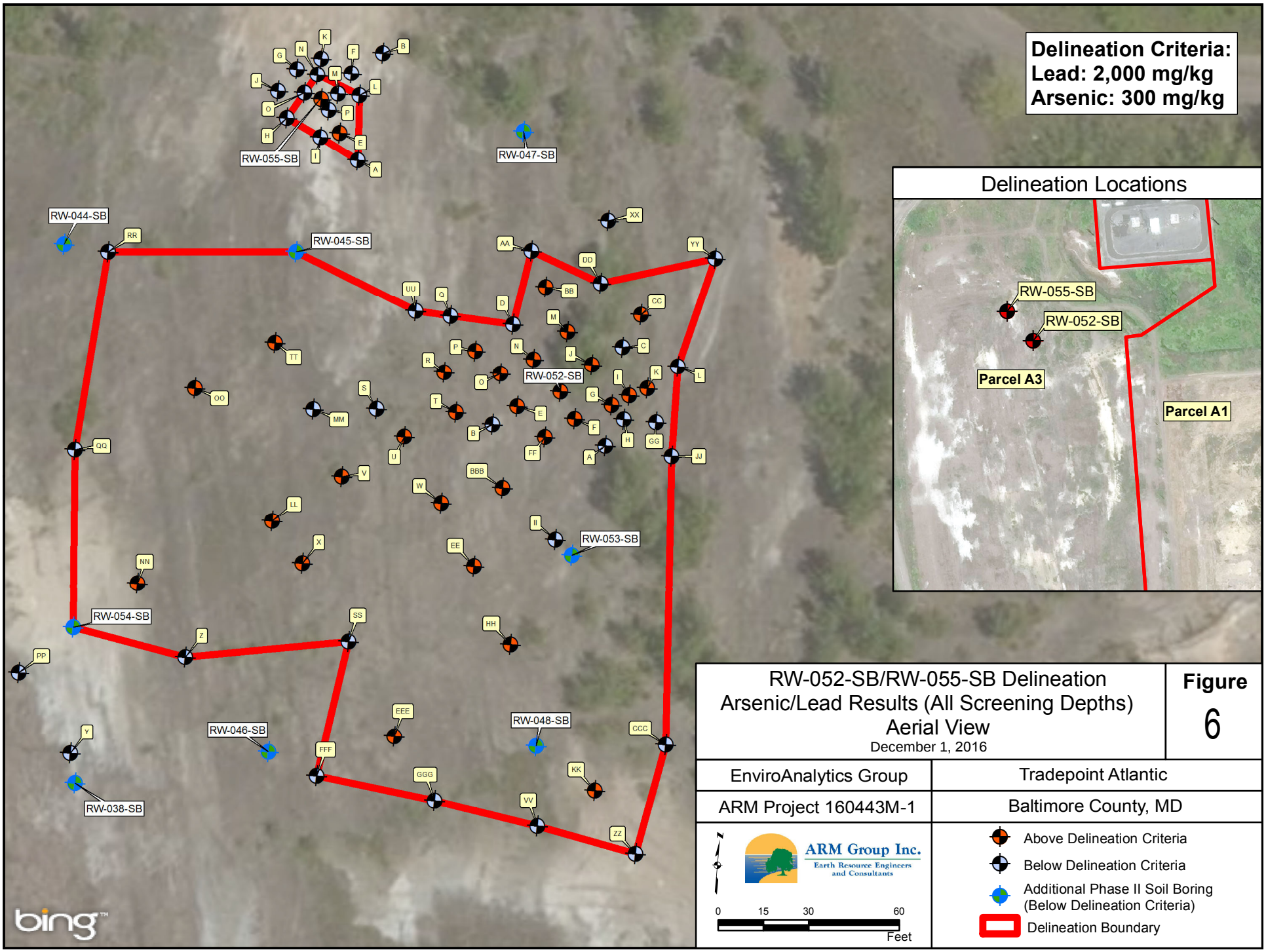
0 75 150 300
Feet

Existing Site-wide Well (Intermediate)
Parcel A3 (RWM) boundary


RW-002-PZ
OG: 1,000 J
RW07-PZM004
RW02-PZM000
RW19-PZM000
RW10-PZM004
OG: 21,400
RW-006-PZ
RW20-PZM000
RW-048-PZ
Parcel A3
RW-011-PZ
DRO: 171
RW-050-PZ
RW-027-PZ
DRO: 233 J
RW-021-PZ
OG: 1,000 J
RW-025-PZ
Development Area
Only RW-011-PZ and RW-022-PZ were analyzed for TPH-DRO/GRO
Parcel A3 (Rod & Wire Mill)
Groundwater TPH/O&G Exceedacnes (ug/L)
Shallow Hydrogeologic Zone
November 2, 2016
Figure
GW-5
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Existing Site-wide Well (Shallow)
Phase II Piezometer (Shallow)
Parcel A3 (RWM) boundary


RW-002-PZ
Cadmium (D): 102
Manganese (D): 5,150
RW07-PZM004
Manganese (T): 5,480
RW02-PZM000
Arsenic (T): 116
Cadmium (T): 31.3
Chromium VI (T): 13.0
Thallium (T): 4.1 J
Vanadium (T): 196
RW-006-PZ
Cadmium (D): 20.1
Cobalt (D): 42.4
Iron (D): 54,200
Manganese (D): 3,220
Zinc (D): 245,000
RW10-PZM004
Thallium (T): 3.9 B
Vanadium (T): 154
RW19-PZM000
Arsenic (T): 14.6 J
Cyanide: 1,330
Thallium (T): 4.2 B
Vanadium (T): 260
RW-048-PZ
Arsenic (D): 15.5
Cobalt (D): 41.3
Iron (D): 90,800
Manganese (D): 3,860
RW20-PZM000
Arsenic (T): 118
Cyanide: 215
Parcel A3
RW-011-PZ
Vanadium (D): 114
RW-050-PZ
Chromium VI (T): 5.0 J
Thallium (D): 3.6 J
RW-027-PZ
Cobalt (D): 51.1
Manganese (D): 1,250
RW-021-PZ
Arsenic (D): 21.7
Iron (D): 73,200
Manganese (D): 2,030
RW-025-PZ
Arsenic (D): 10.1
Chromium VI (T): 5.0 J
Development Area
(D) = Dissolved
(T) = Total
Parcel A3 (Rod & Wire Mill)
Groundwater Inorganic Exceedances (ug/L)
Shallow Hydrogeologic Zone
September 7, 2016
Figure
GW-6
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 75 150 300
Feet
Existing Site-wide Well (Shallow)
Phase II Piezometer (Shallow)
Parcel A3 (RWM) boundary


RW07-PZM017
Antimony (T): 7.3
Cadmium (T): 9,780
Cobalt (T): 144
Iron (T): 283,000
Manganese (T): 17,500
Zinc (T): 387,000
RW02-PZM020
Antimony (T): 11.0
Cadmium (T): 47.2
Cobalt (T): 113
Iron (T): 443,000
Manganese (T): 19,000
Zinc (T): 576,000
RW19-PZM020
Cadmium (T): 41.9
Cobalt (T): 38.5
Iron (T): 37,000
Manganese (T): 2,580
Zinc (T): 7,000
RW10-PZM020
Antimony (T): 7.9
Cadmium (T): 10,200
Cobalt (T): 114
Iron (T): 202,000
Manganese (T): 18,000
Zinc (T): 509,000
RW20-PZM020
Cobalt (T): 53.1
Iron (T): 226,000
Manganese (T): 9,210
Zinc (T): 82,800
Parcel A3
Development Area
(D) = Dissolved
(T) = Total
Parcel A3 (Rod & Wire Mill)
Groundwater Inorganic Exceedances (ug/L)
Intermediate Hydrogeologic Zone
September 7, 2016
Figure
GW-7
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Existing Site-wide Well (Intermediate)
Parcel A3 (RWM) boundary



RW-052-SB/RW-055-SB Delineation
Arsenic/Lead Results (All Screening Depths)
Aerial View
December 1, 2016

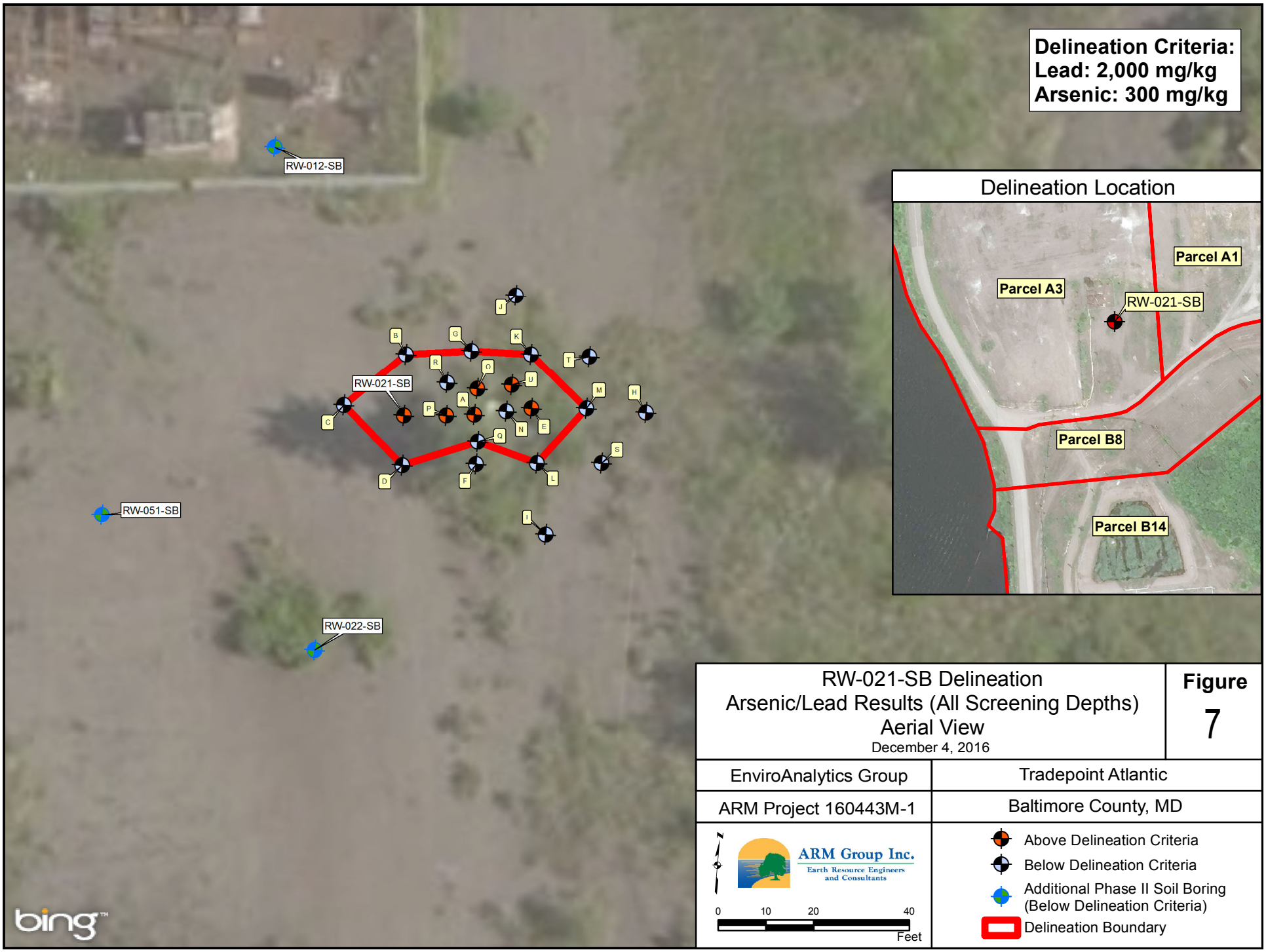
Figure 6

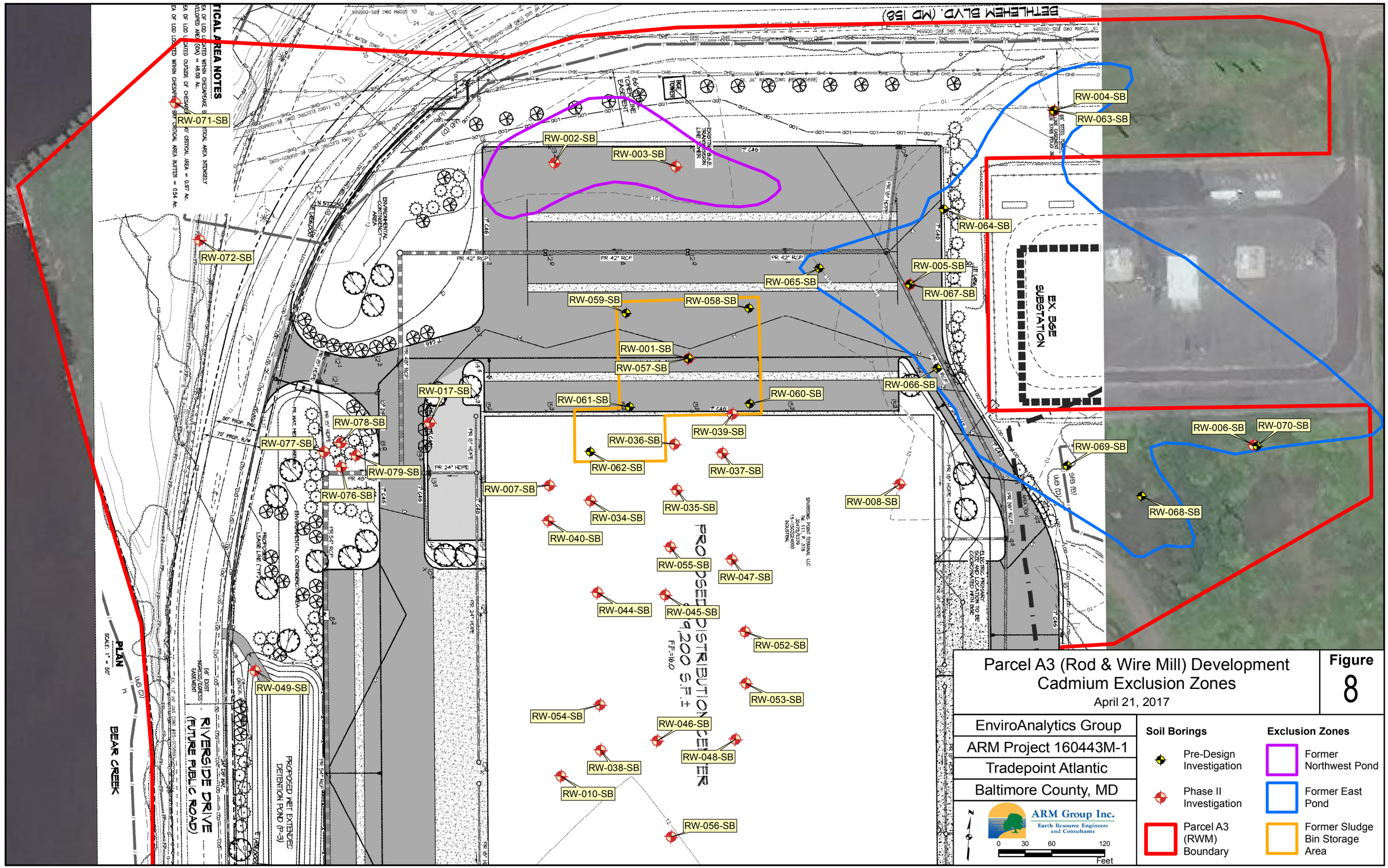
EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 15 30 60
Feet

- Above Delineation Criteria
- Below Delineation Criteria
- Additional Phase II Soil Boring (Below Delineation Criteria)
- Delineation Boundary


Delineation Criteria:
Lead: 2,000 mg/kg
Arsenic: 300 mg/kg
RW-012-SB
RW-021-SB
RW-051-SB
RW-022-SB
Delineation Location
Parcel A1
Parcel A3
RW-021-SB
Parcel B8
Parcel B14
bing
RW-021-SB Delineation
Arsenic/Lead Results (All Screening Depths)
Aerial View
December 4, 2016
Figure
7
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
10
20
40
Feet
Above Delineation Criteria
Below Delineation Criteria
Additional Phase II Soil Boring (Below Delineation Criteria)
Delineation Boundary



Parcel A3 (Rod & Wire Mill) Development
Cadmium Exclusion Zones

April 21, 2017

Figure 8

EnviroAnalytics Group

ARM Project 160443M-1

Tradepoint Atlantic

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 30 60 120
Feet

Soil Borings

- Pre-Design Investigation
- Phase II Investigation

Exclusion Zones

- Parcel A3 (RWM) Boundary
- Former Northwest Pond
- Former East Pond
- Former Sludge Bin Storage Area

Parcel A3 (Rod & Wire Mill)
Vapor Intrusion Criteria Exceedances (ug/L)
Shallow Zone
October 20, 2016

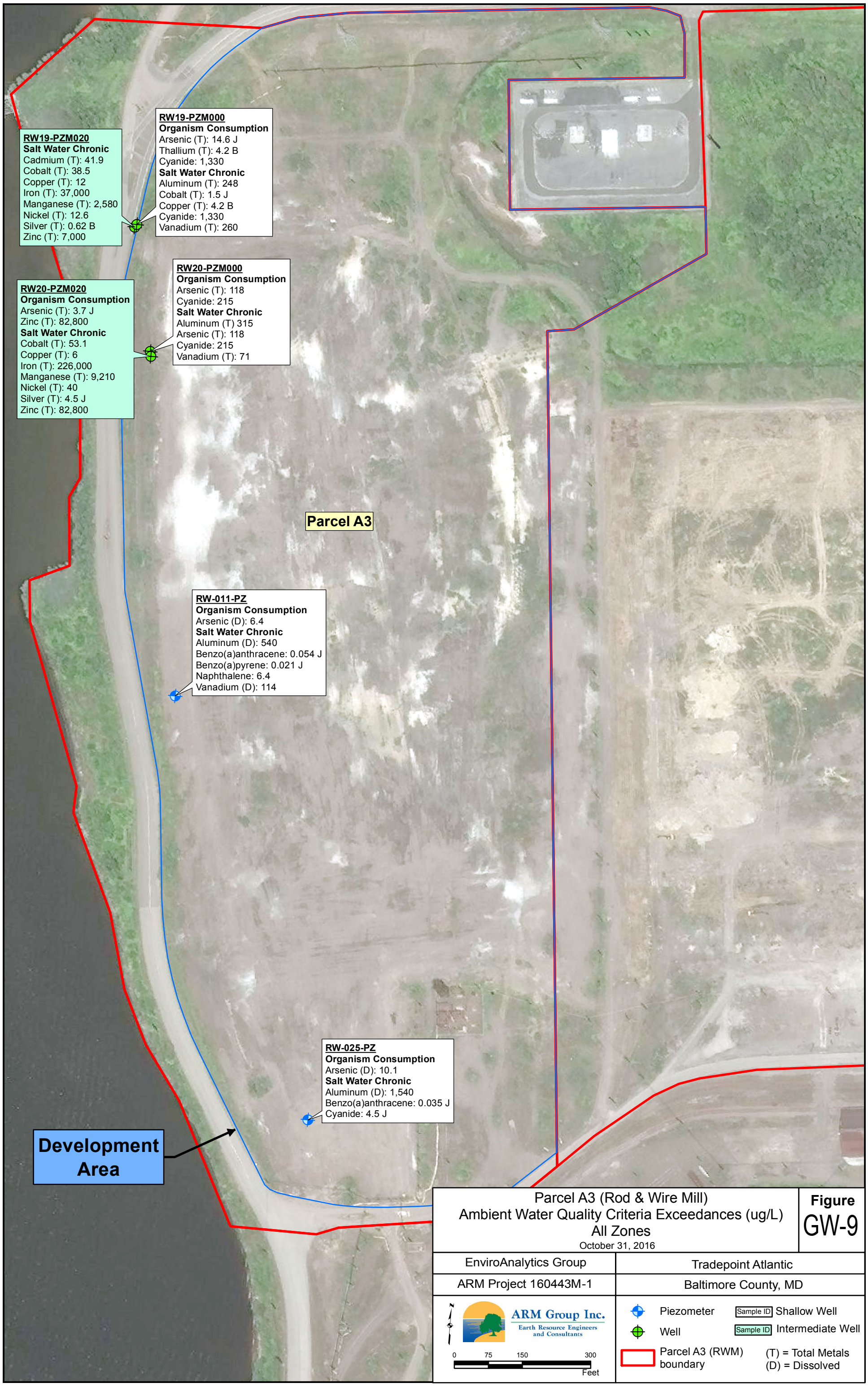
Figure
GW-8

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

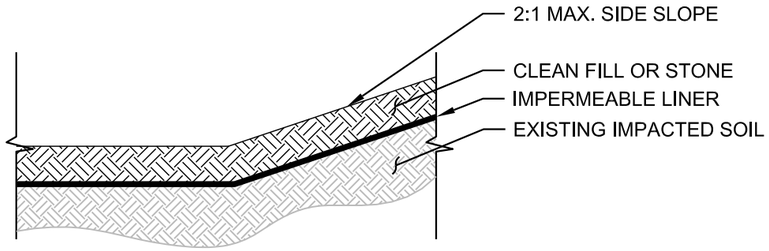
0 75 150 300
Feet

Piezometer
Well
Parcel A3 (RWM) boundary

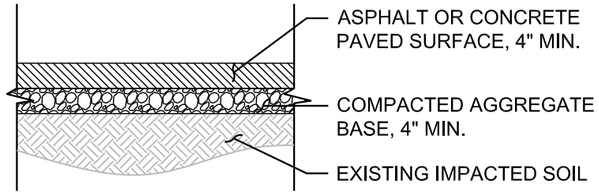

RW19-PZM020
Salt Water Chronic
Cadmium (T): 41.9
Cobalt (T): 38.5
Copper (T): 12
Iron (T): 37,000
Manganese (T): 2,580
Nickel (T): 12.6
Silver (T): 0.62 B
Zinc (T): 7,000
RW19-PZM000
Organism Consumption
Arsenic (T): 14.6 J
Thallium (T): 4.2 B
Cyanide: 1,330
Salt Water Chronic
Aluminum (T): 248
Cobalt (T): 1.5 J
Copper (T): 4.2 B
Cyanide: 1,330
Vanadium (T): 260
RW20-PZM020
Organism Consumption
Arsenic (T): 3.7 J
Zinc (T): 82,800
Salt Water Chronic
Cobalt (T): 53.1
Copper (T): 6
Iron (T): 226,000
Manganese (T): 9,210
Nickel (T): 40
Silver (T): 4.5 J
Zinc (T): 82,800
RW20-PZM000
Organism Consumption
Arsenic (T): 118
Cyanide: 215
Salt Water Chronic
Aluminum (T) 315
Arsenic (T): 118
Cyanide: 215
Vanadium (T): 71
Parcel A3
RW-011-PZ
Organism Consumption
Arsenic (D): 6.4
Salt Water Chronic
Aluminum (D): 540
Benzo(a)anthracene: 0.054 J
Benzo(a)pyrene: 0.021 J
Naphthalene: 6.4
Vanadium (D): 114
RW-025-PZ
Organism Consumption
Arsenic (D): 10.1
Salt Water Chronic
Aluminum (D): 1,540
Benzo(a)anthracene: 0.035 J
Cyanide: 4.5 J
Development Area
Parcel A3 (Rod & Wire Mill)
Ambient Water Quality Criteria Exceedances (ug/L)
All Zones
October 31, 2016
Figure
GW-9
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 75 150 300
Feet
Piezometer
Sample ID Shallow Well
Well
Sample ID Intermediate Well
Parcel A3 (RWM) boundary
(T) = Total Metals
(D) = Dissolved

P:\EnviroAnalytics Group\160443M EAG_TPA Redevelopment\Drwg\A3\Site Development\Figure 8 - Environmental Capping Detail.dwg Plotted: January 18, 2017

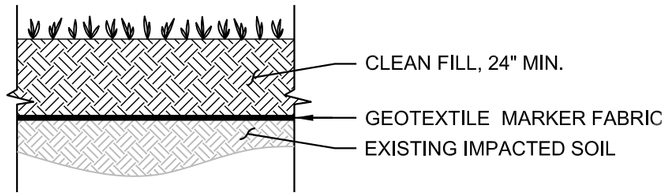
Figure 9a	drawing title: ENVIRONMENTAL CAPPING PLAN	designed JMA	scale 1" = 200'	ARM Group Inc. Earth Resource Engineers and Consultants www.armgroup.net
		checked TNP	date 1/18/2017	
		drawn JMA	project no. 160443M-1-1	
	project title: SPARROWS POINT AREA A ENVIROANALYTICS GROUP	SPARROWS POINT BALTIMORE COUNTY, MARYLAND	0 200 400 SCALE IN FEET	



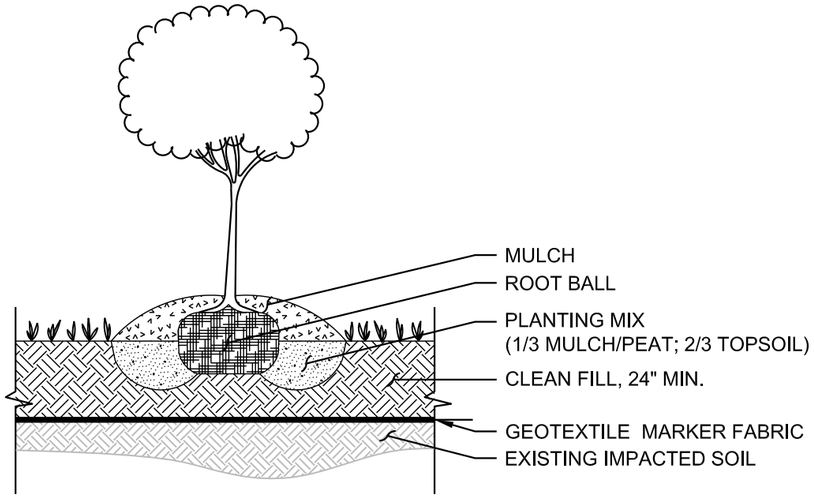
TYPICAL POND SECTION
NOT TO SCALE



TYPICAL PAVING SECTION
NOT TO SCALE



TYPICAL LANDSCAPE SECTION
NOT TO SCALE



TYPICAL PLANTING SECTION
NOT TO SCALE

GEOTEXTILE MARKER FABRIC SPECIFICATIONS

THE GEOTEXTILE MARKER FABRIC SHALL BE A NONWOVEN PERVIOUS SHEET OF POLYPROPYLENE MATERIAL. ADD STABILIZERS AND/OR INHIBITORS TO THE BASE MATERIAL, AS NEEDED, TO MAKE THE FILAMENTS RESISTANT TO DETERIORATION BY ULTRAVIALET LIGHT, OXIDATION AND HEAT EXPOSURE. REGRIND MATERIAL, WHICH CONSISTS OF EDGE TRIMMINGS AND OTHER SCRAPS THAT HAVE NEVER REACHED THE CONSUMER, MAY BE USED TO PRODUCE THE GEOTEXTILE. POST-CONSUMER RECYCLED MATERIAL MAY BE USED. GEOTEXTILE SHALL BE FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER, INCLUDING THE EDGES. GEOTEXTILES SHALL MEET THE REQUIRE,MENTS SPECIFIED IN TABLE 1. WHERE APPLICABLE, TABLE 1 PROPERTY VALUES REPRESENT THE MINIMUM AVERAGE ROLL VALUES IN THE WEAKEST PRINCIPAL DIRECTION. VALUES FOR APPARENT OPENING SIZE (AOS) REPRESENT MAXIMUM AVERAGE ROLL VALUES

TABLE 1

		WOVEN SLIT FILM GEOTEXTILE		WOVEN MONOFILAMENT GEOTEXTILE		NONWOVEN GEOTEXTILE	
		MINIMUM AVERAGE ROLL VALUE[1]					
PROPERTY	TEST METHOD	MD	CD	MD	CD	MD	CD
Grab Tensile Strength	ASTM D-4632	200 lb	200 lb	370 lb	250 lb	200 lb	200 lb
Grab Tensile Elongation	ASTM D-4632	15%	10%	15%	15%	50%	50%
Trapezoidal Tear Strength	ASTM D-4533	75 lb	75 lb	100 lb	60 lb	80 lb	80 lb
Puncture Strength	ASTM D-6241	450 lb		900 lb		450 lb	
Apparent Opening Size[2]	ASTM D-4751	U.S. Sieve 30 (0.59 mm)		U.S. Sieve 70 (0.21 mm)		U.S. Sieve 70 (0.21 mm)	
Permittivity	ASTM D-4491	0.05 sec^{-1}		0.28 sec^{-1}		1.1 sec^{-1}	
Ultraviolet Resistance Retained at 500 hours	ASTM D-4355	70% strength		70% strength		70% strength	

[1] All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.

[2] Values for AOS represent the average maximum opening.

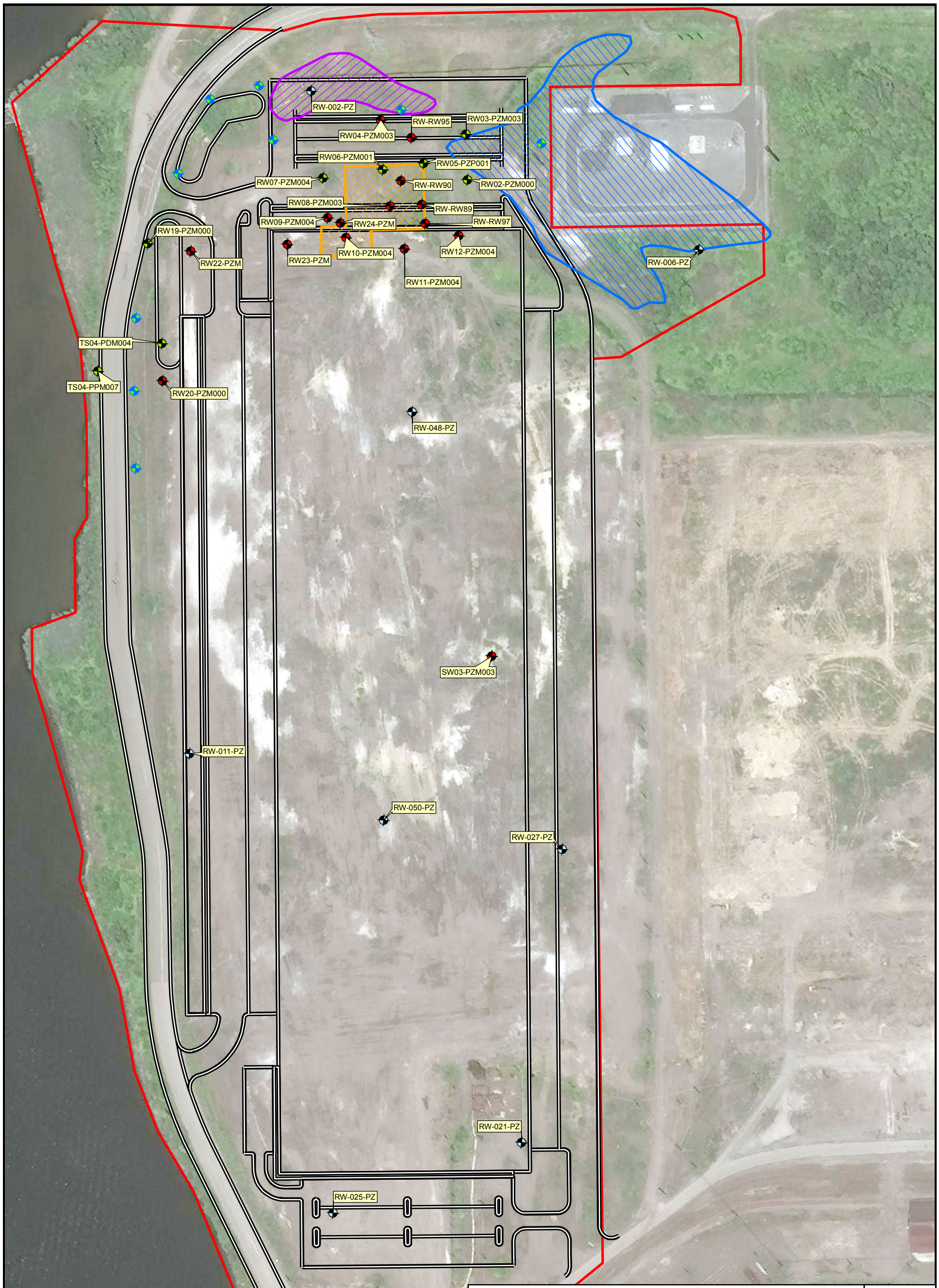
ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

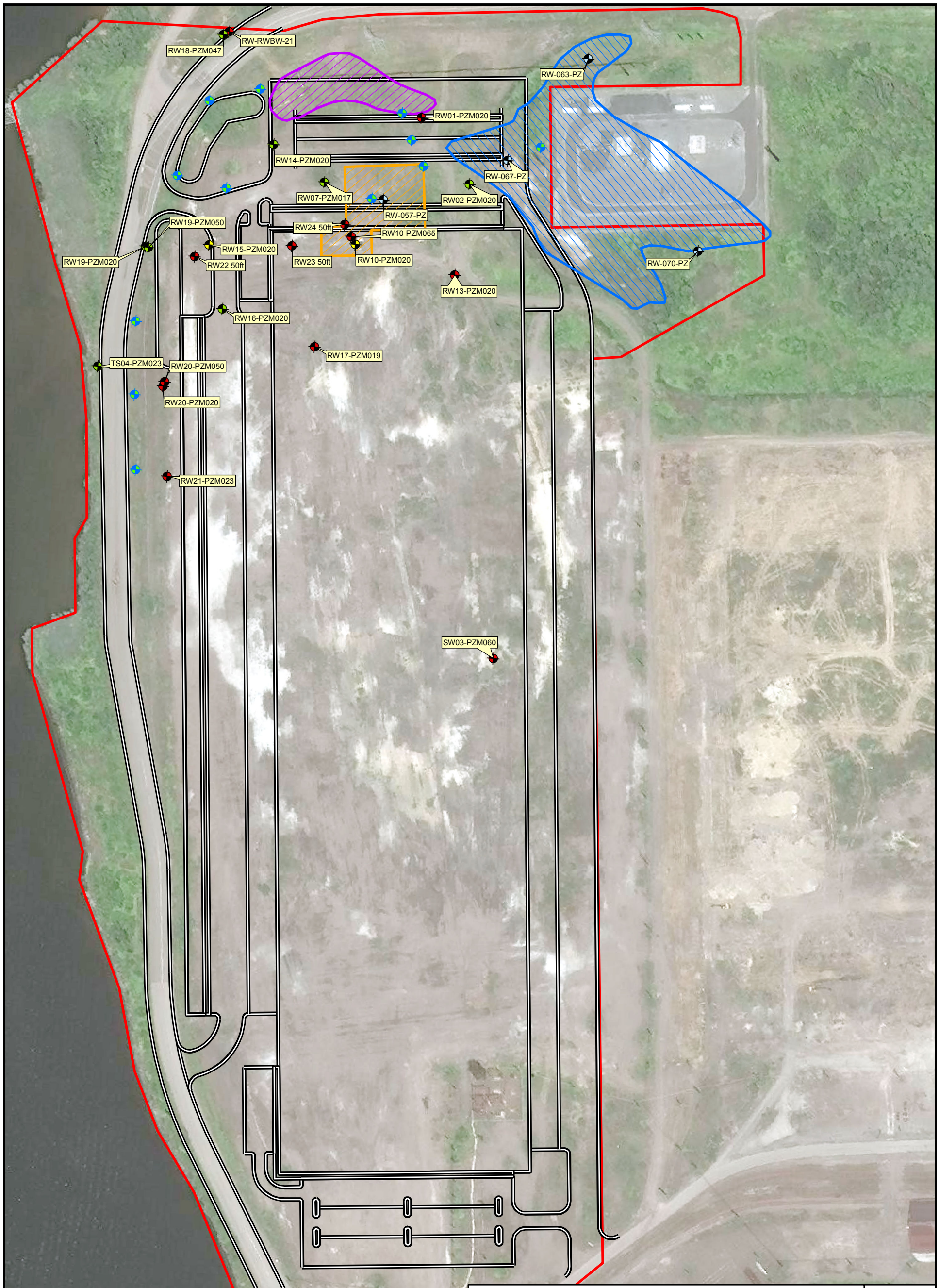
designed JMA
checked TNP
drawn JMA
scale AS NOTED
date 1/18/2017
project no. 160443M-1-1

drawing title: ENVIRONMENTAL CAPPING DETAILS

project title: SPARROWS POINT AREA A ENVIROANALYTICS GROUP
SPARROWS POINT BALTIMORE COUNTY, MARYLAND

Figure 9b


RW-002-PZ
RW-RW95
RW03-PZM003
RW04-PZM003
RW06-PZM001
RW05-PZP001
RW07-PZM004
RW-RW90
RW02-PZM000
RW08-PZM003
RW-RW89
RW09-PZM004
RW24-PZM
RW-RW97
RW19-PZM000
RW22-PZM
RW23-PZM
RW10-PZM004
RW12-PZM004
RW-006-PZ
RW11-PZM004
TS04-PDM004
TS04-PPM007
RW20-PZM000
RW-048-PZ
SW03-PZM003
RW-011-PZ
RW-050-PZ
RW-027-PZ
RW-021-PZ
RW-025-PZ
Parcel A3 (Rod & Wire Mill)
Enhanced GW Monitoring Network
Proposed Shallow Zone
April 21, 2017
Figure
10
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Shallow Zone Monitoring Well (abandon)
Shallow Zone Piezometer (abandon)
Shallow Zone Monitoring Well (keep)
Shallow Zone Monitoring Well (new)
Former Northwest Pond
Former East Pond
Former Sludge Bin Storage Area



Parcel A3 (Rod & Wire Mill)
Enhanced GW Monitoring Network
Proposed Intermediate/Lower Zone
April 21, 2017

Figure 11

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 160443M-1	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300
Feet

- Intermediate/Lower Zone Monitoring Well (abandon)
- Intermediate Zone Piezometer (abandon)
- Intermediate Zone Monitoring Well (relocate)
- Intermediate/Lower Zone Monitoring Well (keep)
- Intermediate Zone Monitoring Well (new)
- Former Northwest Pond
- Former East Pond
- Former Sludge Bin Storage Area

TABLES

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-001-SB-1	RW-001-SB-5	RW-002-SB-1	RW-002-SB-4.5	RW-003-SB-1	RW-003-SB-4.5	RW-003-SB-5	RW-004-SB-1	RW-004-SB-5	RW-004-SB-10	RW-005-SB-1	RW-005-SB-5	RW-006-SB-1	RW-006-SB-5	RW-007-SB-1	RW-007-SB-5	RW-008-SB-1
Volatile Organic Compound																			
1,1,2-Trichloroethane	mg/kg	5	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
1,1-Dichloroethane	mg/kg	16	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
1,2,3-Trichlorobenzene	mg/kg	930	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 UJ	0.0044 U	0.0064 U	0.0041 U	0.0047 U
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 UJ	0.0044 U	0.0064 UJ	0.0041 UJ	0.0047 U
1,2-Dichloroethane	mg/kg	2	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.012 U	0.013 U	0.0099 U	0.012 U	0.01 U	N/A	0.011 U	0.0089 U	0.0092 U	N/A	0.012 U	0.0082 U	0.011 U	0.0088 U	0.013 U	0.0081 U	0.0094 U
1,4-Dichlorobenzene	mg/kg	11	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 UJ	0.0044 U	0.0064 U	0.0041 U	0.0047 U
2-Butanone (MEK)	mg/kg	190,000	**0.0082 J**	**0.0032 J**	**0.011**	**0.0092 J**	**0.0055 J**	N/A	**0.0059 J**	**0.0025 J**	**0.0096**	N/A	**0.003 J**	**0.00091 J**	**0.0099 J**	**0.0013 J**	0.013 U	0.0081 U	**0.0045 J**
2-Hexanone	mg/kg	1,300	0.012 U	0.013 U	0.0099 U	0.012 U	0.01 U	N/A	0.011 U	0.0089 U	0.0092 U	N/A	0.012 U	0.0082 U	0.011 U	0.0088 U	0.013 U	0.0081 U	0.0094 U
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.012 U	0.013 U	0.0099 U	0.012 U	0.01 U	N/A	0.011 U	0.0089 U	**0.0014 J**	N/A	0.012 U	0.0082 U	0.011 U	0.0088 U	0.013 U	0.0081 U	0.0094 U
Acetone	mg/kg	670,000	**0.068**	**0.036**	**0.12**	**0.039**	**0.066**	N/A	**0.017**	**0.019**	**0.036**	N/A	**0.021**	**0.0098**	**0.097**	**0.013**	**0.046**	0.0081 U	**0.033**
Benzene	mg/kg	5.1	0.0058 U	0.0064 U	**0.0013 J**	**0.001 J**	**0.0007 J**	N/A	**0.0029 J**	**0.00053 J**	**0.0058**	N/A	**0.0016 J**	0.0041 U	**0.00066 J**	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Bromoform	mg/kg	86	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 UJ	0.0044 U	0.0064 UJ	0.0041 UJ	0.0047 U
Carbon disulfide	mg/kg	3,500	**0.0091**	**0.0026 J**	**0.0056**	**0.016**	**0.0055**	N/A	**0.0025 J**	**0.0041 J**	**0.0074**	N/A	**0.0094**	**0.0015 J**	**0.0039 J**	**0.0046**	**0.014**	**0.006**	0.0047 U
Chloroform	mg/kg	1.4	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Chloromethane	mg/kg	460	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Cyclohexane	mg/kg	27,000	0.012 U	0.013 U	**0.00061 J**	**0.001 J**	0.01 U	N/A	**0.0033 J**	0.0089 U	**0.0041 J**	N/A	0.012 U	0.0082 U	0.011 U	0.0088 U	0.013 U	0.0081 U	0.0094 U
Ethylbenzene	mg/kg	25	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	**0.0013 J**	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Isopropylbenzene	mg/kg	9,900	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 UJ	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Methyl Acetate	mg/kg	1,200,000	0.058 U	0.064 U	0.049 U	0.06 U	0.051 U	N/A	0.056 U	0.045 U	0.046 U	N/A	0.062 U	0.041 U	0.053 U	0.044 U	0.064 U	0.041 U	0.047 U
Methylene Chloride	mg/kg	1,000	**0.0046 J**	**0.0059 J**	**0.0036 J**	0.006 U	0.0051 U	N/A	**0.0033 J**	**0.003 J**	**0.0022 J**	N/A	**0.0037 J**	**0.0039 J**	**0.0034 J**	**0.0043 J**	0.0064 U	0.0041 U	**0.0045 J**
Styrene	mg/kg	35,000	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Tetrachloroethene	mg/kg	100	0.0058 U	0.0064 U	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Toluene	mg/kg	47,000	0.0058 U	0.0064 U	**0.00085 J**	**0.0007 J**	**0.00061 J**	N/A	**0.0019 J**	**0.00041 J**	**0.0043 J**	N/A	**0.0015 J**	0.0041 U	**0.00074 J**	**0.00085 J**	0.0064 U	0.0041 U	0.0047 U
Trichloroethene	mg/kg	6	0.0058 U	**0.0008 J**	0.0049 U	0.006 U	0.0051 U	N/A	0.0056 U	0.0045 U	0.0046 U	N/A	0.0062 U	0.0041 U	0.0053 U	0.0044 U	0.0064 U	0.0041 U	0.0047 U
Xylenes	mg/kg	2,800	0.017 U	0.019 U	0.015 U	0.018 U	0.015 U	N/A	0.017 U	0.013 U	**0.0043 J**	N/A	0.019 U	0.012 U	0.016 U	0.013 U	0.019 U	0.012 U	0.014 U
Semi-Volatile Organic Compound*																			
1,1-Biphenyl	mg/kg	200	0.083 U	0.075 U	0.069 U	0.07 U	0.069 U	0.074 U	N/A	**0.027 J**	**0.28**	0.077 U	0.081 U	0.076 U	**0.36**	0.077 U	**0.047 J**	0.37 U	0.074 U
2,4,5-Trichlorophenol	mg/kg	82,000	0.21 U	0.19 U	0.17 U	0.18 U	0.17 U	0.19 U	N/A	0.18 U	0.18 U	0.19 U	0.2 U	0.19 U	0.18 R	0.19 U	0.19 R	0.92 U	0.19 U
2,4-Dimethylphenol	mg/kg	16,000	0.083 U	0.075 U	0.069 U	0.07 U	0.069 U	0.074 U	N/A	0.072 U	**0.016 J**	0.077 U	0.081 U	0.076 U	0.072 R	0.077 U	0.074 R	0.37 U	0.074 U
2-Methylnaphthalene	mg/kg	3,000	0.0076 U	0.0084 U	**0.066**	**0.0044 J**	**0.092**	N/A	**0.013**	**0.015**	**0.35**	**0.13 J**	**0.0069 J**	0.0078 U	**0.045**	0.0083 U	**0.078**	0.0075 U	0.0073 U
2-Methylphenol	mg/kg	41,000	0.083 U	0.075 U	0.069 U	0.07 U	0.069 U	0.074 U	N/A	0.072 U	**0.015 J**	0.077 U	0.081 U	0.076 U	0.072 R	0.077 U	0.074 R	0.37 U	0.074 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.17 U	0.15 U	0.14 U	0.14 U	0.14 U	0.15 U	N/A	0.14 U	**0.059 J**	0.15 U	0.16 U	0.15 U	0.14 R	0.15 U	0.15 R	0.73 U	0.15 U
Acenaphthene	mg/kg	45,000	0.0076 U	0.0084 U	**0.0068 J**	0.0071 U	**0.027**	N/A	**0.0026 J**	**0.0044 J**	**0.19**	**0.052 J**	**0.0032 J**	0.0078 U	**0.016**	0.0083 U	**0.17**	0.0075 U	0.0073 U
Acenaphthylene	mg/kg	45,000	0.0076 U	0.0084 U	**0.026**	**0.025**	**0.016**	N/A	**0.014**	**0.14**	**1**	**0.24 J**	**0.0066 J**	0.0078 U	**0.07**	0.0083 U	**0.11**	0.0075 U	0.0073 U
Acetophenone	mg/kg	120,000	0.083 U	0.075 U	0.069 U	0.07 U	0.069 U	0.074 U	N/A	0.072 U	0.074 U	0.077 U	0.081 U	0.076 U	0.072 U	0.077 U	**0.019 J**	0.37 U	0.074 U
Anthracene	mg/kg	230,000	**0.002 J**	0.0084 U	**0.029**	**0.0098**	**0.033**	N/A	**0.014**	**0.088**	**1.9**	**0.45 J**	**0.0037 J**	0.0078 U	**0.067**	**0.0011 J**	**0.7**	0.0075 U	0.0073 U
Benz[a]anthracene	mg/kg	2.9	**0.011**	0.0084 U	**0.13**	**0.044**	**0.13**	N/A	**0.046**	**0.41 J**	**4.3**	**0.9 J**	**0.011**	0.0078 U	**0.35**	**0.0048 J**	**2.2**	**0.0055 J**	**0.0033 J**
Benzaldehyde	mg/kg	120,000	0.083 R	0.075 R	**0.018 J**	0.07 R	0.069 R	0.074 R	N/A	0.072 R	0.074 R	0.077 UJ	0.081 R	0.076 R	0.072 R	0.077 R	0.074 R	0.37 U	0.074 R
Benzo[a]pyrene	mg/kg	0.29	**0.014**	0.0084 U	**0.19**	**0.078**	**0.17**	N/A	**0.053**	**0.51**	**3.9**	**0.91 J**	**0.011**	0.0078 U	**0.44**	**0.0051 J**	**1.9**	0.0075 U	0.0073 U
Benzo[b]fluoranthene	mg/kg	2.9	**0.02**	0.0084 U	**0.43**	**0.16**	**0.46**	N/A	**0.096**	**0.82 J**	**9.2**	**2.8 J**	**0.034**	0.0078 U	**0.81**	**0.0073 J**	**3**	0.0075 U	**0.012**
Benzo[g,h,i]perylene	mg/kg		**0.012**	0.0084 U	**0.042**	**0.019**	0.007 U	N/A	**0.015**	**0.41**	**2.3**	**0.45 J**	**0.01**	0.0078 U	**0.25**	**0.0039 J**	**0.93**	**0.0022 J**	**0.0019 J**
Benzo[k]fluoranthene	mg/kg	29	**0.0098**	0.0084 U	**0.17**	**0.059**	**0.41**	N/A	**0.034**	**0.27**	**7.4**	**0.65 J**	**0.027**	0.0078 U	**0.23**	**0.0035 J**	**0.96**	0.0075 U	**0.0058 J**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.083 UJ	0.075 UJ	0.069 U	0.07 U	0.069 U	0.074 U	N/A	0.072 U	0.074 UJ	0.077 U	0.081 UJ	0.076 UJ	0.072 UJ	0.077 UJ	0.074 UJ	0.37 U	0.074 UJ
Caprolactam	mg/kg	400,000	0.21 UJ	0.19 UJ	0.17 U	0.18 U	0.17 U	0.19 U	N/A	0.18 U	0.18 UJ	0.19 U	0.2 UJ	0.19 UJ	0.18 UJ	0.19 UJ	0.19 U	0.92 U	0.19 UJ
Carbazole	mg/kg		0.083 U	0.075 U	0.069 U	0.07 U	0.069 U	0.074 U	N/A	**0.046 J**	**1.5 J**	0.077 U	0.081 U	0.076 U	**0.023 J**	0.077 U	**0.31**	0.37 U	0.074 U
Chrysene	mg/kg	290	**0.013**	0.0084 U	**0.18**	**0.056**	**0.14**	N/A	**0.05**	**0.4 J**	**4.1**	**0.83 J**	**0.014**	0.0078 U	**0.36**	**0.0051 J**	**2.1**	**0.0043 J**	**0.0056 J**
Dibenz[a,h]anthracene	mg/kg	0.29	0.0076 U	0.0084 U	**0.019**	**0.013**	**0.017**	N/A	0.0075 U	**0.15**	**0.96**	**0.18 J**	0.008 U	0.0078 U	**0.11**	0.0083 U	**0.4**	0.0075 U	0.0073 U
Di-n-butylphthalate	mg/kg	82,000	0.083 U	0.075 U	0.069 U	0.07 U	0.069 U	0.074 U	N/A	0.072 U	0.074 U	0.077 U	0.081 U	0.076 U	0.072 U	0.077 U	0.074 U	0.37 U	0.074 U
Di-n-octylphthalate	mg/kg	8,200	0.083 UJ	0.075 UJ	0.069 U	0.07 U	0.069 U	0.074 U	N/A	0.072 U	0.074 UJ	0.077 U	0.081 UJ	0.076 UJ	0.072 UJ	0.077 UJ	0.074 UJ	0.37 U	0.074 UJ
Fluoranthene	mg/kg	30,000	**0.018**	0.0084 U	**0.28**	**0.056**	**0.23**	N/A	**0.13**	**0.56 J**	**9.4**	**3.2 J**	**0.03**	0.0078 U	**0.59**	**0.011**	**4.2**	**0.0095**	**0.0049 J**
Fluorene	mg/kg	30,000	**0.00073 J**	0.0084 U	**0.01**	**0.0032 J**	**0.016**	N/A	**0.007 J**	**0.013**	**0.76**	**0.37 J**	**0.0038 J**	0.0078 U	**0.018**	**0.003 J**	**0.23**	**0.00083 J**	0.0073 U
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.01**	0.0084 U	**0.051**	**0.027**	**0.056**	N/A	**0.018**	**0.43**	**2.5**	**0.47 J**	**0.0089**	0.0078 U	**0.29**	0.0083 U	**1.1**	0.0075 U	0.0073 U
Naphthalene	mg/kg	17	0.0076 U	0.0084 U	**0.067**	**0.021**	**0.061**	N/A	**0.082**	**0.09**	**2.2**	**0.57 J**	**0.012**	0.0078 U	**0.16**	**0.0027 J**	**0.16**	**0.012**	0.0073 U
Phenanthrene	mg/kg		**0.0069 J**	0.0084 U	**0.14**	**0.02**	**0.15**	N/A	**0.041**	**0.17**	**4.8**	**2.9 J**	**0.022**	0.0078 U	**0.28**	**0.0071 J**	**2.4**	0.0075 U	0.0073 U
Phenol	mg/kg	250,000	0.083 U	0.075 U	0.069 U	0.07 U	0.069 U	0.074 U	N/A	0.072 U	**0.082**	0.077 U	0.081 U	0.076 U	0.072 R	0.077 U	0.074 R	0.37 U	0.074 U
Pyrene	mg/kg	23,000	**0.018**	0.0084 U	**0.25**	**0.066**	**0.21**	N/A	**0.14**	**0.49 J**	**7.4**	**1.3 J**	**0.022**	0.0078 U	**0.49**	**0.0076 J**	**3.7**	**0.0081**	**0.0058 J**
PCBs																			
Aroclor 1242	mg/kg	0.97	0.019 U	N/A	0.018 U	N/A	0.018 U	N/A	N/A	0.018 U	N/A	N/A	0.02 U	N/A	0.037 U	N/A	0.19 U	N/A	0.018 U
Aroclor 1248	mg/kg	0.94	0.019 U	N/A	0.018 U	N/A	0.018 U	N/A	N/A	0.018 U	N/A	N/A	0.02 U	N/A	0.037 U	N/A	0.19 U	N/A	0.018 U
Aroclor 1254	mg/kg	0.97	0.019 U	N/A	0.018 UJ	N/A	0.018 UJ	N/A	N/A	0.018 U	N/A	N/A	0.02 U	N/A	0.037 U	N/A	0.19 U	N/A	0.018 U
Aroclor 1260	mg/kg	0.99	0.019 U	N/A	0.018 U	N/A	**0.18 J**	N/A	N/A	**0.022**	N/A	N/A	**0.015 J**	N/A	**0.12**	N/A	0.19 U	N/A	0.018 U
PCBs (total)	mg/kg	0.97	0.13 U	N/A	0.12 U	N/A	**0.18**	N/A	N/A	0.13 U	N/A	N/A	0.14 U	N/A	**0.12 J**	N/A	1.3 U	N/A	0.13 U
TPH/Oil and Grease																			
Diesel Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gasoline Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	mg/kg	6,200	**264**	**345**	**561**	**590**	**2,270**	N/A	**360**	**301**	**12,400**	N/A	**329**	**242**	**327**	**262**	**525**	**559**	**237**

Detections in bold
*PAH compounds were analyzed via SIM
Values in Red indicate an exceedance of the Project Action Limit (PAL)
Gray highlighting indicates boring locations within the building footprint

R: The analytical result was rejected during validation.
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.
N/A: This parameter was not analyzed for this sample.

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-008-SB-5	RW-009-SB-1	RW-009-SB-5	RW-010-SB-1	RW-010-SB-7	RW-010-SB-10	RW-011-SB-1	RW-011-SB-5	RW-012-SB-1	RW-012-SB-5	RW-013-SB-1	RW-013-SB-5	RW-014-SB-1	RW-014-SB-5	RW-015-SB-1	RW-015-SB-5	RW-015-SB-10
Volatile Organic Compound																			
1,1,2-Trichloroethane	mg/kg	5	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	**0.00053 J**	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
1,1-Dichloroethane	mg/kg	16	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
1,2,3-Trichlorobenzene	mg/kg	930	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
1,2-Dichloroethane	mg/kg	2	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	**0.0011 J**	0.0048 U	0.0049 U	N/A
1,2-Dichloroethene (Total)	mg/kg	2,300	0.01 U	0.01 U	0.009 U	0.0087 U	**0.0093 J**	**0.0079 J**	0.0099 U	0.013 U	0.011 U	0.0084 U	0.01 U	0.0099 U	0.011 U	0.0097 U	0.0097 U	0.0098 U	N/A
1,4-Dichlorobenzene	mg/kg	11	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
2-Butanone (MEK)	mg/kg	190,000	**0.0016 J**	0.01 U	0.009 U	0.0087 U	0.0096 U	0.01 R	**0.0053 J**	**0.0057 J**	**0.0052 J**	0.0084 U	0.01 U	0.0099 U	0.011 U	0.0097 U	0.0097 U	0.0098 U	N/A
2-Hexanone	mg/kg	1,300	0.01 U	0.01 U	0.009 U	**0.0013 J**	0.0096 U	0.01 R	0.0099 U	0.013 U	0.011 U	0.0084 U	0.01 U	0.0099 U	0.011 U	0.0097 U	0.0097 U	0.0098 U	N/A
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.01 U	0.01 U	0.009 U	0.0087 U	0.0096 U	0.01 R	0.0099 U	0.013 U	0.011 U	0.0084 U	0.01 U	0.0099 U	0.011 U	0.0097 U	0.0097 U	0.0098 U	N/A
Acetone	mg/kg	670,000	**0.018**	0.01 U	0.009 U	0.0087 UJ	0.0096 UJ	**0.0063 J**	**0.026**	**0.047**	**0.029 J**	**0.025 J**	**0.015**	0.0099 U	**0.016**	**0.019**	**0.025 J**	0.0098 UJ	N/A
Benzene	mg/kg	5.1	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Bromoform	mg/kg	86	0.005 U	0.0052 UJ	0.0045 UJ	0.0044 UJ	0.0048 UJ	0.0051 R	0.005 UJ	0.0067 UJ	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Carbon disulfide	mg/kg	3,500	**0.0018 J**	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	**0.015**	**0.0042 J**	**0.0094**	**0.0025 J**	**0.0083**	0.005 U	0.0054 U	**0.0049**	**0.011**	0.0049 U	N/A
Chloroform	mg/kg	1.4	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Chloromethane	mg/kg	460	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
cis-1,2-Dichloroethene	mg/kg	2,300	0.005 U	0.0052 U	0.0045 U	0.0044 U	**0.0085**	**0.0079 J**	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Cyclohexane	mg/kg	27,000	0.01 U	0.01 U	0.009 U	0.0087 U	0.0096 U	0.01 R	0.0099 U	**0.0058 J**	0.011 U	0.0084 U	0.01 U	0.0099 U	0.011 U	0.0097 U	0.0097 U	0.0098 U	N/A
Ethylbenzene	mg/kg	25	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Isopropylbenzene	mg/kg	9,900	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Methyl Acetate	mg/kg	1,200,000	**0.0022 J**	0.052 U	0.045 U	0.044 U	0.048 U	0.051 R	0.05 U	0.067 U	0.054 U	0.042 U	0.051 U	0.05 U	0.054 U	0.049 U	0.048 U	0.049 U	N/A
Methylene Chloride	mg/kg	1,000	**0.0029 J**	**0.0057**	**0.0038 J**	0.0044 U	0.0048 U	**0.0052 J**	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	**0.0042 B**	0.0049 U	N/A
Styrene	mg/kg	35,000	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Tetrachloroethene	mg/kg	100	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	**0.001 J**	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Toluene	mg/kg	47,000	0.005 U	0.0052 U	0.0045 U	0.0044 U	0.0048 U	0.0051 R	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Trichloroethene	mg/kg	6	0.005 U	0.0052 U	**0.0044 J**	**0.0045**	6.1	N/A	0.005 U	0.0067 U	0.0054 U	0.0042 U	0.0051 U	0.005 U	0.0054 U	0.0049 U	0.0048 U	0.0049 U	N/A
Xylenes	mg/kg	2,800	0.015 U	0.016 U	0.014 U	0.013 U	0.014 U	0.015 R	0.015 U	0.02 U	0.016 U	0.013 U	0.015 U	0.015 U	0.016 U	0.015 U	0.015 U	0.015 U	N/A
Semi-Volatile Organic Compound*																			
1,1-Biphenyl	mg/kg	200	0.077 U	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	**0.13 J**	0.37 U	0.37 U	0.36 U	0.39 U	0.37 U	0.39 U	0.36 U	0.39 U	N/A
2,4,5-Trichlorophenol	mg/kg	82,000	0.19 U	0.92 U	0.95 U	0.91 U	1 U	N/A	0.91 U	0.97 U	0.93 R	0.93 U	0.91 UJ	0.97 U	0.92 R	0.98 U	0.91 U	0.97 U	N/A
2,4-Dimethylphenol	mg/kg	16,000	0.077 U	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	0.39 U	0.37 R	0.37 U	0.36 UJ	0.39 U	0.37 R	0.39 U	0.36 U	0.39 U	N/A
2-Methylnaphthalene	mg/kg	3,000	0.0083 U	**0.031**	**0.0026 J**	0.0073 U	**0.0063 J**	N/A	**0.21**	**0.85**	0.0075 U	0.0075 U	**0.0032 J**	**0.0073 J**	0.0073 U	**0.0043 J**	0.074 U	**4.1**	0.0081 UJ
2-Methylphenol	mg/kg	41,000	0.077 U	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	0.39 U	0.37 R	0.37 U	0.36 UJ	0.39 U	0.37 R	0.39 U	0.36 U	0.39 U	N/A
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.15 U	0.74 U	0.76 U	0.72 U	0.81 U	N/A	0.73 U	0.77 U	0.74 R	0.75 U	0.73 UJ	0.77 U	0.74 R	0.79 U	0.73 U	0.78 U	N/A
Acenaphthene	mg/kg	45,000	0.0083 U	**0.037**	0.0076 U	0.0073 U	0.0081 U	N/A	**0.49**	**0.43**	0.0075 U	0.0075 U	**0.0063 J**	0.0079 U	0.0073 U	0.0079 U	0.074 U	**6.3**	0.0081 UJ
Acenaphthylene	mg/kg	45,000	0.0083 U	**0.033**	0.0076 U	0.0073 U	0.0081 U	N/A	**0.064**	**0.12**	0.0075 U	0.0075 U	**0.0036 J**	0.0079 U	0.0073 U	0.0079 U	0.074 U	**0.13**	0.0081 UJ
Acetophenone	mg/kg	120,000	0.077 U	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	0.39 U	0.37 U	0.37 U	0.36 U	0.39 U	0.37 U	0.39 U	0.36 U	0.39 U	N/A
Anthracene	mg/kg	230,000	0.0083 U	**0.15**	**0.0026 J**	0.0073 U	0.0081 U	N/A	**0.86**	**0.9**	**0.0044 J**	**0.0015 J**	**0.031**	0.0079 U	0.0073 U	0.0079 U	**0.025 J**	**22.3**	**0.0033 J**
Benz[a]anthracene	mg/kg	2.9	**0.0049 J**	**0.49**	**0.0067 J**	**0.0022 J**	0.0081 U	N/A	**1.9**	**3.2 J**	**0.022**	**0.0065 J**	**0.1**	0.0079 U	0.0073 U	**0.0024 J**	**0.15**	**23.1**	**0.0076 J**
Benzaldehyde	mg/kg	120,000	0.077 R	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	**0.44**	0.37 U	0.37 U	**0.22 J**	0.39 U	0.37 U	**0.26 J**	0.36 U	0.39 U	N/A
Benzo[a]pyrene	mg/kg	0.29	**0.0055 J**	0.52	**0.0066 J**	0.0073 U	0.0081 U	N/A	1.9	**2.9 J**	**0.037**	**0.0048 J**	**0.095**	0.0079 U	0.0073 U	0.0079 U	**0.17**	16.7	**0.0054 J**
Benzo[b]fluoranthene	mg/kg	2.9	**0.017**	**1**	**0.0098**	0.0073 U	0.0081 U	N/A	2.9	4.4	**0.082**	**0.014**	**0.15**	0.0079 U	0.0073 U	**0.0055 J**	**0.27**	23.6	**0.011 J**
Benzo[g,h,i]perylene	mg/kg		**0.0025 J**	**0.11**	**0.0017 J**	0.0073 U	0.0081 U	N/A	**0.61**	**0.52**	**0.012**	**0.0022 J**	**0.054**	0.0079 U	0.0073 U	**0.0026 J**	**0.054 J**	**2.1**	**0.0022 J**
Benzo[k]fluoranthene	mg/kg	29	**0.0085**	**0.36**	**0.0062 J**	0.0073 U	0.0081 U	N/A	**1.3**	**2 J**	**0.07**	**0.012**	**0.064**	0.0079 U	0.0073 U	**0.0017 J**	**0.12**	**9**	**0.0048 J**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.077 UJ	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	0.39 U	0.37 U	0.37 U	0.36 U	0.39 U	0.37 U	0.39 U	0.36 U	0.39 U	N/A
Caprolactam	mg/kg	400,000	**0.028 B**	0.92 U	0.95 U	0.91 U	1 U	N/A	0.91 U	0.97 U	0.93 U	0.93 U	0.91 U	0.97 U	0.92 U	0.98 U	0.91 U	0.97 U	N/A
Carbazole	mg/kg		0.077 U	**0.1 J**	0.38 U	0.36 U	0.4 U	N/A	**0.25 J**	**0.58**	0.37 U	0.37 U	0.36 U	0.39 U	0.37 U	0.39 U	0.36 U	**0.29 J**	N/A
Chrysene	mg/kg	290	**0.0081 J**	**0.48**	**0.0063 J**	**0.0019 J**	0.0081 U	N/A	**1.9**	**3.4 J**	**0.023**	**0.0058 J**	**0.1**	0.0079 U	**0.0013 J**	**0.0043 J**	**0.15**	**20.4**	**0.0093 J**
Dibenz[a,h]anthracene	mg/kg	0.29	0.0083 U	**0.057**	0.0076 U	0.0073 U	0.0081 U	N/A	0.45	0.33	0.0075 U	0.0075 U	**0.021**	0.0079 U	0.0073 U	0.0079 U	0.074 U	1.3	0.0081 UJ
Di-n-butylphthalate	mg/kg	82,000	0.077 U	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	0.39 U	0.37 U	0.37 U	0.36 U	0.39 U	0.37 U	0.39 U	0.36 U	0.39 U	N/A
Di-n-octylphthalate	mg/kg	8,200	0.077 UJ	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	0.39 U	0.37 U	0.37 U	0.36 U	0.39 U	0.37 U	0.39 U	0.36 U	0.39 U	N/A
Fluoranthene	mg/kg	30,000	**0.0072 J**	**1.3**	**0.013**	0.0073 U	0.0081 U	N/A	**3.4**	**6.9**	**0.035**	**0.011**	**0.24**	0.0079 U	0.0073 U	**0.0057 J**	**0.3**	**66.9**	**0.019 J**
Fluorene	mg/kg	30,000	0.0083 U	**0.03**	0.0076 U	0.0073 U	0.0081 U	N/A	**0.47**	**0.35**	**0.0012 J**	**0.0055 J**	**0.0071 J**	0.0079 U	0.0073 U	**0.0011 J**	0.074 U	**9.5**	**0.0021 J**
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	0.0083 U	**0.14**	0.0076 U	0.0073 U	0.0081 U	N/A	**0.81**	**0.61**	**0.014**	0.0075 U	**0.054**	0.0079 U	0.0073 U	0.0079 U	0.074 U	3.4	0.0081 UJ
Naphthalene	mg/kg	17	0.0083 U	**0.024**	0.0076 U	0.0073 U	**0.004 J**	N/A	**0.34**	**0.69**	**0.003 J**	**0.024**	**0.0047 J**	**0.0053 J**	0.0073 U	**0.017**	0.074 U	**3.6**	0.0081 UJ
Phenanthrene	mg/kg		0.0083 U	**0.62**	**0.0096**	0.0073 U	0.0081 U	N/A	**2.7**	**5.1**	**0.017**	**0.0092**	**0.16**	0.0079 U	0.0073 U	**0.025**	**0.11**	**68.2**	**0.015 J**
Phenol	mg/kg	250,000	0.077 U	0.37 U	0.38 U	0.36 U	0.4 U	N/A	0.37 U	0.39 U	0.37 R	0.37 U	0.36 UJ	0.39 U	0.37 R	0.39 U	0.36 U	0.39 U	N/A
Pyrene	mg/kg	23,000	**0.0084**	**1.1**	**0.012**	**0.003 J**	**0.0024 J**	N/A	**2.9**	**6.1**	**0.03**	**0.0085**	**0.21**	0.0079 U	0.0073 U	**0.0069 J**	**0.24**	**52.1**	**0.015 J**
PCBs																			
Aroclor 1242	mg/kg	0.97	N/A	0.091 U	N/A	0.018 U	N/A	N/A	0.09 U	N/A	0.092 U	N/A	0.018 U	N/A	0.018 U	N/A	0.037 U	N/A	N/A
Aroclor 1248	mg/kg	0.94	N/A	0.091 U	N/A	0.018 U	N/A	N/A	0.09 U	N/A	0.092 U	N/A	0.018 U	N/A	0.018 U	N/A	0.037 U	N/A	N/A
Aroclor 1254	mg/kg	0.97	N/A	0.091 U	N/A	0.018 U	N/A	N/A	**0.3**	N/A	0.092 U	N/A	0.018 U	N/A	0.018 U	N/A	0.037 U	N/A	N/A
Aroclor 1260	mg/kg	0.99	N/A	0.091 U	N/A	0.018 U	N/A	N/A	0.09 U	N/A	0.092 U	N/A	0.018 U	N/A	0.018 U	N/A	0.037 U	N/A	N/A
PCBs (total)	mg/kg	0.97	N/A	0.64 U	N/A	0.13 U	N/A	N/A	**0.3 J**	N/A	0.65 U	N/A	0.13 U	N/A	0.13 U	N/A	0.26 U	N/A	N/A
TPH/Oil and Grease																			
Diesel Range Organics	mg/kg	6,200	N/A	N/A	N/A	7.2 U	7.9 U	N/A	**42.5**	**166**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gasoline Range Organics	mg/kg	6,200	N/A	N/A	N/A	8.2 U	9.1 U	N/A	10.7 U	15.1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	mg/kg	6,200	**152**	**474**	**264**	**387**	22,300	N/A	**579**	**553**	**381**	**559**	**207**	**366**	**223**	**306**	**811**	**324**	N/A

Detections in bold
*PAH compounds were analyzed via SIM
Values in Red indicate an exceedance of the Project Action Limit (PAL)
Gray highlighting indicates boring locations within the building footprint

R: The analytical result was rejected during validation.
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.
N/A: This parameter was not analyzed for this sample.

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-016-SB-1	RW-016-SB-4	RW-017-SB-1	RW-017-SB-6	RW-018-SB-1	RW-018-SB-5	RW-019-SB-1	RW-019-SB-4	RW-020-SB-1	RW-020-SB-4.5	RW-020-SB-7	RW-021-SB-1	RW-021-SB-6	RW-022-SB-1	RW-022-SB-8.5	RW-023-SB-1	RW-023-SB-5
Volatile Organic Compound																			
1,1,2-Trichloroethane	mg/kg	5	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
1,1-Dichloroethane	mg/kg	16	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
1,2,3-Trichlorobenzene	mg/kg	930	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
1,2-Dichloroethane	mg/kg	2	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.012 U	0.011 U	0.0091 U	0.0089 U	0.0094 U	0.0093 U	0.013 U	0.012 U	0.0098 U	0.012 U	N/A	0.01 U	0.0086 U	0.01 U	0.019 U	0.012 U	0.0092 U
1,4-Dichlorobenzene	mg/kg	11	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
2-Butanone (MEK)	mg/kg	190,000	0.012 U	0.011 U	**0.0027 J**	**0.0023 J**	0.0094 U	0.0093 U	**0.0074 J**	0.012 U	**0.0042 J**	0.012 U	N/A	0.01 U	0.0086 U	0.01 U	**0.055**	0.012 U	0.0092 U
2-Hexanone	mg/kg	1,300	0.012 U	0.011 U	0.0091 U	0.0089 U	0.0094 U	0.0093 U	0.013 U	0.012 U	0.0098 U	0.012 U	N/A	0.01 U	0.0086 U	0.01 U	0.019 U	0.012 U	0.0092 U
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.012 U	0.011 U	0.0091 U	0.0089 U	0.0094 U	0.0093 U	0.013 U	0.012 U	0.0098 U	0.012 U	N/A	0.01 U	0.0086 U	0.01 U	0.019 U	0.012 U	0.0092 U
Acetone	mg/kg	670,000	**0.031**	0.011 U	**0.024**	**0.027**	**0.0084 J**	**0.0049 J**	**0.044**	**0.02**	**0.031 J**	**0.011 J**	N/A	**0.028 J**	**0.012 J**	**0.023 J**	**0.29 J**	**0.027**	**0.02**
Benzene	mg/kg	5.1	0.0058 U	**0.0029 J**	**0.00038 J**	0.0044 U	0.0047 U	0.0047 U	0.0066 U	**0.0019 J**	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Bromoform	mg/kg	86	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Carbon disulfide	mg/kg	3,500	**0.0041 J**	0.0053 U	**0.014**	0.0044 U	0.0047 U	0.0047 U	**0.0066**	**0.0048 J**	**0.012**	**0.0037 J**	N/A	**0.0032 J**	**0.0031 J**	**0.0087**	**0.0059 J**	**0.014**	0.0046 U
Chloroform	mg/kg	1.4	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Chloromethane	mg/kg	460	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Cyclohexane	mg/kg	27,000	0.012 U	0.011 U	0.0091 U	0.0089 U	0.0094 U	0.0093 U	0.013 U	0.012 U	0.0098 U	0.012 U	N/A	0.01 U	0.0086 U	0.01 U	0.019 U	0.012 U	0.0092 U
Ethylbenzene	mg/kg	25	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Isopropylbenzene	mg/kg	9,900	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Methyl Acetate	mg/kg	1,200,000	0.058 U	0.053 U	0.045 U	0.044 U	0.047 U	0.047 U	0.066 U	0.058 U	0.049 U	0.058 U	N/A	0.052 U	0.043 U	0.052 U	0.097 U	0.061 U	0.046 U
Methylene Chloride	mg/kg	1,000	**0.0045 J**	0.0053 U	**0.0043 J**	**0.0055**	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Styrene	mg/kg	35,000	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Tetrachloroethene	mg/kg	100	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	0.0047 U	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Toluene	mg/kg	47,000	0.0058 U	**0.002 J**	**0.00039 J**	0.0044 U	0.0047 U	0.0047 U	0.0066 U	**0.0023 J**	**0.0027 J**	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Trichloroethene	mg/kg	6	0.0058 U	0.0053 U	0.0045 U	0.0044 U	0.0047 U	**0.0027 J**	0.0066 U	0.0058 U	0.0049 U	0.0058 U	N/A	0.0052 U	0.0043 U	0.0052 U	0.0097 U	0.0061 U	0.0046 U
Xylenes	mg/kg	2,800	0.017 U	0.016 U	0.014 U	0.013 U	0.014 U	0.014 U	0.02 U	0.017 U	0.015 U	0.017 U	N/A	0.016 U	0.013 U	0.016 U	0.029 U	0.018 U	0.014 U
Semi-Volatile Organic Compound*																			
1,1-Biphenyl	mg/kg	200	0.37 U	0.39 U	0.074 U	0.077 U	0.38 U	0.39 U	0.38 U	**0.26 J**	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 U	0.37 U	0.4 U
2,4,5-Trichlorophenol	mg/kg	82,000	0.92 R	0.96 U	0.19 U	0.19 U	0.94 R	0.97 U	0.95 R	1 U	0.85 U	0.92 U	N/A	0.89 U	1 U	0.93 UJ	1.5 R	0.93 R	1 U
2,4-Dimethylphenol	mg/kg	16,000	0.37 R	0.39 U	0.074 U	0.077 U	0.38 R	0.39 U	0.38 R	0.4 U	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 R	0.37 R	0.4 U
2-Methylnaphthalene	mg/kg	3,000	0.0075 U	**0.13**	**0.011**	**0.0097**	0.0076 U	**0.016**	**0.039 J**	**0.18**	**0.022**	**0.22**	**0.2 J**	**0.16**	0.0081 U	0.074 U	**0.011 J**	0.0073 U	0.0081 U
2-Methylphenol	mg/kg	41,000	0.37 R	0.39 U	0.074 U	0.077 U	0.38 R	0.39 U	0.38 R	0.4 U	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 R	0.37 R	0.4 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.74 R	0.77 U	0.15 U	0.15 U	0.75 R	0.78 U	0.76 R	0.8 U	0.68 U	0.74 U	N/A	0.71 U	0.81 U	0.74 U	**1.2 J**	0.74 R	0.8 U
Acenaphthene	mg/kg	45,000	0.0075 U	**0.03**	**0.0073**	0.0076 U	0.0076 U	0.0078 U	**0.05 J**	**0.2**	**0.017**	**0.79**	**0.86 J**	**0.024**	0.0081 U	0.074 U	0.012 U	0.0073 U	0.0081 U
Acenaphthylene	mg/kg	45,000	0.0075 U	**0.013**	**0.022**	0.0076 U	0.0076 U	0.0078 U	0.077 U	**0.03**	**0.0053 J**	**0.005 J**	**0.0067 J**	**0.14**	0.0081 U	0.074 U	0.012 U	0.0073 U	0.0081 U
Acetophenone	mg/kg	120,000	0.37 U	0.39 U	0.074 U	0.077 U	0.38 U	0.39 U	0.38 U	0.4 U	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 U	0.37 U	0.4 U
Anthracene	mg/kg	230,000	**0.0025 J**	**0.23**	**0.051**	**0.0054 J**	**0.0017 J**	0.0078 U	**0.16**	**0.14**	**0.098**	**4.4**	**30.5 J**	**0.11**	**0.0032 J**	0.074 U	0.012 U	0.0073 U	0.0081 U
Benz[a]anthracene	mg/kg	2.9	**0.0095**	**1.6**	**0.18**	**0.011**	**0.011**	0.0078 U	**0.48**	**0.13**	**1.1**	**8.1**	**60.9 J**	**0.36**	**0.015**	**0.15**	**0.0087 J**	**0.0043 J**	**0.0053 J**
Benzaldehyde	mg/kg	120,000	**0.23 J**	**0.26 B**	0.074 R	0.077 R	0.38 U	0.39 U	0.38 U	**0.31 J**	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 U	**0.26 B**	0.4 U
Benzo[a]pyrene	mg/kg	0.29	**0.0076**	**1.6**	**0.18**	**0.011**	**0.008**	0.0078 U	**0.5**	**0.11**	**0.81**	**6.5**	**42.8 J**	**0.41**	**0.016**	**0.16**	**0.0082 J**	**0.0057 J**	**0.006 J**
Benzo[b]fluoranthene	mg/kg	2.9	**0.015**	**2.8**	**0.34**	**0.018**	**0.016**	0.0078 U	**0.85**	**0.23**	**2.1**	**15.2**	**76.3 J**	**1.2**	**0.024**	**0.4**	**0.023**	**0.01**	**0.0096**
Benzo[g,h,i]perylene	mg/kg		**0.005 J**	**0.73**	**0.036**	**0.0027 J**	**0.008**	0.0078 U	**0.27**	**0.048**	**0.16**	**0.39**	**0.72 J**	**0.12**	**0.004 J**	**0.087**	**0.0042 J**	**0.0045 J**	**0.0039 J**
Benzo[k]fluoranthene	mg/kg	29	**0.0075 J**	**1.6**	**0.12**	**0.01**	**0.01**	0.0078 U	**0.38**	**0.071**	**1.8**	**13**	**36 J**	**0.42**	**0.011**	**0.34**	**0.02**	**0.0052 J**	**0.0041 J**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.37 U	0.39 U	0.074 U	0.077 U	0.38 U	0.39 U	**0.29 J**	0.4 U	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 U	0.37 U	0.4 U
Caprolactam	mg/kg	400,000	0.92 U	0.96 U	0.19 U	0.19 U	0.94 U	0.97 U	0.95 U	1 U	0.85 U	0.92 U	N/A	0.89 U	1 U	0.93 U	1.5 U	0.93 U	1 U
Carbazole	mg/kg		0.37 U	**0.14 J**	**0.054 J**	0.077 U	0.38 U	0.39 U	0.38 U	**0.15 J**	0.34 U	**1.3**	N/A	0.36 U	0.4 U	0.37 U	0.59 U	0.37 U	0.4 U
Chrysene	mg/kg	290	**0.011**	**1.9**	**0.18**	**0.011**	**0.013**	0.0078 U	**0.56**	**0.17**	**1**	**7.1**	**56.6 J**	**0.51**	**0.016**	**0.14**	**0.011 J**	**0.0077**	**0.0064 J**
Dibenz[a,h]anthracene	mg/kg	0.29	0.0075 U	**0.36**	**0.023**	0.0076 U	0.0076 U	0.0078 U	**0.11**	**0.027**	**0.081**	**0.26**	**0.48 J**	**0.067**	0.0081 U	0.074 U	0.012 U	0.0073 U	0.0081 U
Di-n-butylphthalate	mg/kg	82,000	0.37 U	0.39 U	0.074 U	0.077 U	0.38 U	0.39 U	0.38 U	0.4 U	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 U	0.37 U	0.4 U
Di-n-ocytlphthalate	mg/kg	8,200	0.37 U	0.39 U	0.074 U	0.077 U	0.38 U	0.39 U	0.38 U	0.4 U	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	0.59 U	0.37 U	0.4 U
Fluoranthene	mg/kg	30,000	**0.025**	**3.5**	**0.37**	**0.022**	**0.026**	0.0078 U	**1.1**	**0.45**	**1.7**	**17.9**	**142 J**	**0.73**	**0.031**	**0.24**	**0.033**	**0.0066 J**	**0.0094 J**
Fluorene	mg/kg	30,000	**0.00082 J**	**0.0064 J**	**0.013**	**0.0027 J**	**0.00067 J**	0.0078 U	**0.052 J**	**0.2**	**0.016**	**0.95**	**1 J**	**0.033**	**0.0013 J**	0.074 U	**0.0038 J**	**0.00067 J**	0.0081 U
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	0.0075 U	**0.9**	**0.047**	0.0076 U	0.0076 U	0.0078 U	**0.29**	**0.052**	**0.2**	**0.62**	**0.96 J**	**0.16**	0.0081 U	0.074 U	0.012 U	0.0073 U	0.0081 U
Naphthalene	mg/kg	17	0.0075 U	**0.23**	**0.056**	**0.03**	**0.011**	**0.0018 J**	**0.048 J**	**1.4**	**0.018**	**0.22**	**0.24 J**	**0.49**	**0.0031 J**	0.074 U	**0.017**	0.0073 U	0.0081 U
Phenanthrene	mg/kg		**0.016**	**2.3**	**0.18**	**0.021**	**0.016**	0.0078 U	**0.6**	**0.58**	**0.44**	**12.8**	**111 J**	**0.43**	**0.016**	0.074 U	**0.028**	0.0073 U	0.0081 U
Phenol	mg/kg	250,000	0.37 R	0.39 U	0.074 U	0.077 U	0.38 R	0.39 U	0.38 R	0.4 U	0.34 U	0.37 U	N/A	0.36 U	0.4 U	0.37 U	**0.72 J**	0.37 R	0.4 U
Pyrene	mg/kg	23,000	**0.022**	**3**	**0.33**	**0.019**	**0.021**	0.0078 U	**1**	**0.39**	**1.4**	**13.3**	**105 J**	**0.62**	**0.027**	**0.22**	**0.03**	**0.0072 J**	**0.0087 J**
PCBs																			
Aroclor 1242	mg/kg	0.97	0.018 U	N/A	0.018 U	N/A	N/A	N/A	0.095 U	N/A	0.087 U	N/A	N/A	0.036 U	N/A	0.092 U	N/A	0.037 U	N/A
Aroclor 1248	mg/kg	0.94	0.018 U	N/A	0.018 U	N/A	N/A	N/A	0.095 U	N/A	0.087 U	N/A	N/A	0.036 U	N/A	0.092 U	N/A	0.037 U	N/A
Aroclor 1254	mg/kg	0.97	0.018 U	N/A	0.018 U	N/A	N/A	N/A	0.095 U	N/A	0.087 U	N/A	N/A	0.036 U	N/A	0.092 U	N/A	0.037 U	N/A
Aroclor 1260	mg/kg	0.99	0.018 U	N/A	0.018 U	N/A	N/A	N/A	**0.62**	N/A	0.087 U	N/A	N/A	**0.22**	N/A	0.092 U	N/A	0.037 U	N/A
PCBs (total)	mg/kg	0.97	0.13 U	N/A	0.13 U	N/A	N/A	N/A	**0.62 J**	N/A	0.61 U	N/A	N/A	**0.22 J**	N/A	0.65 U	N/A	0.26 U	N/A
TPH/Oil and Grease																			
Diesel Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gasoline Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	mg/kg	6,200	**374**	**346**	**528**	**1,720**	**219**	**201**	**3,060**	**724**	**628**	**738**	N/A	**621**	**316**	**1,470**	**610**	**725**	**168**

Detections in bold
*PAH compounds were analyzed via SIM
Values in Red indicate an exceedance of the Project Action Limit (PAL)
Gray highlighting indicates boring locations within the building footprint

R: The analytical result was rejected during validation.
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.
N/A: This parameter was not analyzed for this sample.

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-024-SB-1	RW-024-SB-6	RW-025-SB-1	RW-025-SB-5	RW-026-SB-1	RW-026-SB-5	RW-027-SB-1	RW-027-SB-5	RW-028-SB-1	RW-028-SB-5	RW-029-SB-1	RW-029-SB-7	RW-030-SB-1	RW-030-SB-5	RW-031-SB-1	RW-031-SB-6	RW-032-SB-1
Volatile Organic Compound																			
1,1,2-Trichloroethane	mg/kg	5	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
1,1-Dichloroethane	mg/kg	16	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
1,2,3-Trichlorobenzene	mg/kg	930	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 UJ
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 UJ
1,2-Dichloroethane	mg/kg	2	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.0098 U	0.014 U	0.011 U	0.01 U	0.0098 U	0.01 U	0.01 U	0.0097 U	0.013 U	0.013 U	0.0085 U	0.58 U	0.011 U	0.012 U	0.0092 U	0.0089 U	0.011 U
1,4-Dichlorobenzene	mg/kg	11	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 UJ
2-Butanone (MEK)	mg/kg	190,000	0.0098 U	**0.013 J**	0.011 U	**0.0041 J**	0.0098 U	0.01 U	**0.0049 J**	0.0097 U	0.013 U	**0.0041 J**	0.0085 U	0.58 U	0.011 U	0.012 U	**0.0031 J**	0.0089 U	**0.0044 J**
2-Hexanone	mg/kg	1,300	0.0098 U	0.014 U	0.011 U	0.01 U	0.0098 U	0.01 U	0.01 U	0.0097 U	**0.0088 J**	0.013 U	0.0085 U	0.58 U	0.011 U	0.012 U	0.0092 U	0.0089 U	0.011 U
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.0098 U	0.014 U	0.011 U	0.01 U	0.0098 U	0.01 U	0.01 U	0.0097 U	0.013 U	0.013 U	0.0085 U	0.58 U	0.011 U	0.012 U	0.0092 U	0.0089 U	0.011 U
Acetone	mg/kg	670,000	**0.048**	0.014 U	**0.018**	**0.017**	**0.0089 J**	**0.0059 J**	**0.023**	0.0097 U	**0.015**	**0.037**	**0.014**	0.58 U	**0.014 J**	0.012 U	**0.026**	**0.012**	**0.027**
Benzene	mg/kg	5.1	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	**0.0023 J**
Bromoform	mg/kg	86	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 UJ	0.0045 U	0.0053 U
Carbon disulfide	mg/kg	3,500	**0.051**	**0.04**	0.0053 U	**0.006**	**0.012**	0.005 U	**0.0062**	0.0049 U	**0.0068**	**0.087**	0.0042 U	0.29 U	0.0056 U	0.0062 U	**0.0048**	**0.0042 J**	**0.0073**
Chloroform	mg/kg	1.4	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
Chloromethane	mg/kg	460	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
Cyclohexane	mg/kg	27,000	0.0098 U	0.014 U	0.011 U	0.01 U	0.0098 U	0.01 U	0.01 U	0.0097 U	0.013 U	0.013 U	0.0085 U	0.58 U	0.011 U	0.012 U	0.0092 U	0.0089 U	**0.0062 J**
Ethylbenzene	mg/kg	25	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
Isopropylbenzene	mg/kg	9,900	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 UJ
Methyl Acetate	mg/kg	1,200,000	0.049 U	0.068 U	0.053 U	0.05 U	0.049 U	0.05 UJ	0.051 U	0.049 U	0.064 U	0.063 U	0.042 U	2.9 U	0.056 U	0.062 U	0.046 U	0.045 U	0.053 U
Methylene Chloride	mg/kg	1,000	**0.0039 J**	**0.007**	0.0053 U	0.005 U	0.0049 U	**0.0039 J**	0.0051 U	**0.0046 J**	0.0064 U	0.0063 U	0.0042 U	0.29 U	**0.0044 J**	0.0062 U	0.0046 U	0.0045 U	0.0053 U
Styrene	mg/kg	35,000	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
Tetrachloroethene	mg/kg	100	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
Toluene	mg/kg	47,000	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	**0.0022 J**
Trichloroethene	mg/kg	6	0.0049 U	0.0068 U	0.0053 U	0.005 U	0.0049 U	0.005 U	0.0051 U	0.0049 U	0.0064 U	0.0063 U	0.0042 U	0.29 U	0.0056 U	0.0062 U	0.0046 U	0.0045 U	0.0053 U
Xylenes	mg/kg	2,800	0.015 U	0.021 U	0.016 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.019 U	0.019 U	0.013 U	0.87 U	0.017 U	0.018 U	0.014 U	0.013 U	0.016 U
Semi-Volatile Organic Compound*																			
1,1-Biphenyl	mg/kg	200	0.35 U	0.35 U	0.37 U	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 U	0.46 U	0.38 U	0.37 U	1.9 U
2,4,5-Trichlorophenol	mg/kg	82,000	0.87 R	0.88 U	0.92 R	0.91 U	0.9 U	0.92 U	4.9 U	1 U	1.1 U	1 U	18.4 U	21.1 U	0.99 R	1.2 U	0.96 R	0.94 U	4.6 U
2,4-Dimethylphenol	mg/kg	16,000	0.35 R	0.35 U	0.37 R	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 R	0.46 U	0.38 R	0.37 U	1.9 U
2-Methylnaphthalene	mg/kg	3,000	**0.0047 J**	0.0071 U	0.073 U	**0.022**	0.0072 U	0.0075 U	**0.061 J**	0.008 U	**0.017**	**0.052**	0.15 U	**6.1**	**0.0038 J**	**0.031**	0.0075 U	0.0075 U	**0.15**
2-Methylphenol	mg/kg	41,000	0.35 R	0.35 U	0.37 R	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 R	0.46 U	0.38 R	0.37 U	1.9 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.69 R	0.7 U	0.74 R	0.73 U	0.72 U	0.74 U	3.9 U	0.8 U	0.85 U	0.81 U	14.7 U	16.9 U	0.79 R	0.92 U	**0.34 J**	0.75 U	3.7 U
Acenaphthene	mg/kg	45,000	0.0069 U	0.0071 U	**0.056 J**	**0.03**	0.0072 U	0.0075 U	**0.21**	0.008 U	**0.0032 J**	**0.0039 J**	0.15 U	**2.5**	0.008 U	**0.0036 J**	0.0075 U	0.0075 U	0.075 U
Acenaphthylene	mg/kg	45,000	**0.0012 J**	0.0071 U	0.073 U	**0.0066 J**	0.0072 U	0.0075 U	**0.17**	0.008 U	**0.0088**	**0.012**	0.15 U	**0.46**	**0.0086**	**0.0039 J**	0.0075 U	0.0075 U	0.075 U
Acetophenone	mg/kg	120,000	0.35 U	0.35 U	0.37 U	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 U	0.46 U	0.38 U	0.37 U	1.9 U
Anthracene	mg/kg	230,000	**0.0027 J**	0.0071 U	**0.2**	**0.075**	**0.0071 J**	0.0075 U	**1.2**	0.008 U	**0.018**	**0.023**	0.15 U	**5.6**	**0.023 J**	**0.019**	0.0075 U	0.0075 U	**0.099**
Benz[a]anthracene	mg/kg	2.9	**0.014**	**0.0065 J**	**0.57**	**0.055**	**0.026**	0.0075 U	5.2	**0.0028 J**	**0.072**	**0.082**	**0.11 J**	**2.6**	**0.074 J**	**0.022**	0.0075 U	0.0075 U	**0.32**
Benzaldehyde	mg/kg	120,000	0.35 U	**0.22 J**	0.37 U	0.36 U	**0.22 J**	0.37 U	**1.2 B**	0.4 U	**0.32 B**	**0.26 B**	7.4 U	8.4 U	0.4 U	**0.3 B**	0.38 U	0.37 U	1.9 U
Benzo[a]pyrene	mg/kg	0.29	**0.012**	**0.011**	0.52	**0.048**	**0.03**	0.0075 U	3.8	0.008 U	**0.078**	**0.12**	**0.11 J**	3.4	**0.068 J**	**0.014**	0.0075 U	0.0075 U	**0.24**
Benzo[b]fluoranthene	mg/kg	2.9	**0.03**	**0.016**	**0.85**	**0.079**	**0.054**	0.0075 U	9.3	0.008 U	**0.13**	**0.2**	**0.19**	**1.1**	**0.12 J**	**0.04**	0.0075 U	**0.0042 J**	**0.36**
Benzo[g,h,i]perylene	mg/kg		0.0069 U	**0.0081**	**0.25**	**0.021**	**0.015**	0.0075 U	**2.6**	**0.0016 J**	**0.043**	**0.072**	**0.13 J**	0.17 U	**0.022 J**	**0.0081 J**	0.0075 U	**0.0022 J**	**0.2**
Benzo[k]fluoranthene	mg/kg	29	**0.013**	**0.0096**	**0.53**	**0.03**	**0.017**	0.0075 U	**3.5**	0.008 U	**0.052**	**0.097**	**0.093 J**	**0.35**	**0.049**	**0.011**	0.0075 U	**0.0026 J**	**0.18**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.35 U	0.35 U	**0.73**	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 U	0.46 U	0.38 U	0.37 U	1.9 U
Caprolactam	mg/kg	400,000	0.87 U	0.88 U	0.92 U	0.91 U	0.9 U	0.92 U	4.9 U	1 U	1.1 U	1 U	18.4 U	21.1 U	0.99 U	1.2 U	0.96 U	0.94 U	4.6 U
Carbazole	mg/kg		0.35 U	0.35 U	0.37 U	0.36 U	0.36 U	0.37 U	**0.54 J**	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 U	0.46 U	0.38 U	0.37 U	1.9 U
Chrysene	mg/kg	290	**0.026**	**0.0082**	**0.63**	**0.06**	**0.028**	0.0075 U	**6.2**	**0.0021 J**	**0.084**	**0.087**	**0.079 J**	**4.1**	**0.07 J**	**0.049**	0.0075 U	0.0075 U	**0.29**
Dibenz[a,h]anthracene	mg/kg	0.29	0.0069 U	0.0071 U	**0.1**	**0.0092**	**0.0054 J**	0.0075 U	1.1	0.008 U	**0.018**	**0.022**	0.15 U	**0.13 J**	**0.0099**	**0.0046 J**	0.0075 U	0.0075 U	**0.048 J**
Di-n-butylphthalate	mg/kg	82,000	0.35 U	0.35 U	0.37 U	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 U	0.46 U	0.38 U	0.37 U	1.9 U
Di-n-ocytlphthalate	mg/kg	8,200	0.35 U	0.35 U	**0.3 J**	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 U	0.46 U	0.38 U	0.37 U	1.9 U
Fluoranthene	mg/kg	30,000	**0.047**	**0.012**	**1.3**	**0.18**	**0.056**	0.0075 U	**15**	**0.0053 J**	**0.14**	**0.14**	**0.14 J**	**2.5**	**0.18 J**	**0.066**	0.0075 U	**0.005 J**	**0.56**
Fluorene	mg/kg	30,000	**0.001 J**	**0.0012 J**	**0.037 J**	**0.051**	**0.0018 J**	0.0075 U	**0.28**	**0.0009 J**	**0.0082 J**	**0.0083**	0.15 U	**4.3**	**0.0043 J**	**0.0096**	0.0075 U	0.0075 U	**0.037 J**
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.0084**	0.0071 U	**0.26**	**0.021**	**0.016**	0.0075 U	2.9	0.008 U	**0.049**	**0.082**	0.15 U	**0.27**	**0.027 J**	0.0092 U	0.0075 U	0.0075 U	**0.15**
Naphthalene	mg/kg	17	**0.003 J**	0.0071 U	0.073 U	**0.017**	0.0072 U	0.0075 U	**0.13**	0.008 U	**0.02**	**0.053**	0.15 U	**2.4**	**0.013**	**0.044**	0.0075 U	**0.0019 J**	**0.13**
Phenanthrene	mg/kg		**0.024**	0.0071 U	**0.87**	**0.31**	**0.025**	0.0075 U	**4.5**	0.008 U	**0.081**	**0.084**	0.15 U	**18.5**	**0.089 J**	**0.11**	0.0075 U	0.0075 U	**0.42**
Phenol	mg/kg	250,000	**1.3 J**	0.35 U	0.37 R	0.36 U	0.36 U	0.37 U	1.9 U	0.4 U	0.43 U	0.4 U	7.4 U	8.4 U	0.4 R	0.46 U	0.38 R	0.37 U	1.9 U
Pyrene	mg/kg	23,000	**0.038**	**0.011**	**1.2**	**0.16**	**0.052**	0.0075 U	**14.7**	**0.0046 J**	**0.13**	**0.12**	**0.16**	**19.7**	**0.17 J**	**0.058**	0.0075 U	**0.0042 J**	**0.47**
PCBs																			
Aroclor 1242	mg/kg	0.97	0.017 U	N/A	**0.22**	N/A	0.018 U	N/A	0.019 U	N/A	0.021 U	N/A	0.091 U	N/A	0.02 U	N/A	0.019 U	N/A	0.019 U
Aroclor 1248	mg/kg	0.94	0.017 U	N/A	0.037 U	N/A	**0.031**	N/A	0.019 U	N/A	0.021 U	N/A	0.091 U	N/A	**0.13**	N/A	0.019 U	N/A	0.019 U
Aroclor 1254	mg/kg	0.97	**0.02**	N/A	0.037 U	N/A	0.018 U	N/A	0.019 U	N/A	0.021 U	N/A	0.091 U	N/A	0.02 U	N/A	0.019 U	N/A	0.019 U
Aroclor 1260	mg/kg	0.99	0.017 U	N/A	0.037 U	N/A	0.018 U	N/A	0.019 U	N/A	0.021 U	N/A	0.091 U	N/A	0.02 U	N/A	0.019 U	N/A	0.019 U
PCBs (total)	mg/kg	0.97	0.12 U	N/A	**0.22 J**	N/A	0.13 U	N/A	0.14 U	N/A	0.15 U	N/A	0.64 U	N/A	**0.13 J**	N/A	0.13 U	N/A	0.13 U
TPH/Oil and Grease																			
Diesel Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.5 U	7.5 U	**74.3**
Gasoline Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.3 U	8.5 U	12.5 U
Oil and Grease	mg/kg	6,200	**437**	**635**	**8,190**	**1,120**	**284**	**496**	**502**	**321**	**307**	**417**	**14,700**	**39,600**	**394**	**247**	**326**	**169**	**1,410**

Detections in bold
*PAH compounds were analyzed via SIM
Values in Red indicate an exceedance of the Project Action Limit (PAL)
Gray highlighting indicates boring locations within the building footprint

R: The analytical result was rejected during validation.
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.
N/A: This parameter was not analyzed for this sample.

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-032-SB-5	RW-033-SB-1	RW-033-SB-6.5	RW-034-SB-1	RW-034-SB-5	RW-035-SB-1	RW-035-SB-5	RW-036-SB-1	RW-036-SB-4	RW-037-SB-1	RW-037-SB-8	RW-038-SB-1	RW-038-SB-5	RW-039-SB-1	RW-039-SB-5	RW-040-SB-1	RW-040-SB-6
Volatile Organic Compound																			
1,1,2-Trichloroethane	mg/kg	5	0.006 U	0.0069 UJ	0.0045 U	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
1,1-Dichloroethane	mg/kg	16	**0.0077**	0.0069 U	0.0045 U	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
1,2,3-Trichlorobenzene	mg/kg	930	0.006 UJ	0.0069 UJ	0.0045 UJ	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.006 UJ	0.0069 UJ	0.0045 U	0.0058 UJ	0.0056 UJ	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 UJ	0.0051 UJ
1,2-Dichloroethane	mg/kg	2	0.006 U	0.0069 U	0.0045 U	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	**0.0041 U**	0.0048 U	0.0048 U	0.0054 U	0.0051 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.012 U	0.014 U	**0.12**	0.012 U	0.011 U	0.0088 U	0.0078 U	0.011 U	0.0096 U	0.0095 U	0.0076 U	**0.0058 J**	**0.01**	0.0095 U	0.0097 U	0.011 U	0.01 U
1,4-Dichlorobenzene	mg/kg	11	0.006 UJ	0.0069 UJ	0.0045 U	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
2-Butanone (MEK)	mg/kg	190,000	**0.016**	**0.015**	**0.081**	0.012 U	0.011 U	**0.0062 J**	0.0078 U	**0.0038 J**	**0.0025 J**	**0.0025 J**	0.0076 U	**0.0038 J**	0.0082 U	**0.002 J**	0.0097 U	0.011 U	0.01 U
2-Hexanone	mg/kg	1,300	0.012 U	0.014 UJ	**0.011 J**	0.012 U	0.011 U	0.0088 U	0.0078 U	0.011 U	0.0096 U	0.0095 U	0.0076 U	0.0081 U	0.0082 U	0.0095 U	0.0097 U	0.011 U	0.01 U
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.012 U	0.014 UJ	**0.0063 J**	0.012 U	0.011 U	0.0088 U	0.0078 U	0.011 U	0.0096 U	0.0095 U	0.0076 U	0.0081 U	0.0082 U	0.0095 U	0.0097 U	0.011 U	0.01 U
Acetone	mg/kg	670,000	**0.085**	**0.094**	**0.21**	**0.013**	**0.011 J**	**0.045**	0.0078 U	**0.035**	**0.021**	**0.015**	0.0076 U	**0.044 J**	0.0082 UJ	0.0095 U	**0.016**	**0.018**	0.01 U
Benzene	mg/kg	5.1	**0.0028 J**	**0.0059 J**	0.0045 U	0.0058 U	0.0056 U	**0.0028 J**	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Bromoform	mg/kg	86	0.006 U	0.0069 UJ	0.0045 UJ	0.0058 UJ	0.0056 UJ	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 UJ	0.0041 UJ	0.0048 U	0.0048 U	0.0054 UJ	0.0051 UJ
Carbon disulfide	mg/kg	3,500	**0.012**	**0.0044 J**	0.0045 U	**0.043**	**0.0043 J**	**0.0067**	**0.0076**	**0.0055**	**0.0015 J**	**0.0058**	0.0038 U	**0.0046**	0.0041 U	0.0048 U	0.0048 U	**0.0044 J**	**0.0055**
Chloroform	mg/kg	1.4	0.006 U	**0.0062 J**	0.0045 U	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Chloromethane	mg/kg	460	0.006 U	0.0069 U	0.0045 U	0.0058 U	0.0056 U	0.0044 U	**0.00051 J**	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.006 U	**0.0048 J**	**0.12**	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	**0.005**	**0.0092**	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Cyclohexane	mg/kg	27,000	0.012 U	0.014 U	0.0091 U	0.012 U	0.011 U	0.0088 U	0.0078 U	0.011 U	0.0096 U	0.0095 U	0.0076 U	0.0081 U	0.0082 U	0.0095 U	0.0097 U	0.011 U	0.01 U
Ethylbenzene	mg/kg	25	0.006 U	0.0069 UJ	**0.0039 J**	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Isopropylbenzene	mg/kg	9,900	0.006 UJ	0.0069 UJ	**0.0024 J**	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Methyl Acetate	mg/kg	1,200,000	0.06 U	0.069 U	0.045 U	0.058 U	0.056 U	0.044 U	0.039 U	0.053 U	0.048 U	0.047 U	0.038 U	0.04 U	0.041 U	0.048 U	0.048 U	0.054 U	0.051 U
Methylene Chloride	mg/kg	1,000	0.006 U	0.0069 U	**0.0047**	0.0058 U	0.0056 U	0.0044 U	**0.0035 J**	**0.0029 J**	0.0048 U	0.0047 U	**0.0034 J**	0.004 U	0.0041 U	**0.004 J**	**0.0025 J**	0.0054 U	0.0051 U
Styrene	mg/kg	35,000	0.006 U	0.0069 UJ	0.0045 U	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Tetrachloroethene	mg/kg	100	0.006 U	0.0069 UJ	0.0045 U	0.0058 U	0.0056 U	0.0044 U	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	0.004 U	0.0041 U	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Toluene	mg/kg	47,000	**0.0028 J**	0.0069 UJ	**0.003 J**	0.0058 U	0.0056 U	**0.00081 J**	0.0039 U	0.0053 U	0.0048 U	0.0047 U	**0.00026 J**	0.004 U	0.0041 U	**0.00042 J**	0.0048 U	0.0054 U	0.0051 U
Trichloroethene	mg/kg	6	0.006 U	**0.53 J**	**0.031 J**	0.0058 U	0.0056 U	**0.0024 J**	0.0039 U	0.0053 U	0.0048 U	0.0047 U	0.0038 U	**0.038**	**0.047**	0.0048 U	0.0048 U	0.0054 U	0.0051 U
Xylenes	mg/kg	2,800	0.018 U	0.021 UJ	**0.052**	0.018 U	0.017 U	0.013 U	**0.0011 J**	0.016 U	0.014 U	0.014 U	0.011 U	0.012 U	0.012 U	0.014 U	0.014 U	0.016 U	0.015 U
Semi-Volatile Organic Compound*																			
1,1-Biphenyl	mg/kg	200	0.42 U	**4 J**	**0.77**	0.072 U	0.39 U	0.37 U	0.4 U	**0.019 J**	0.38 U	0.078 U	0.081 U	0.36 U	0.39 U	0.073 U	0.37 U	0.072 U	0.41 U
2,4,5-Trichlorophenol	mg/kg	82,000	1.1 U	19.8 U	0.96 UJ	0.18 R	0.98 U	0.94 U	1 U	0.2 R	0.94 U	0.2 R	**0.022 J**	0.91 U	0.97 U	0.18 R	0.92 R	0.18 R	1 U
2,4-Dimethylphenol	mg/kg	16,000	0.42 U	7.9 U	0.38 U	0.072 R	0.39 U	0.37 U	0.4 U	0.079 R	0.38 U	0.078 R	0.081 U	0.36 U	0.39 U	0.073 R	0.37 U	0.072 R	0.41 U
2-Methylnaphthalene	mg/kg	3,000	**0.053**	**0.83**	**6.3**	**0.0056 J**	0.0078 U	**0.052**	0.0079 U	**0.018**	0.0076 U	**0.0064 J**	0.0078 U	**0.0036 J**	0.0078 U	**0.0043 J**	0.0075 U	**0.98**	0.0082 U
2-Methylphenol	mg/kg	41,000	0.42 U	7.9 U	0.38 U	0.072 R	0.39 U	0.37 U	0.4 U	0.079 R	0.38 U	0.078 R	0.081 U	0.36 U	0.39 U	0.073 R	0.37 UJ	0.072 R	0.41 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.85 U	15.9 U	0.77 U	0.14 R	0.78 U	0.75 U	0.8 U	0.16 R	0.75 U	0.16 R	0.16 U	0.72 U	0.78 U	0.15 R	0.74 U	0.14 R	0.81 U
Acenaphthene	mg/kg	45,000	**0.015**	**1.6**	0.78 U	**0.0036 J**	0.0078 U	**0.12**	0.0079 U	**0.013**	0.0076 U	**0.0073 J**	0.0078 U	**0.0038 J**	0.0078 U	0.0074 U	0.0075 U	**0.55**	0.0082 U
Acenaphthylene	mg/kg	45,000	**0.0095**	**0.32**	0.78 U	**0.0061 J**	0.0078 U	**0.13**	0.0079 U	**0.033**	0.0076 U	**0.015**	0.0078 U	**0.0049 J**	0.0078 U	**0.0067 J**	0.0075 U	**1.2**	0.0082 U
Acetophenone	mg/kg	120,000	0.42 U	7.9 U	0.38 U	0.072 U	0.39 U	0.37 U	0.4 U	0.079 U	0.38 U	0.078 U	0.081 U	0.36 U	0.39 U	**0.05 J**	0.37 U	0.072 U	0.41 U
Anthracene	mg/kg	230,000	**0.06**	**2.9**	0.78 U	**0.023**	**0.0028 J**	**0.37**	0.0079 U	**0.07**	**0.0019 J**	**0.023**	0.0078 U	**0.02**	0.0078 U	**0.011**	0.0075 U	**5.3**	**0.0051 J**
Benz[a]anthracene	mg/kg	2.9	**0.19**	**6.8**	**0.21 J**	**0.12**	**0.0042 J**	**1.3**	0.0079 U	**0.3**	**0.0038 J**	**0.097**	0.0078 U	**0.089**	0.0078 U	**0.034**	0.0075 U	**9.6**	**0.012**
Benzaldehyde	mg/kg	120,000	**0.39 B**	**5.1 B**	**0.5**	0.072 R	0.39 U	0.37 U	0.4 U	**0.019 J**	0.38 U	0.078 R	0.081 R	0.36 U	0.39 U	0.073 R	0.37 U	0.072 R	0.41 U
Benzo[a]pyrene	mg/kg	0.29	**0.2**	**6.7**	0.78 U	**0.12**	0.0078 U	**1.4**	0.0079 U	**0.28**	**0.0046 J**	**0.071**	0.0078 U	**0.093**	0.0078 U	**0.045**	0.0075 U	**7.6**	0.0082 U
Benzo[b]fluoranthene	mg/kg	2.9	**0.34**	**10.7**	0.78 U	**0.22**	**0.004 J**	**5.4**	0.0079 U	**0.74**	**0.0073 J**	**0.21**	0.0078 U	**0.19**	0.0078 U	**0.09**	0.0075 U	**11.4**	0.0082 U
Benzo[g,h,i]perylene	mg/kg		**0.13**	**2.5**	0.78 U	**0.062**	0.0078 U	**0.45**	0.0079 U	**0.13**	**0.0031 J**	**0.03**	0.0078 U	**0.028**	0.0078 U	**0.016**	0.0075 U	**3.1**	**0.0049 J**
Benzo[k]fluoranthene	mg/kg	29	**0.1**	**4**	0.78 U	**0.089**	**0.002 J**	**0.88**	0.0079 U	**0.22**	**0.0032 J**	**0.099**	0.0078 U	**0.087**	0.0078 U	**0.047**	0.0075 U	**4**	0.0082 U
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.42 U	7.9 U	0.38 U	0.072 UJ	0.39 U	**0.35 B**	0.4 U	**0.24 J**	0.38 U	**0.55 J**	0.081 UJ	0.36 U	0.39 U	**0.78 J**	0.37 U	**0.017 B**	0.41 U
Caprolactam	mg/kg	400,000	1.1 U	19.8 U	0.96 U	0.18 UJ	0.98 U	0.94 U	1 U	0.2 UJ	0.94 U	0.2 UJ	0.2 UJ	0.91 U	0.97 U	0.18 UJ	0.92 U	0.18 UJ	1 U
Carbazole	mg/kg		0.42 U	**60.1**	0.38 U	0.072 U	0.39 U	**0.16 J**	0.4 U	**0.11**	0.38 U	**0.043 J**	0.081 U	0.36 U	0.39 U	0.073 U	0.37 U	0.072 U	0.41 U
Chrysene	mg/kg	290	**0.24**	**7.5**	**0.15 J**	**0.13**	**0.0037 J**	**1.1**	**0.00085 J**	**0.35**	**0.0046 J**	**0.14**	0.0078 U	**0.09**	0.0078 U	**0.048**	0.0075 U	**9.1**	**0.01**
Dibenz[a,h]anthracene	mg/kg	0.29	**0.042**	**1.1**	0.78 U	**0.029**	0.0078 U	**0.26**	0.0079 U	**0.061**	0.0076 U	**0.014**	0.0078 U	**0.011**	0.0078 U	**0.0086**	0.0075 U	**1.4**	0.0082 U
Di-n-butylphthalate	mg/kg	82,000	0.42 U	7.9 U	0.38 UJ	0.072 U	0.39 U	0.37 U	0.4 U	**0.078 J**	0.38 U	**0.036 J**	0.081 U	0.36 U	0.39 U	0.073 U	0.37 U	0.072 U	0.41 U
Di-n-ocytlphthalate	mg/kg	8,200	0.42 U	7.9 U	0.38 U	0.072 UJ	0.39 U	0.37 U	0.4 U	0.079 UJ	0.38 U	0.078 UJ	0.081 UJ	0.36 U	0.39 U	0.073 UJ	0.37 U	0.072 UJ	0.41 U
Fluoranthene	mg/kg	30,000	**0.42**	**17.6**	**0.37 J**	**0.2**	**0.011 J**	**5.7**	0.0079 U	**0.61**	**0.01**	**0.3**	0.0078 U	**0.17**	0.0078 U	**0.07**	0.0075 U	**20.2**	**0.024**
Fluorene	mg/kg	30,000	**0.038**	**1.3**	**0.12 J**	**0.0051 J**	**0.0029 J**	**0.12**	**0.0011 J**	**0.014**	**0.0013 J**	**0.0066 J**	0.0078 U	**0.0039 J**	0.0078 U	**0.0033 J**	0.0075 U	**2.7**	**0.0019 J**
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.12**	**2.9**	0.78 U	**0.066**	0.0078 U	**0.52**	0.0079 U	**0.15**	0.0076 U	**0.035**	0.0078 U	**0.029**	0.0078 U	**0.019**	0.0075 U	**3.8**	0.0082 U
Naphthalene	mg/kg	17	**0.07**	**0.63**	**1.8**	**0.0096**	0.0078 U	**0.12**	0.0079 U	**0.028**	0.0076 U	**0.011**	0.0078 U	**0.0063 J**	0.0078 U	**0.0075**	0.0075 U	**2.7**	0.0082 U
Phenanthrene	mg/kg		**0.3**	**13.4**	0.78 U	**0.094**	**0.014 J**	**1.4**	0.0079 U	**0.28**	**0.0098**	**0.11**	0.0078 U	**0.07**	0.0078 U	**0.033**	0.0075 U	**17.1**	**0.018**
Phenol	mg/kg	250,000	0.42 U	7.9 U	0.38 U	0.072 R	0.39 U	0.37 U	0.4 U	0.079 R	0.38 U	0.078 R	0.081 U	0.36 U	0.39 U	0.073 R	0.37 U	0.072 R	0.41 U
Pyrene	mg/kg	23,000	**0.33**	**15.1**	**0.31 J**	**0.16**	**0.0078 J**	**5.4**	0.0079 U	**0.54**	**0.013**	**0.29**	0.0078 U	**0.16**	0.0078 U	**0.067**	0.0075 U	**16.5**	**0.018**
PCBs																			
Aroclor 1242	mg/kg	0.97	N/A	2 U	N/A	0.092 U	N/A	1.9 U	N/A	0.19 U	N/A	0.098 U	N/A	0.092 U	N/A	0.019 U	N/A	0.38 U	N/A
Aroclor 1248	mg/kg	0.94	N/A	2 U	N/A	0.092 U	N/A	1.9 U	N/A	0.19 U	N/A	0.098 U	N/A	0.092 U	N/A	0.019 U	N/A	0.38 U	N/A
Aroclor 1254	mg/kg	0.97	N/A	2 U	N/A	0.092 U	N/A	**6.7**	N/A	**0.94**	N/A	0.098 U	N/A	0.092 U	N/A	0.019 U	N/A	0.38 U	N/A
Aroclor 1260	mg/kg	0.99	N/A	2 U	N/A	**0.091 J**	N/A	1.9 U	N/A	0.19 U	N/A	0.098 U	N/A	0.092 U	N/A	0.019 U	N/A	0.38 U	N/A
PCBs (total)	mg/kg	0.97	N/A	13.7 U	N/A	0.64 U	N/A	**6.7 J**	N/A	**0.94 J**	N/A	0.69 U	N/A	0.64 U	N/A	0.13 U	N/A	2.6 U	N/A
TPH/Oil and Grease																			
Diesel Range Organics	mg/kg	6,200	**40.5**	**956**	**520**	N/A	N/A	**206**	7.9 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gasoline Range Organics	mg/kg	6,200	12 U	14.9 U	**9.5**	N/A	N/A	9.4 U	9.7 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	mg/kg	6,200	**808**	**7,200**	**1,060**	**411**	**544**	**2,730**	**289**	**410**	**541**	**491**	**326**	**122**	**513**	**258**	**222**	**7,870**	**371**

Detections in bold
*PAH compounds were analyzed via SIM
Values in Red indicate an exceedance of the Project Action Limit (PAL)
Gray highlighting indicates boring locations within the building footprint

R: The analytical result was rejected during validation.
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.
N/A: This parameter was not analyzed for this sample.

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-041-SB-1	RW-041-SB-5	RW-042-SB-1	RW-042-SB-5	RW-043-SB-1	RW-043-SB-8	RW-043-SB-10	RW-044-SB-1	RW-044-SB-5	RW-045-SB-1	RW-045-SB-5	RW-045-SB-10	RW-046-SB-1	RW-046-SB-5	RW-047-SB-1	RW-047-SB-6	RW-047-SB-10
Volatile Organic Compound																			
1,1,2-Trichloroethane	mg/kg	5	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
1,1-Dichloroethane	mg/kg	16	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	**0.0033 J**	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
1,2,3-Trichlorobenzene	mg/kg	930	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 UJ	0.0044 UJ	0.0064 UJ	0.0056 UJ	N/A	0.005 U	0.0047 U	0.0046 UJ	**0.24 J**	0.23 R
1,2-Dichloroethane	mg/kg	2	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
1,2-Dichloroethene (Total)	mg/kg	2,300	0.0092 U	0.016 U	0.012 U	0.012 U	0.0087 U	0.47 U	N/A	0.0099 U	0.0088 U	0.013 U	0.011 U	N/A	0.01 U	0.0095 U	0.0092 U	0.46 U	0.45 R
1,4-Dichlorobenzene	mg/kg	11	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
2-Butanone (MEK)	mg/kg	190,000	0.0092 U	0.016 U	**0.011 J**	**0.003 J**	**0.0021 J**	0.47 U	N/A	0.0099 U	0.0088 U	0.013 U	0.011 U	N/A	**0.0051 J**	0.0095 U	0.0092 U	0.46 U	0.45 R
2-Hexanone	mg/kg	1,300	0.0092 U	0.016 U	0.012 U	0.012 U	**0.0095**	0.47 U	N/A	0.0099 U	0.0088 U	0.013 U	0.011 U	N/A	0.01 U	0.0095 U	0.0092 U	0.46 U	0.45 R
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.0092 U	0.016 U	0.012 U	0.012 U	0.0087 U	0.47 U	N/A	0.0099 U	0.0088 U	0.013 U	0.011 U	N/A	0.01 U	0.0095 U	0.0092 U	0.46 U	0.45 R
Acetone	mg/kg	670,000	**0.0076 J**	**0.04**	**0.061**	**0.032**	**0.025**	0.47 U	N/A	**0.019**	0.0088 U	**0.024**	0.011 U	N/A	**0.026 J**	0.0095 UJ	**0.022**	0.46 U	**0.14 J**
Benzene	mg/kg	5.1	0.0046 U	0.0081 U	**0.0018 J**	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	**0.0015 J**	0.0047 U	0.0046 U	0.23 U	0.23 R
Bromoform	mg/kg	86	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 UJ	0.23 UJ	N/A	0.0049 UJ	0.0044 UJ	0.0064 UJ	0.0056 UJ	N/A	0.005 UJ	0.0047 UJ	**0.0054 J**	0.23 UJ	0.23 R
Carbon disulfide	mg/kg	3,500	**0.0035 J**	**0.007 J**	**0.028**	0.0058 U	0.0044 U	0.23 U	N/A	**0.0029 J**	0.0044 U	**0.0074**	**0.023**	N/A	**0.0091**	0.0047 U	**0.0042 J**	0.23 U	0.23 R
Chloroform	mg/kg	1.4	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
Chloromethane	mg/kg	460	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
cis-1,2-Dichloroethene	mg/kg	2,300	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	**0.085 J**	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
Cyclohexane	mg/kg	27,000	0.0092 U	0.016 U	**0.0033 J**	0.012 U	0.0087 U	0.47 U	N/A	0.0099 U	0.0088 U	0.013 U	0.011 U	N/A	0.01 U	0.0095 U	0.0092 U	0.46 U	0.45 R
Ethylbenzene	mg/kg	25	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	**0.75**	N/A	0.0049 U	0.0044 U	0.0064 U	**0.0013 J**	N/A	0.005 U	0.0047 U	0.0046 U	**0.37**	**0.52 J**
Isopropylbenzene	mg/kg	9,900	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	**0.86**	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	**0.52**	**1.2 J**
Methyl Acetate	mg/kg	1,200,000	0.046 U	0.081 U	0.06 U	0.058 U	0.044 U	2.3 U	N/A	0.049 U	0.044 U	0.064 U	0.056 U	N/A	0.05 U	0.047 U	0.046 U	2.3 U	2.3 R
Methylene Chloride	mg/kg	1,000	**0.0044 J**	0.0081 U	**0.0038 J**	**0.0055 J**	**0.0035 J**	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
Styrene	mg/kg	35,000	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
Tetrachloroethene	mg/kg	100	0.0046 U	0.0081 U	0.006 U	0.0058 U	0.0044 U	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
Toluene	mg/kg	47,000	0.0046 U	0.0081 U	**0.0029 J**	0.0058 U	0.0044 U	**0.075 J**	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	0.005 U	0.0047 U	0.0046 U	0.23 U	0.23 R
Trichloroethene	mg/kg	6	0.0046 U	0.0081 U	0.006 U	0.0058 U	**0.0021 J**	0.23 U	N/A	0.0049 U	0.0044 U	0.0064 U	0.0056 U	N/A	**0.032**	0.0047 U	0.0046 U	0.23 U	0.23 R
Xylenes	mg/kg	2,800	0.014 U	0.024 U	0.018 U	0.017 U	0.013 U	**6.4**	N/A	0.015 U	0.013 U	0.019 U	0.017 U	N/A	0.015 U	0.014 U	0.014 U	0.7 U	0.68 R
Semi-Volatile Organic Compound*																			
1,1-Biphenyl	mg/kg	200	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	**11.3**	N/A	0.076 U	0.39 U	0.074 U	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
2,4,5-Trichlorophenol	mg/kg	82,000	0.91 U	20.5 U	0.21 U	0.18 U	0.91 U	18.8 R	N/A	0.19 R	0.97 U	0.19 UJ	0.97 U	N/A	0.98 U	0.93 U	0.95 U	1 U	N/A
2,4-Dimethylphenol	mg/kg	16,000	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 R	N/A	0.076 R	0.39 U	0.074 UJ	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
2-Methylnaphthalene	mg/kg	3,000	0.0072 U	0.16 U	**0.093**	0.0075 U	0.0073 U	**273**	**0.04 J**	**0.037**	0.0077 U	**0.0091**	**0.24**	0.0081 UJ	**0.076 J**	0.0076 U	**0.054**	**0.091**	N/A
2-Methylphenol	mg/kg	41,000	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 U	N/A	0.076 R	0.39 U	0.074 UJ	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	**0.09 J**	16.4 U	0.16 U	0.14 U	0.73 U	15 R	N/A	0.15 R	0.77 U	0.15 UJ	0.77 U	N/A	0.78 U	0.74 U	0.76 U	0.8 U	N/A
Acenaphthene	mg/kg	45,000	0.0072 U	0.16 U	**0.018**	0.0075 U	0.0073 U	**0.57**	0.0078 UJ	**0.034**	0.0077 U	**0.0047 J**	**0.51**	0.0081 UJ	**0.14**	0.0076 U	**0.0065 J**	0.0081 U	N/A
Acenaphthylene	mg/kg	45,000	0.0072 U	0.16 U	**0.11**	0.0075 U	0.0073 U	**0.28**	0.0078 UJ	**0.025**	0.0077 U	**0.0025 J**	**0.3**	0.0081 UJ	**0.04 J**	0.0076 U	**0.013**	0.0081 U	N/A
Acetophenone	mg/kg	120,000	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 U	N/A	0.076 U	0.39 U	0.074 U	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
Anthracene	mg/kg	230,000	0.0072 U	**0.32**	**0.14**	0.0075 U	0.0073 U	**0.054 J**	0.0078 UJ	**0.13**	0.0077 U	**0.021**	**1.9**	0.0081 UJ	**0.63**	0.0076 U	**0.037**	**0.0025 J**	N/A
Benz[a]anthracene	mg/kg	2.9	**0.0023 J**	**0.73**	**0.51**	0.0075 U	**0.0061 J**	0.15 U	0.0078 UJ	**0.43**	0.0077 U	**0.06**	**4**	0.0081 UJ	**1.6**	0.0076 U	**0.15**	**0.0051 J**	N/A
Benzaldehyde	mg/kg	120,000	**0.26 J**	8.2 U	0.082 R	0.072 R	0.37 U	7.5 U	N/A	0.076 R	0.39 U	0.074 R	0.39 U	N/A	**0.25 B**	0.37 U	0.38 U	0.4 U	N/A
Benzo[a]pyrene	mg/kg	0.29	0.0072 U	**0.74**	**0.55**	0.0075 U	0.0073 U	0.15 U	0.0078 UJ	**0.39**	0.0077 U	**0.043**	**3.9**	0.0081 UJ	**1.7**	0.0076 U	**0.14**	**0.0031 J**	N/A
Benzo[b]fluoranthene	mg/kg	2.9	**0.0043 J**	**1.1**	**1.3**	0.0075 U	**0.008**	**0.019 J**	0.0078 UJ	**0.64**	0.0077 U	**0.075**	**5.5**	0.0081 UJ	**2.9**	0.0076 U	**0.26**	**0.0061 J**	N/A
Benzo[g,h,i]perylene	mg/kg		**0.0029 J**	**0.42**	**0.2**	0.0075 U	**0.0029 J**	**0.029 J**	**0.0021 B**	**0.17**	0.0077 U	**0.028**	**2.2**	0.0081 UJ	**0.33**	0.0076 U	**0.077**	**0.0022 J**	N/A
Benzo[k]fluoranthene	mg/kg	29	**0.0014 J**	**0.42**	**0.38**	0.0075 U	**0.0034 J**	0.15 U	0.0078 UJ	**0.22**	0.0077 U	**0.026**	**2**	0.0081 UJ	**1.3**	0.0076 U	**0.081**	**0.0017 J**	N/A
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 U	N/A	0.076 UJ	0.39 U	0.074 UJ	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
Caprolactam	mg/kg	400,000	0.91 U	20.5 U	0.21 U	0.18 U	0.91 U	18.8 U	N/A	0.19 UJ	0.97 U	0.19 UJ	0.97 U	N/A	0.98 U	0.93 U	0.95 U	1 U	N/A
Carbazole	mg/kg		0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 U	N/A	**0.045 J**	0.39 U	**0.025 J**	**0.23 J**	N/A	**0.3 J**	0.37 U	0.38 U	0.4 U	N/A
Chrysene	mg/kg	290	**0.0025 J**	**0.77**	**0.64**	0.0075 U	**0.0052 J**	0.15 U	0.0078 UJ	**0.42**	0.0077 U	**0.063**	**3.7**	0.0081 UJ	**1.6**	0.0076 U	**0.18**	**0.0067 J**	N/A
Dibenz[a,h]anthracene	mg/kg	0.29	0.0072 U	**0.16 J**	**0.11**	0.0075 U	0.0073 U	0.15 U	0.0078 UJ	**0.077**	0.0077 U	**0.011**	**0.89**	0.0081 UJ	**0.18**	0.0076 U	**0.041**	0.0081 U	N/A
Di-n-butylphthalate	mg/kg	82,000	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 U	N/A	0.076 U	0.39 U	0.074 U	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
Di-n-octylphthalate	mg/kg	8,200	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 U	N/A	0.076 UJ	0.39 U	0.074 UJ	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
Fluoranthene	mg/kg	30,000	0.0072 U	**1.7**	**0.89**	0.0075 U	**0.0092**	0.15 U	0.0078 UJ	**0.9**	0.0077 U	**0.13**	**7.8**	0.0081 UJ	**3.7**	**0.0071 J**	**0.24**	**0.012**	N/A
Fluorene	mg/kg	30,000	0.0072 U	**0.11 J**	**0.025**	0.0075 U	0.0073 U	**0.53**	**0.00089 J**	**0.047**	**0.00078 J**	**0.02**	**0.9**	0.0081 UJ	**0.13**	0.0076 U	**0.0064 J**	**0.0021 J**	N/A
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	0.0072 U	**0.39**	**0.24**	0.0075 U	0.0073 U	0.15 U	0.0078 UJ	**0.2**	0.0077 U	**0.028**	**2.4**	0.0081 UJ	**0.39**	0.0076 U	**0.085**	0.0081 U	N/A
Naphthalene	mg/kg	17	0.0072 U	**0.15 J**	**0.19**	0.0075 U	**0.0013 J**	75	**0.014 J**	**0.054**	0.0077 U	**0.013**	**0.69**	**0.0048 J**	**0.13**	0.0076 U	**0.055**	**0.65**	N/A
Phenanthrene	mg/kg		0.0072 U	**1**	**0.31**	0.0075 U	0.0073 U	**2.4**	0.0078 UJ	**0.53**	0.0077 U	**0.1**	**6.5**	0.0081 UJ	**2**	0.0076 U	**0.17**	**0.01**	N/A
Phenol	mg/kg	250,000	0.36 U	8.2 U	0.082 U	0.072 U	0.37 U	7.5 R	N/A	0.076 R	0.39 U	**0.038 J**	0.39 U	N/A	0.39 U	0.37 U	0.38 U	0.4 U	N/A
Pyrene	mg/kg	23,000	0.0072 U	**1.5**	**0.83**	0.0075 U	**0.0077**	**0.097 J**	0.0078 UJ	**0.72**	0.0077 U	**0.1**	**5.9**	0.0081 UJ	**3.2**	**0.0074 J**	**0.2**	**0.01**	N/A
PCBs																			
Aroclor 1242	mg/kg	0.97	0.018 U	N/A	0.1 U	N/A	0.018 U	N/A	N/A	0.094 U	N/A	0.091 U	N/A	N/A	0.098 U	N/A	0.19 U	N/A	N/A
Aroclor 1248	mg/kg	0.94	0.018 U	N/A	0.1 U	N/A	0.018 U	N/A	N/A	0.094 U	N/A	0.091 U	N/A	N/A	0.098 U	N/A	0.19 U	N/A	N/A
Aroclor 1254	mg/kg	0.97	0.018 U	N/A	0.1 U	N/A	0.018 U	N/A	N/A	0.094 U	N/A	0.091 U	N/A	N/A	0.098 U	N/A	0.19 U	N/A	N/A
Aroclor 1260	mg/kg	0.99	0.018 U	N/A	0.1 U	N/A	0.018 U	N/A	N/A	0.094 U	N/A	0.091 U	N/A	N/A	0.098 U	N/A	0.19 U	N/A	N/A
PCBs (total)	mg/kg	0.97	0.13 U	N/A	0.7 U	N/A	0.13 U	N/A	N/A	0.66 U	N/A	0.64 U	N/A	N/A	0.69 U	N/A	1.3 U	N/A	N/A
TPH/Oil and Grease																			
Diesel Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gasoline Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	mg/kg	6,200	**330**	**13,700**	**586**	**135**	**277**	**2,200**	N/A	**565**	**1,110**	**616**	**6,330**	N/A	**1,520**	**273**	**1,140**	**8,630**	N/A

Detections in bold
*PAH compounds were analyzed via SIM
Values in Red indicate an exceedance of the Project Action Limit (PAL)
Gray highlighting indicates boring locations within the building footprint

R: The analytical result was rejected during validation.
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.
N/A: This parameter was not analyzed for this sample.

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-048-SB-1	RW-048-SB-5	RW-049-SB-1	RW-049-SB-5	RW-050-SB-1	RW-050-SB-4.5	RW-051-SB-1	RW-051-SB-5	RW-052-SB-1	RW-052-SB-5	RW-053-SB-1	RW-053-SB-5	RW-054-SB-1	RW-054-SB-5	RW-055-SB-1	RW-055-SB-5	RW-055-SB-7
Volatile Organic Compound																			
1,1,2-Trichloroethane	mg/kg	5	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 R	0.0052 U	0.0042 U	0.0046 U	0.0054 U	0.0046 U	0.0045 U	0.34 U
1,1-Dichloroethane	mg/kg	16	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0058 R	0.0052 U	0.0042 U	0.0046 U	0.0054 U	0.0046 U	0.0045 U	0.34 U
1,2,3-Trichlorobenzene	mg/kg	930	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0015 R	0.0052 U	0.0042 U	0.0046 U	0.0054 U	0.0046 U	0.0045 U	**0.096 B**
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 R	0.0052 U	0.0042 U	0.0046 U	0.0054 U	0.0046 UJ	0.0045 UJ	0.34 UJ
1,2-Dichloroethane	mg/kg	2	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 R	0.0052 U	0.0042 U	0.0046 U	0.0054 U	0.0046 U	0.0045 U	0.34 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.0092 U	0.0088 U	0.012 U	0.012 U	0.01 U	0.0062 U	0.0097 U	0.014 U	0.0099 R	0.011 R	0.01 U	0.0083 U	**0.0052 J**	0.011 U	0.0093 U	0.0089 U	0.69 U
1,4-Dichlorobenzene	mg/kg	11	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 R	0.0052 U	0.0042 U	0.0046 U	0.0054 U	0.0046 U	0.0045 U	39.8
2-Butanone (MEK)	mg/kg	190,000	**0.0084 J**	0.0088 U	**0.019**	**0.0014 J**	0.01 U	0.0062 U	0.0097 U	0.014 U	0.0076 R	0.031 R	**0.0042 J**	0.0083 U	**0.004 J**	0.011 U	0.0093 U	0.0089 U	0.69 U
2-Hexanone	mg/kg	1,300	0.0092 U	0.0088 U	0.012 U	0.012 U	0.01 U	0.0062 U	0.0097 U	0.014 U	0.082 R	0.011 R	0.01 U	0.0083 U	0.0093 U	0.011 U	0.0093 U	0.0089 U	0.69 U
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.0092 U	0.0088 U	0.012 U	0.012 U	0.01 U	0.0062 U	0.0097 U	0.014 U	0.0027 R	0.029 R	0.01 U	0.0083 U	0.0093 U	0.011 U	0.0093 U	0.0089 U	0.69 U
Acetone	mg/kg	670,000	**0.02 J**	0.0088 UJ	**0.12**	**0.015**	**0.016**	**0.035**	**0.016 J**	**0.02 J**	**0.043 J**	**0.13 J**	**0.015 J**	0.0083 UJ	**0.028 J**	0.011 UJ	**0.011**	**0.0048 J**	0.69 U
Benzene	mg/kg	5.1	**0.0039 J**	0.0044 U	**0.0023 J**	0.006 U	0.005 U	**0.0092**	0.0048 U	0.0068 U	0.0038 R	0.1 R	0.0052 U	0.0042 U	**0.0015 J**	0.0054 U	0.0046 U	0.0045 U	**0.96**
Bromoform	mg/kg	86	0.0046 UJ	0.0044 UJ	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 UJ	0.0053 UJ	0.0052 UJ	0.0042 UJ	0.0046 UJ	0.0054 UJ	0.0046 UJ	0.0045 UJ	0.34 UJ
Carbon disulfide	mg/kg	3,500	**0.011**	**0.0048**	**0.017**	**0.0036 J**	0.005 U	**0.04**	**0.0097**	**0.034**	0.0093 R	0.023 R	**0.0087**	0.0042 U	**0.0067**	0.0054 U	0.0046 U	0.0045 U	0.34 U
Chloroform	mg/kg	1.4	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 U	0.0052 U	0.0042 R	0.0046 U	0.0054 U	0.0046 U	0.0045 U	0.34 U
Chloromethane	mg/kg	460	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 U	0.0052 U	0.0042 R	0.0046 U	0.0054 U	0.0046 U	0.0045 U	0.34 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 U	0.0052 U	0.0042 R	**0.0041 J**	0.0054 U	0.0046 U	0.0045 U	0.34 U
Cyclohexane	mg/kg	27,000	**0.0056 J**	0.0088 U	**0.0061 J**	0.012 U	0.01 U	0.0062 U	0.0097 U	0.014 U	0.0039 R	0.011 U	0.01 U	0.0083 R	0.0093 U	0.011 U	0.0093 U	0.0089 U	0.69 U
Ethylbenzene	mg/kg	25	**0.0011 J**	0.0044 U	0.0059 U	0.006 U	0.005 U	**0.0032**	0.0048 U	0.0068 U	0.0049 R	**0.12**	0.0052 U	0.0042 R	0.0046 U	0.0054 U	0.0046 U	0.0045 U	**8.4**
Isopropylbenzene	mg/kg	9,900	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	**0.04**	0.0052 U	0.0042 R	0.0046 U	0.0054 U	0.0046 U	0.0045 U	**0.47**
Methyl Acetate	mg/kg	1,200,000	0.046 U	0.044 U	0.059 U	0.06 U	0.05 U	0.031 U	0.048 U	0.068 U	0.049 R	0.053 U	0.052 U	0.042 R	0.046 U	0.054 U	0.046 U	0.045 U	3.4 U
Methylene Chloride	mg/kg	1,000	**0.0045 J**	0.0044 U	**0.0024 J**	**0.0045 J**	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	**0.0061**	0.0052 U	0.0042 R	**0.0047**	0.0054 U	**0.0044 J**	0.0045 U	0.34 U
Styrene	mg/kg	35,000	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	**0.41**	0.0052 U	0.0042 R	0.0046 U	0.0054 U	0.0046 U	0.0045 U	**0.3 J**
Tetrachloroethene	mg/kg	100	0.0046 U	0.0044 U	0.0059 U	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	0.0053 U	0.0052 U	0.0042 R	0.0046 U	0.0054 U	0.0046 U	0.0045 U	0.34 U
Toluene	mg/kg	47,000	**0.0033 J**	0.0044 U	**0.0017 J**	**0.00053 J**	0.005 U	**0.0078**	0.0048 U	0.0068 U	0.0034 R	**0.17**	0.0052 U	0.0042 R	0.0046 U	0.0054 U	0.0046 U	0.0045 U	**0.75**
Trichloroethene	mg/kg	6	0.0046 U	0.0044 U	**0.0022 J**	0.006 U	0.005 U	0.0031 U	0.0048 U	0.0068 U	0.0049 R	**0.014**	0.0052 U	0.0019 R	**0.088**	**0.0072**	0.0046 U	0.0045 U	**0.49**
Xylenes	mg/kg	2,800	0.014 U	0.013 U	0.018 U	0.018 U	0.015 U	**0.0034 J**	0.014 U	0.02 U	0.015 R	**0.18**	0.016 U	0.013 R	0.014 U	0.016 U	0.014 U	0.013 U	**1.3**
Semi-Volatile Organic Compound*																			
1,1-Biphenyl	mg/kg	200	0.37 U	0.38 U	0.085 U	0.078 U	0.36 U	1.8 U	0.35 U	0.55 U	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 U	0.41 U	**0.76**
2,4,5-Trichlorophenol	mg/kg	82,000	0.94 U	0.96 U	0.21 U	0.19 U	0.9 R	4.6 U	0.88 R	1.4 R	10 U	10.3 U	10 U	0.97 U	0.96 U	1 U	0.22 R	1 U	1 U
2,4-Dimethylphenol	mg/kg	16,000	0.37 U	0.38 U	0.085 U	0.078 U	0.36 R	1.8 U	0.35 R	0.55 R	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 R	0.41 U	0.41 U
2-Methylnaphthalene	mg/kg	3,000	**0.021**	0.0077 U	**0.031**	0.0079 U	0.0072 U	**0.02 J**	**0.011**	**0.017**	**0.053**	**8.1**	0.079 U	0.0077 U	**0.027**	**0.002 J**	**0.056**	0.0082 U	**4**
2-Methylphenol	mg/kg	41,000	0.37 U	0.38 U	0.085 U	0.078 U	0.36 R	1.8 U	0.35 R	0.55 R	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 R	0.41 U	0.41 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.75 U	0.77 U	0.17 U	0.16 U	0.72 R	3.6 U	0.7 R	1.1 R	8 U	8.2 U	8 U	0.77 U	0.76 U	0.81 U	0.17 R	0.82 U	0.81 U
Acenaphthene	mg/kg	45,000	**0.0047 J**	0.0077 U	**0.0081**	0.0079 U	0.0072 U	**0.034 J**	**0.009**	**0.015**	**0.029**	**4.1**	0.079 U	0.0077 U	**0.042**	0.0082 U	**0.084**	0.0082 U	**0.51**
Acenaphthylene	mg/kg	45,000	**0.013**	0.0077 U	**0.075**	0.0079 U	0.0072 U	0.072 U	**0.015**	**0.004 J**	**0.099**	**1.7**	0.079 U	0.0077 U	**0.037**	0.0082 U	**0.013**	0.0082 U	**1**
Acetophenone	mg/kg	120,000	0.37 U	0.38 U	0.085 U	0.078 U	0.36 U	1.8 U	0.35 U	0.55 U	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 U	0.41 U	0.41 U
Anthracene	mg/kg	230,000	**0.021**	0.0077 U	**0.11**	**0.0062 J**	**0.0049 J**	**0.067 J**	**0.074**	**0.038**	**0.14**	**8.4**	**0.044 J**	0.0077 U	**0.17**	0.0082 U	**0.065**	**0.013**	**1**
Benz[a]anthracene	mg/kg	2.9	**0.081**	0.0077 U	**0.36 J**	**0.015**	**0.011**	**0.16**	**0.18**	**0.094**	**0.61**	14.7	**0.15**	0.0077 U	**0.61**	0.0082 U	**0.35**	**0.022**	**2.1**
Benzaldehyde	mg/kg	120,000	0.37 U	**0.25 J**	0.085 R	0.078 R	**0.22 J**	1.8 U	0.35 U	0.55 U	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 R	0.41 U	0.41 U
Benzo[a]pyrene	mg/kg	0.29	**0.085**	0.0077 U	0.41 J	**0.012**	**0.0098**	**0.14**	**0.15**	**0.1**	0.64	**10.8**	**0.18**	0.0077 U	0.65	0.0082 U	0.42	**0.017**	1.6
Benzo[b]fluoranthene	mg/kg	2.9	**0.15**	0.0077 U	**1.1**	**0.021**	**0.016**	**0.22**	**0.3**	**0.19**	**1.3**	17	**0.23**	0.0077 U	**1.1**	0.0082 U	**0.73**	**0.023**	**2.5**
Benzo[g,h,i]perylene	mg/kg		**0.055**	0.0077 UJ	**0.13 J**	**0.0021 J**	**0.0043 J**	**0.083**	**0.033**	**0.026**	**0.36**	**5.8**	**0.2**	0.0077 U	**0.35**	0.0082 U	**0.3**	**0.0091**	**0.76**
Benzo[k]fluoranthene	mg/kg	29	**0.056**	0.0077 U	**0.29 J**	**0.011**	**0.0074**	**0.1**	**0.093**	**0.068**	**0.54**	**7**	**0.097**	0.0077 U	**0.35**	0.0082 U	**0.24**	**0.0098**	**0.84**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.37 U	0.38 U	0.085 U	0.078 U	0.36 U	1.8 U	0.35 U	0.55 U	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 UJ	0.41 U	0.41 U
Caprolactam	mg/kg	400,000	0.94 U	0.96 U	0.21 U	0.19 U	0.9 U	4.6 U	0.88 U	1.4 U	10 U	10.3 U	10 U	0.97 U	0.96 U	1 U	0.22 UJ	1 U	1 U
Carbazole	mg/kg		0.37 U	0.38 U	0.085 U	0.078 U	0.36 U	1.8 U	0.35 U	0.55 U	4 U	**2.4 J**	4 U	0.39 U	0.38 U	0.4 U	0.086 U	0.41 U	**0.3 J**
Chrysene	mg/kg	290	**0.079**	0.0077 U	**0.44 J**	**0.013**	**0.011**	**0.2**	**0.18**	**0.1**	**0.67**	**15.1**	**0.16**	0.0077 U	**0.57**	**0.00074 J**	**0.41**	**0.02**	**2.1**
Dibenz[a,h]anthracene	mg/kg	0.29	**0.02**	0.0077 UJ	**0.059 J**	0.0079 U	0.0072 U	0.072 U	**0.02**	**0.013**	**0.14**	2.7	**0.063 J**	0.0077 U	**0.14**	0.0082 U	**0.14**	0.0082 U	0.33
Di-n-butylphthalate	mg/kg	82,000	0.37 U	0.38 U	0.085 U	0.078 U	0.36 U	1.8 U	0.35 U	0.55 U	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 U	0.41 U	0.41 U
Di-n-ocytlphthalate	mg/kg	8,200	0.37 U	0.38 U	0.085 UJ	0.078 U	0.36 U	1.8 U	0.35 U	0.55 U	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 UJ	0.41 U	0.41 U
Fluoranthene	mg/kg	30,000	**0.17**	0.0077 U	**0.55 J**	**0.031**	**0.025**	**0.52**	**0.43**	**0.2**	**0.97**	**36.9**	**0.31**	**0.002 J**	**1.3**	0.0082 U	**0.57**	**0.085**	**5.4**
Fluorene	mg/kg	30,000	**0.008**	0.0077 U	**0.01**	**0.0025 J**	**0.0014 J**	**0.068 J**	**0.02**	**0.01 J**	**0.061**	**9.1**	**0.034 J**	**0.00093 J**	**0.045**	0.0082 U	**0.019**	**0.0055 J**	**1.4**
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.058**	0.0077 UJ	**0.17 J**	0.0079 U	0.0072 U	**0.075**	**0.043**	0.011 U	**0.39**	6.2	**0.16**	0.0077 U	**0.35**	0.0082 U	**0.32**	**0.0082 J**	**0.85**
Naphthalene	mg/kg	17	**0.014**	0.0077 U	**0.046**	**0.0059 J**	0.0072 U	**0.094**	**0.012**	**0.02**	**0.13**	23.4	0.079 U	0.0077 U	**0.043**	0.0082 U	**0.12**	0.0082 U	28.6
Phenanthrene	mg/kg		**0.093**	0.0077 U	**0.12 J**	**0.025**	**0.018**	**0.27**	**0.33**	**0.14**	**0.49**	**37.4**	**0.24**	0.0077 U	**0.63**	0.0082 U	**0.36**	**0.033**	**6.2**
Phenol	mg/kg	250,000	0.37 U	0.38 U	0.085 U	0.078 U	0.36 R	1.8 U	0.35 R	0.55 R	4 U	4.1 U	4 U	0.39 U	0.38 U	0.4 U	0.086 R	0.41 U	0.41 U
Pyrene	mg/kg	23,000	**0.15**	0.0077 U	**0.58 J**	**0.022**	**0.021**	**0.5**	**0.33**	**0.16**	**1.1**	**32.2**	**0.34**	**0.0022 J**	**1.2**	0.0082 U	**0.51**	**0.064**	**4.3**
PCBs																			
Aroclor 1242	mg/kg	0.97	0.092 U	N/A	0.097 U	N/A	0.018 U	N/A	**0.42**	N/A	0.4 U	N/A	0.02 U	N/A	0.096 U	N/A	0.019 U	N/A	N/A
Aroclor 1248	mg/kg	0.94	0.092 U	N/A	0.097 U	N/A	0.018 U	N/A	0.036 U	N/A	0.4 U	N/A	0.02 U	N/A	0.096 U	N/A	0.019 U	N/A	N/A
Aroclor 1254	mg/kg	0.97	0.092 U	N/A	0.097 U	N/A	0.018 U	N/A	0.036 U	N/A	0.4 U	N/A	0.02 U	N/A	0.096 U	N/A	**0.086**	N/A	N/A
Aroclor 1260	mg/kg	0.99	0.092 U	N/A	0.097 U	N/A	0.018 U	N/A	0.036 U	N/A	0.4 U	N/A	0.02 U	N/A	0.096 U	N/A	0.019 U	N/A	N/A
PCBs (total)	mg/kg	0.97	0.64 U	N/A	0.68 U	N/A	0.13 U	N/A	**0.42**	N/A	2.8 U	N/A	0.14 U	N/A	0.68 U	N/A	**0.086 J**	N/A	N/A
TPH/Oil and Grease																			
Diesel Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gasoline Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	mg/kg	6,200	**669**	**336**	**449**	**458**	**101 J**	**1,810**	**305**	**297**	**832**	7,130	**344**	**356**	**501**	**367**	**471**	26,100	**3,090**

Detections in bold
*PAH compounds were analyzed via SIM
Values in Red indicate an exceedance of the Project Action Limit (PAL)
Gray highlighting indicates boring locations within the building footprint

R: The analytical result was rejected during validation.
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.
N/A: This parameter was not analyzed for this sample.

Table 1
Summary of Organics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-056-SB-1	RW-056-SB-5	RW-076-SB-1	RW-076-SB-6	RW-077-SB-1	RW-077-SB-5	RW-078-SB-1	RW-078-SB-5	RW-079-SB-1	RW-079-SB-5
Volatile Organic Compound												
1,1,2-Trichloroethane	mg/kg	5	0.0049 U	0.0065 U	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 UJ	0.0056 U	0.0044 U
1,1-Dichloroethane	mg/kg	16	0.0049 U	0.0065 U	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 U	0.0056 U	0.0044 U
1,2,3-Trichlorobenzene	mg/kg	930	0.0049 U	0.0065 U	0.0045 U	0.0044 UJ	0.0058 U	0.0073 U	0.0045 UJ	0.0067 UJ	0.0056 U	0.0044 UJ
1,2-Dibromo-3-chloropropane	mg/kg	0.064	0.0049 U	0.0065 U	0.0045 U	0.0044 UJ	0.0058 U	0.0073 U	0.0045 UJ	0.0067 UJ	0.0056 U	0.0044 UJ
1,2-Dichloroethane	mg/kg	2	0.0049 U	0.0065 U	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 U	0.0056 U	0.0044 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.0099 U	**0.0068 J**	0.009 U	0.0089 U	0.012 U	0.015 U	0.0091 U	0.013 U	0.011 U	0.0089 U
1,4-Dichlorobenzene	mg/kg	11	0.0049 U	0.0065 U	0.0045 U	0.0044 UJ	0.0058 U	0.0073 U	0.0045 UJ	0.0067 UJ	0.0056 U	0.0044 UJ
2-Butanone (MEK)	mg/kg	190,000	**0.0038 J**	**0.011 J**	**0.013**	**0.0032 J**	**0.0049 J**	**0.012 J**	**0.015**	**0.0029 J**	**0.0041 J**	**0.0059 J**
2-Hexanone	mg/kg	1,300	0.0099 U	0.013 U	0.009 U	0.0089 U	0.012 U	0.015 U	0.0091 U	0.013 UJ	0.011 U	0.0089 U
4-Methyl-2-pentanone (MIBK)	mg/kg	56,000	0.0099 U	0.013 U	0.009 U	0.0089 U	0.012 U	0.015 U	**0.0021 J**	0.013 UJ	0.011 U	0.0089 U
Acetone	mg/kg	670,000	**0.034 J**	**0.036 J**	**0.056**	**0.016**	**0.016**	**0.014 J**	**0.1**	**0.02**	**0.019**	**0.023**
Benzene	mg/kg	5.1	0.0049 U	0.0065 U	**0.0015 J**	0.0044 U	0.0058 U	**0.002 J**	**0.0018 J**	**0.0036 J**	0.0056 U	**0.0016 J**
Bromoform	mg/kg	86	0.0049 UJ	0.0065 UJ	0.0045 U	0.0044 UJ	0.0058 U	0.0073 U	0.0045 UJ	0.0067 UJ	0.0056 U	0.0044 UJ
Carbon disulfide	mg/kg	3,500	**0.0086**	**0.028**	**0.003 J**	**0.0067**	**0.024**	**0.01**	**0.0037 J**	**0.0029 J**	**0.013**	**0.015**
Chloroform	mg/kg	1.4	0.0049 U	0.0065 U	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 U	0.0056 U	0.0044 U
Chloromethane	mg/kg	460	0.0049 U	0.0065 U	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 U	0.0056 U	0.0044 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0049 U	**0.0042 J**	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 U	0.0056 U	0.0044 U
Cyclohexane	mg/kg	27,000	0.0099 U	0.013 U	**0.0031 J**	**0.0024 J**	0.012 U	**0.0089 J**	**0.00068 J**	**0.0029 J**	0.011 U	**0.0031 J**
Ethylbenzene	mg/kg	25	0.0049 U	**0.0022 J**	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 UJ	0.0056 U	0.0044 U
Isopropylbenzene	mg/kg	9,900	0.0049 U	**0.008**	0.0045 U	0.0044 UJ	0.0058 U	0.0073 U	0.0045 UJ	0.0067 UJ	0.0056 U	0.0044 UJ
Methyl Acetate	mg/kg	1,200,000	0.049 U	0.065 U	0.045 U	0.044 U	0.058 U	0.073 U	0.045 U	0.067 U	0.056 U	**0.0023 J**
Methylene Chloride	mg/kg	1,000	0.0049 U	**0.0051 J**	0.0045 U	0.0044 U	**0.0048 J**	**0.0046 J**	**0.0028 J**	**0.0035 J**	**0.0041 J**	**0.002 J**
Styrene	mg/kg	35,000	0.0049 U	0.0065 U	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 UJ	0.0056 U	0.0044 U
Tetrachloroethene	mg/kg	100	0.0049 U	0.0065 U	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 UJ	0.0056 U	0.0044 U
Toluene	mg/kg	47,000	0.0049 U	0.0065 U	**0.0011 J**	0.0044 U	**0.00041 J**	**0.0017 J**	**0.0014 J**	**0.0034 J**	**0.00054 J**	**0.0013 J**
Trichloroethene	mg/kg	6	**0.0087**	**0.01**	0.0045 U	0.0044 U	0.0058 U	0.0073 U	0.0045 U	0.0067 UJ	0.0056 U	**0.0058**
Xylenes	mg/kg	2,800	0.015 U	0.02 U	0.014 U	0.013 U	0.017 U	0.022 U	0.014 U	0.02 UJ	0.017 U	0.013 U
Semi-Volatile Organic Compound*												
1,1-Biphenyl	mg/kg	200	0.36 U	0.4 U	**0.017 J**	0.077 U	**0.055 J**	**0.02 J**	**0.016 J**	0.075 U	0.074 U	0.078 U
2,4,5-Trichlorophenol	mg/kg	82,000	0.9 U	1 U	0.19 U	0.19 U	0.2 U	0.22 U	0.18 U	0.19 U	0.18 U	0.19 U
2,4-Dimethylphenol	mg/kg	16,000	0.36 U	0.4 U	0.074 U	0.077 U	**0.017 J**	0.087 U	**0.023 J**	0.075 U	0.074 U	0.078 U
2-Methylnaphthalene	mg/kg	3,000	0.0073 U	**0.0069 J**	**0.1 J**	0.15 U	0.15 U	**0.006 J**	0.14 U	**0.28**	**0.022 J**	0.15 U
2-Methylphenol	mg/kg	41,000	0.36 U	0.4 U	0.074 U	0.077 U	0.078 U	0.087 U	0.071 U	0.075 U	0.074 U	0.078 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.72 U	0.8 U	0.15 U	0.15 U	**0.023 J**	**0.026 J**	**0.039 J**	0.15 U	0.15 U	0.16 U
Acenaphthene	mg/kg	45,000	0.0073 U	**0.0062 J**	**0.07 J**	0.15 U	0.15 U	0.0083 U	0.14 U	**0.0096**	0.15 U	0.15 U
Acenaphthylene	mg/kg	45,000	0.0073 U	0.008 U	**0.3**	0.15 U	0.15 U	**0.0092**	**0.11 J**	**0.092**	**0.27**	0.15 U
Acetophenone	mg/kg	120,000	0.36 U	0.4 U	**0.022 J**	0.077 U	**0.1**	**0.021 J**	0.071 U	0.075 U	0.074 U	0.078 U
Anthracene	mg/kg	230,000	**0.0064 J**	**0.023**	**0.23**	0.15 U	0.15 U	**0.0049 J**	**0.27**	**0.038**	**0.64**	0.15 U
Benz[a]anthracene	mg/kg	2.9	**0.026**	**0.0069 J**	**1.3**	0.15 U	0.15 U	**0.0094**	**0.87**	**0.084**	**2.2**	**0.043 J**
Benzaldehyde	mg/kg	120,000	0.36 U	0.4 U	**0.028 J**	0.077 R	**0.063 J**	**0.059 J**	0.071 R	0.075 R	0.074 R	0.078 R
Benzo[a]pyrene	mg/kg	0.29	**0.03**	**0.0026 J**	**1.6**	0.15 U	0.15 U	**0.01**	**0.85**	**0.074**	**2**	**0.022 J**
Benzo[b]fluoranthene	mg/kg	2.9	**0.06**	**0.0061 J**	**2.8**	0.15 U	0.15 U	**0.023**	**1.2**	**0.16**	**3.1**	**0.045 J**
Benzo[g,h,i]perylene	mg/kg		**0.0079**	**0.0024 J**	**0.96**	0.15 U	**0.029 J**	**0.0073 J**	**0.53**	**0.033**	**1**	**0.026 J**
Benzo[k]fluoranthene	mg/kg	29	**0.034**	**0.0035 J**	**1.2**	0.15 U	0.15 U	**0.0098**	**0.55**	**0.051**	**1.1**	**0.019 J**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.36 U	0.4 U	0.074 U	0.077 U	0.078 UJ	0.087 U	0.071 U	0.075 U	0.074 UJ	0.078 U
Caprolactam	mg/kg	400,000	0.9 U	1 U	0.19 U	0.19 U	0.2 U	0.22 U	0.18 U	0.19 U	0.18 U	0.19 U
Carbazole	mg/kg		0.36 U	0.4 U	**0.023 J**	0.077 U	**0.092**	0.087 U	**0.05 J**	0.075 U	0.074 U	0.078 U
Chrysene	mg/kg	290	**0.032**	**0.0088**	**1.1**	0.15 U	0.15 U	**0.013**	**0.72**	**0.14**	**2**	**0.032 J**
Dibenz[a,h]anthracene	mg/kg	0.29	0.0073 U	0.008 U	**0.41**	0.15 U	0.15 U	0.0083 U	**0.18**	**0.022**	**0.39**	0.15 U
Di-n-butylphthalate	mg/kg	82,000	0.36 U	0.4 U	0.074 U	0.077 U	0.078 U	0.087 U	0.071 U	0.075 U	0.074 U	0.078 U
Di-n-ocytlphthalate	mg/kg	8,200	0.36 U	0.4 U	0.074 U	0.077 U	0.078 UJ	0.087 U	0.071 U	0.075 U	0.074 UJ	0.078 U
Fluoranthene	mg/kg	30,000	**0.058**	**0.084**	**0.96**	0.15 U	**0.058 J**	**0.024**	**1.6**	**0.15**	**4.7**	**0.055 J**
Fluorene	mg/kg	30,000	**0.0018 J**	**0.025**	**0.026 J**	0.15 U	0.15 U	**0.0015 J**	**0.032 J**	**0.023**	**0.07 J**	0.15 U
Indeno[1,2,3-c,d]pyrene	mg/kg	2.9	**0.0093**	0.008 U	**0.99**	0.15 U	0.15 U	**0.0059 J**	**0.51**	**0.031**	**1.1**	0.15 U
Naphthalene	mg/kg	17	**0.0029 J**	**0.013**	**0.15**	0.15 U	0.15 U	**0.024**	**0.12 J**	**0.34**	**0.086 J**	0.15 U
Phenanthrene	mg/kg		**0.029**	**0.17**	**0.22**	0.15 U	0.15 U	**0.022**	**0.68**	**0.26**	**2.4**	0.15 U
Phenol	mg/kg	250,000	0.36 U	0.4 U	0.074 U	0.077 U	0.078 U	0.087 U	0.071 U	0.075 U	0.074 U	0.078 U
Pyrene	mg/kg	23,000	**0.056**	**0.091**	**1.3**	0.15 U	**0.051 J**	**0.018**	**1.3**	**0.15**	**3.7**	**0.046 J**
PCBs												
Aroclor 1242	mg/kg	0.97	0.018 U	N/A	0.35 U	N/A	0.018 U	N/A	0.89 U	N/A	0.91 U	N/A
Aroclor 1248	mg/kg	0.94	**0.083**	N/A	0.35 U	N/A	0.018 U	N/A	0.89 U	N/A	0.91 U	N/A
Aroclor 1254	mg/kg	0.97	0.018 U	N/A	0.35 U	N/A	0.018 U	N/A	0.89 U	N/A	0.91 U	N/A
Aroclor 1260	mg/kg	0.99	0.018 U	N/A	0.35 U	N/A	0.018 U	N/A	0.89 U	N/A	0.91 U	N/A
PCBs (total)	mg/kg	0.97	**0.083 J**	N/A	2.5 U	N/A	0.13 U	N/A	6.2 U	N/A	6.4 U	N/A
TPH/Oil and Grease												
Diesel Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gasoline Range Organics	mg/kg	6,200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	mg/kg	6,200	**465**	**1,050**	N/A	N/A	**1,220**	N/A	**5,030**	**1,420**	**1,820**	**2,730**

Detections in bold
*PAH compounds were analyzed via SIM
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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-001-SB-1	RW-001-SB-5	RW-002-SB-1	RW-002-SB-4.5	RW-003-SB-1	RW-003-SB-5	RW-003-SB-10	RW-004-SB-1	RW-004-SB-5	RW-004-SB-10
Metals												
Aluminum	mg/kg	1,100,000	**32,200**	**9,050**	**20,500**	**12,100**	**16,500**	**4,350**	N/A	**9,660 J**	**12,200 J**	N/A
Antimony	mg/kg	470	**2.5 B**	3 R	3.2 UJ	2.7 UJ	2.5 UJ	2.2 UJ	N/A	2.7 UJ	3.3 UJ	N/A
Arsenic	mg/kg	3	**26.5 J**	**2.8 J**	**34.4**	**152**	**23**	**11.8**	**137 J**	**6.3**	**19.4**	**10.3 J**
Barium	mg/kg	220,000	**1,060**	**27.5**	**340**	**236**	**294**	**54.5**	N/A	**92.4**	**196**	N/A
Beryllium	mg/kg	2,300	**2.9**	**0.26 B**	**2.6**	**0.88 B**	**2.3**	**0.31 B**	N/A	**0.66 J**	**0.74 J**	N/A
Cadmium	mg/kg	980	**879**	**42.7**	**62.4**	**22.8**	**2,340**	**73.1**	N/A	**14.7 J**	**274 J**	N/A
Chromium	mg/kg	120,000	**35.6 J**	**9.9 J**	**302**	**160**	**490**	**413**	N/A	**106**	**135**	N/A
Chromium VI	mg/kg	6.3	1.1 UJ	1.3 UJ	1.1 U	1.1 UJ	1.1 U	1.1 UJ	N/A	1.1 UJ	1.2 UJ	N/A
Cobalt	mg/kg	350	**2.7 B**	**2.5 B**	**7.2**	**5.4**	**8.2**	**3.2 J**	N/A	**4.4 B**	**5.1 B**	N/A
Copper	mg/kg	47,000	**222**	**6.4**	**99.8**	**84**	**607**	**58.8**	N/A	**59.7**	**182**	N/A
Iron	mg/kg	820,000	**17,900**	**9,530**	**143,000**	**44,300**	**139,000**	**54,300**	N/A	**23,700**	**28,100**	N/A
Lead	mg/kg	800	**586**	**4.7**	**1,080**	**111**	**1,230**	**174**	N/A	**88.9 J**	**365 J**	N/A
Manganese	mg/kg	26,000	**6,490**	**47.9**	**8,720 J**	**4,570 J**	**10,600 J**	**9,570 J**	N/A	**1,090 J**	**978 J**	N/A
Mercury	mg/kg	350	0.11 R	**0.034 J-**	**0.053 J**	**0.0076 J**	**0.09 J**	**0.0053 J**	N/A	**0.37**	**0.11 J**	N/A
Nickel	mg/kg	22,000	**16.1**	**5.6 J**	**34.8**	**23.7**	**39.3**	**24.8**	N/A	**9.5**	**16.9**	N/A
Selenium	mg/kg	5,800	**2.8 B**	4 U	4.3 U	3.6 U	3.3 U	3 U	N/A	3.6 U	**3.2 B**	N/A
Silver	mg/kg	5,800	**1.4 B**	3 U	**1.3 J**	2.7 U	**0.83 J**	2.2 U	N/A	2.7 U	**1.5 B**	N/A
Thallium	mg/kg	12	9.9 UJ	9.9 UJ	10.8 U	9 U	8.4 U	7.5 U	N/A	8.9 U	11.2 U	N/A
Vanadium	mg/kg	5,800	**303**	**18.4**	**433**	**219**	**1,030**	**950**	N/A	**128**	**125**	N/A
Zinc	mg/kg	350,000	**59,400 J**	**2,400 J**	**5,460**	**2,020**	**35,000**	**3,790**	N/A	**718**	**16,500**	N/A
Other												
Cyanide	mg/kg	150	**0.91**	**0.1 J**	**0.31 J**	**0.21 J**	**0.13 J**	0.57 U	N/A	0.62 U	**1.3**	N/A

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-005-SB-1	RW-005-SB-5	RW-006-SB-1	RW-006-SB-5	RW-007-SB-1	RW-007-SB-5	RW-007-SB-10	RW-008-SB-1	RW-008-SB-5	RW-008-SB-10
Metals												
Aluminum	mg/kg	1,100,000	**30,200 J**	**13,100 J**	**16,200**	**14,800**	**14,800**	**11,000**	N/A	**10,600**	**16,900**	N/A
Antimony	mg/kg	470	2.1 UJ	3.3 UJ	2.5 UJ	2.9 UJ	2.4 UJ	2 UJ	N/A	2.7 UJ	3.3 UJ	N/A
Arsenic	mg/kg	3	**142**	**5.9**	**11.2 J**	**6 J**	**5.2**	**6.2**	**20.5 J**	**2.2**	**3.6**	**12.2 J**
Barium	mg/kg	220,000	**574**	**63.9**	**297 J**	**64.1 J**	**295**	**30.6**	N/A	**37**	**50**	N/A
Beryllium	mg/kg	2,300	**2.3**	**0.43 J**	**1.2**	**0.97**	**1.1**	**0.34 J**	N/A	**0.27 B**	**1.6**	N/A
Cadmium	mg/kg	980	**2,240 J**	**6.5 J**	**61.9 J**	**1.1 B**	**2.3**	0.98 U	N/A	**2.2**	**3.6**	N/A
Chromium	mg/kg	120,000	**19.5**	**16.3**	**1,030**	**22.5**	**211 J**	**15 J**	N/A	**14**	**32.7**	N/A
Chromium VI	mg/kg	6.3	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ	1.1 UJ	**0.45 J-**	N/A	1.1 U	1.2 U	N/A
Cobalt	mg/kg	350	**5.3**	**4.2 B**	**18**	**3.3 J**	**9.2**	**20.4**	N/A	**3.4 J**	**5.2 J**	N/A
Copper	mg/kg	47,000	**468**	**7**	**74.4**	**9.6**	**53.9**	**7.7**	N/A	**8.6**	**9.7**	N/A
Iron	mg/kg	820,000	**21,100**	**16,400**	**112,000**	**27,900**	**34,600**	**15,100**	N/A	**11,500**	**40,800**	N/A
Lead	mg/kg	800	**343 J**	**6.3 J**	**169**	**19.1**	**373**	**10**	N/A	**6.7**	**35.1**	N/A
Manganese	mg/kg	26,000	**8,230 J**	**379 J**	**18,200**	**150**	**3,640**	**244**	N/A	**161 J**	**92.2 J**	N/A
Mercury	mg/kg	350	**0.035 J**	**0.029 J**	**0.068 J**	**0.031 J**	0.11 U	**0.038 J**	N/A	**0.031 J**	**0.016 J**	N/A
Nickel	mg/kg	22,000	**21.8**	**8.8 B**	**54.3 J**	**8.3 J**	**44.1**	**7.2**	N/A	**7.6 B**	**9.9 B**	N/A
Selenium	mg/kg	5,800	**2.1 B**	4.4 U	**1.9 J**	3.9 U	3.1 U	2.6 U	N/A	3.5 U	4.4 U	N/A
Silver	mg/kg	5,800	**4.8**	3.3 U	2.5 U	2.9 U	2.4 U	2 U	N/A	2.7 U	3.3 U	N/A
Thallium	mg/kg	12	7.1 U	11.1 U	**6.6 J**	9.6 U	7.9 U	6.6 U	N/A	8.8 U	11.1 U	N/A
Vanadium	mg/kg	5,800	**233**	**31.1**	**2,320**	**39.6**	**290**	**47.6**	N/A	**21**	**82.6**	N/A
Zinc	mg/kg	350,000	**67,900**	**1,000**	**8,290 J**	**225 J**	**590**	**24.9**	N/A	**755**	**1,210**	N/A
Other												
Cyanide	mg/kg	150	**0.28 J**	0.59 U	**0.52 J**	**0.14 J**	**1.4**	0.59 U	N/A	0.61 U	0.66 U	N/A

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-009-SB-1	RW-009-SB-5	RW-009-SB-10	RW-010-SB-1	RW-010-SB-7	RW-011-SB-1	RW-011-SB-5	RW-012-SB-1	RW-012-SB-5	RW-012-SB-8
Metals												
Aluminum	mg/kg	1,100,000	**16,700**	**10,700**	N/A	**10,400**	**13,100**	**13,000**	**8,640**	**30,100**	**12,800**	N/A
Antimony	mg/kg	470	3.1 UJ	3.1 UJ	N/A	2.5 UJ	2.6 UJ	2.7 UJ	**7.2 J**	2.8 UJ	2.9 UJ	N/A
Arsenic	mg/kg	3	**3.1**	**4**	**14.4 J**	**3.4**	**1.8 J**	**12.9**	**169**	**6.9**	**4.4**	**5.7**
Barium	mg/kg	220,000	**133**	**36.5**	N/A	**28**	**54.2**	**169**	**230**	**312**	**51.4**	N/A
Beryllium	mg/kg	2,300	1 U	**0.53 B**	N/A	**0.21 B**	**0.67 B**	**0.63 B**	**0.71 B**	**4.9**	**0.63 B**	N/A
Cadmium	mg/kg	980	**0.51 J**	1.6 U	N/A	1.3 U	1.3 U	**1.5**	**3.2**	**0.6 B**	1.4 U	N/A
Chromium	mg/kg	120,000	**1,180**	**14.2**	N/A	**15.9**	**130**	**1,010**	**102**	**594 J**	**24.6 J**	N/A
Chromium VI	mg/kg	6.3	**6 J-**	1.1 UJ	N/A	1.1 UJ	**0.48 J-**	1.1 UJ	1.2 UJ	1.1 UJ	1.1 UJ	N/A
Cobalt	mg/kg	350	**2.4 B**	**3 B**	N/A	**2.4 B**	**10.7**	**5.5**	**26.3**	**1.4 J**	**7**	N/A
Copper	mg/kg	47,000	**47.1**	**3 B**	N/A	**4.8**	**49.9**	**131**	**245**	**30.8**	**11.3**	N/A
Iron	mg/kg	820,000	**125,000**	**16,800**	N/A	**13,800**	**26,100**	**7,180**	**4,750**	**88,100**	**17,500**	N/A
Lead	mg/kg	800	**120**	**14.7**	N/A	**15.1**	**316**	**176**	**661**	**25.4**	**57.2**	N/A
Manganese	mg/kg	26,000	**28,200 J**	**41.1 J**	N/A	**85.4 J**	**414 J**	**1,510 J**	**2,120 J**	**16,200**	**160**	N/A
Mercury	mg/kg	350	**4.2**	**0.021 J**	N/A	**0.041 J**	**0.037 J**	**0.055 J**	**0.35**	**0.018 J+**	**0.13 J+**	N/A
Nickel	mg/kg	22,000	**18.8**	**7.1 B**	N/A	**6.4 B**	**52.9**	**25.2**	**126**	**11.5**	**13.8**	N/A
Selenium	mg/kg	5,800	4.1 U	4.2 U	N/A	3.4 U	3.5 U	3.7 U	4.7 U	**2.4 B**	3.8 U	N/A
Silver	mg/kg	5,800	3.1 U	3.1 U	N/A	2.5 U	2.6 U	2.7 U	**1.2 J**	2.8 U	2.9 U	N/A
Thallium	mg/kg	12	10.3 U	10.4 U	N/A	8.4 U	8.8 U	9.1 U	11.8 U	9.3 U	9.5 U	N/A
Vanadium	mg/kg	5,800	**3,070 J**	**25.7 J**	N/A	**24.1 J**	**34.4 J**	**1,820 J**	**71.5 J**	**437 J**	**29.5 J**	N/A
Zinc	mg/kg	350,000	**239**	**16.7**	N/A	**19.1**	**47.8**	**507**	**1,740**	**153**	**45.7**	N/A
Other												
Cyanide	mg/kg	150	**0.19 J**	0.69 U	N/A	**0.11 J**	0.7 U	**0.53 J**	**3.4**	**0.58 J**	0.68 U	N/A

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Table 2
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Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-013-SB-1	RW-013-SB-5	RW-013-SB-10	RW-014-SB-1	RW-014-SB-5	RW-015-SB-1	RW-015-SB-5	RW-015-SB-10	RW-016-SB-1	RW-016-SB-4
Metals												
Aluminum	mg/kg	1,100,000	**8,750**	**7,480**	N/A	**7,550**	**6,310**	**36,300**	**17,000**	N/A	**14,700**	**9,720**
Antimony	mg/kg	470	3.3 UJ	3.3 UJ	N/A	2.8 UJ	**4 J**	2.3 UJ	3.4 UJ	N/A	2.3 UJ	2.2 UJ
Arsenic	mg/kg	3	**4.1**	**9.7**	**7**	**2.7**	**1.6 J**	**5.9**	**5.4**	**2.8**	**2.2**	**6.7**
Barium	mg/kg	220,000	**39.1**	**19.6**	N/A	**34.6**	**46.1**	**695**	**58.5**	N/A	**39**	**180**
Beryllium	mg/kg	2,300	1.1 U	1.1 U	N/A	0.95 U	**0.19 B**	**2.9**	**0.61 B**	N/A	0.76 U	**0.32 B**
Cadmium	mg/kg	980	**0.59 J**	1.7 U	N/A	**0.71 B**	**0.65 B**	**2**	1.7 U	N/A	**0.47 J**	**0.9 J**
Chromium	mg/kg	120,000	**1,380**	**15.7**	N/A	**1,350**	**12.6**	**33.2 J**	**27.9 J**	N/A	**1,530**	**460**
Chromium VI	mg/kg	6.3	**4.2**	**0.98 J**	N/A	**7.8 J-**	1.2 U	1.1 UJ	1.2 UJ	N/A	**3.1**	1.2 U
Cobalt	mg/kg	350	**2.3 B**	**0.97 B**	N/A	**1.5 B**	**1.2 B**	**5.5**	**6.8**	N/A	3.8 U	**8**
Copper	mg/kg	47,000	**37.4**	**4.9 B**	N/A	**23.7**	**28.7**	**18.7**	**10.5**	N/A	**23.6**	**186**
Iron	mg/kg	820,000	**235,000**	**20,700**	N/A	**296,000**	**10,500**	**36,200**	**23,400**	N/A	**195,000**	**75,600**
Lead	mg/kg	800	**23.2**	**8.8**	N/A	**3.2**	**30.5**	**35.6**	**11**	N/A	**14.4**	**203**
Manganese	mg/kg	26,000	**35,200**	**27.3**	N/A	**28,100 J**	**167 J**	**5,520**	**245**	N/A	**30,000**	**15,600**
Mercury	mg/kg	350	**0.067 J**	**0.018 J**	N/A	0.11 U	**0.003 J**	0.11 U	**0.011 J+**	N/A	**0.011 J**	**0.07 J**
Nickel	mg/kg	22,000	**28.1 J**	**1.9 J**	N/A	**26.8**	**7.7 J**	**11.2**	**14.8**	N/A	**11.2 J**	**22.2 J**
Selenium	mg/kg	5,800	**3.5 J**	4.4 U	N/A	3.8 U	3.2 U	**2.6 B**	4.5 U	N/A	3 U	2.9 U
Silver	mg/kg	5,800	**1.8 B**	3.3 U	N/A	**1.7 J**	2.4 U	2.3 U	3.4 U	N/A	**1.1 B**	2.2 U
Thallium	mg/kg	12	11 UJ	11.1 UJ	N/A	9.5 U	7.9 U	7.6 U	11.3 U	N/A	7.6 UJ	7.4 UJ
Vanadium	mg/kg	5,800	**923**	**26.2**	N/A	**806 J**	**14.3 J**	**368 J**	**36.6 J**	N/A	**855**	**2,980**
Zinc	mg/kg	350,000	**112 J**	**12.6 J**	N/A	**93.5**	**64.6**	**1,310**	**54.6**	N/A	**101 J**	**179 J**
Other												
Cyanide	mg/kg	150	**0.22 J**	0.68 U	N/A	0.54 U	0.6 U	**0.24 J**	0.65 U	N/A	**0.12 J**	**0.24 J**

Detections in bold

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-017-SB-1	RW-017-SB-6	RW-018-SB-1	RW-018-SB-5	RW-019-SB-1	RW-019-SB-4	RW-019-SB-10	RW-020-SB-1	RW-020-SB-4.5	RW-021-SB-1
Metals												
Aluminum	mg/kg	1,100,000	**6,930**	**5,120**	**17,900**	**7,640**	**19,200**	**16,200**	N/A	**27,000**	**14,200**	**21,000**
Antimony	mg/kg	470	2.4 UJ	3.3 UJ	2.8 UJ	3.2 UJ	2.7 UJ	**1.4 B**	N/A	3 UJ	2.6 UJ	2.8 UJ
Arsenic	mg/kg	3	**2.7**	2.8 U	**3.6**	**4.4**	**7**	**32.2**	2.6 U	**6**	**2.4**	**492**
Barium	mg/kg	220,000	**73.4**	**39.5**	**92.8**	**32.6**	**236**	**2,400**	N/A	**264**	**170**	**584**
Beryllium	mg/kg	2,300	**0.34 B**	**0.32 B**	0.94 U	**0.26 B**	**1.6**	**2.9**	N/A	**4.4**	**1.9**	**2.2**
Cadmium	mg/kg	980	**0.65 B**	**0.26 B**	**0.34 B**	1.6 U	**1.5**	**6.5**	N/A	**2.3**	**0.43 B**	**3.5**
Chromium	mg/kg	120,000	**352**	**23.7**	**1,470 J**	**9.2 J**	**215 J**	**173 J**	N/A	**222 J**	**9.1 J**	**141 J**
Chromium VI	mg/kg	6.3	**0.52 J-**	1.1 UJ	**7.7**	1.2 U	1.2 UJ	1.2 UJ	N/A	1 UJ	1.1 UJ	1.1 UJ
Cobalt	mg/kg	350	**3.2 J**	**3.7 J**	4.7 UJ	**2.7 B**	**4.7**	**30.6**	N/A	**7.7**	**1 J**	**34.7**
Copper	mg/kg	47,000	**15.4**	**6.4**	**24.5 J**	**5.9 J**	**84**	**244**	N/A	**106**	**9**	**364**
Iron	mg/kg	820,000	**44,900**	**6,770**	**151,000**	**9,560**	**37,900**	**40,100**	N/A	**77,200**	**6,100**	**89,400**
Lead	mg/kg	800	**76.9**	**13.3**	**36.9 J**	**6.3 J**	**203**	**335**	N/A	**832**	**19.8**	**710**
Manganese	mg/kg	26,000	**8,460 J**	**486 J**	**30,500**	**69.8**	**6,440**	**54,000**	**30.7**	**6,360**	**2,070**	**5,290**
Mercury	mg/kg	350	**0.93**	**0.64**	**0.18 J**	**0.037 J**	**0.97 J+**	0.12 U	N/A	**0.023 J+**	0.11 U	**0.0055 J+**
Nickel	mg/kg	22,000	**8.5**	**5.9 B**	**9.8 J**	**7.1 B**	**17.2**	**123**	N/A	**39.3**	**2 J**	**39.5**
Selenium	mg/kg	5,800	3.2 U	4.4 U	3.8 U	4.3 U	3.6 U	**4**	N/A	**2.7 B**	3.5 U	3.8 U
Silver	mg/kg	5,800	2.4 U	3.3 U	2.8 U	3.2 U	2.7 U	**1.7 J**	N/A	3 U	2.6 U	2.8 U
Thallium	mg/kg	12	8 U	11 U	9.4 UJ	10.7 UJ	9 U	8.9 U	N/A	9.9 U	8.8 U	9.5 U
Vanadium	mg/kg	5,800	**799**	**23.6**	**921**	**19**	**200 J**	**187 J**	N/A	**153 J**	**15.6 J**	**422 J**
Zinc	mg/kg	350,000	**121**	**41.2**	**105**	**18.2**	**547**	**1,050**	N/A	**764**	**73.8**	**1,890**
Other												
Cyanide	mg/kg	150	**0.32 J**	**0.24 J**	0.55 U	0.57 U	**0.2 J**	**1.9**	N/A	**0.73**	**0.41 J**	**0.61 J**

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Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-021-SB-6	RW-021-SB-10	RW-022-SB-1	RW-022-SB-8.5	RW-023-SB-1	RW-023-SB-5	RW-023-SB-10	RW-024-SB-1	RW-024-SB-6	RW-025-SB-1
Metals												
Aluminum	mg/kg	1,100,000	**14,500**	N/A	**17,600**	**14,000**	**10,800**	**13,700**	N/A	**20,600**	**38,800**	**13,200**
Antimony	mg/kg	470	2.5 UJ	N/A	2.5 UJ	5.4 UJ	2.9 UJ	**1.6 B**	N/A	2.6 UJ	2.2 UJ	2.5 UJ
Arsenic	mg/kg	3	**4.6**	**3.8**	**39.2**	**11.1**	**5.8**	**4.8**	**4.3**	2.2 U	**2.2**	**4.6**
Barium	mg/kg	220,000	**44.6**	N/A	**240**	**287**	**93.9**	**44**	N/A	**124**	**434**	**123**
Beryllium	mg/kg	2,300	**0.43 B**	N/A	**2.6**	**0.62 B**	**0.34 B**	**0.7 B**	N/A	**1.7**	**6**	**1.1**
Cadmium	mg/kg	980	**0.6 B**	N/A	**2.5**	**0.74 J**	**0.59 B**	**0.18 B**	N/A	**0.32 B**	**0.35 B**	**1.7**
Chromium	mg/kg	120,000	**24.8 J**	N/A	**449 J**	**52.6 J**	**1,090 J**	**83 J**	N/A	**496**	**67.1**	**661**
Chromium VI	mg/kg	6.3	1.2 UJ	N/A	1.1 UJ	1.8 UJ	1.1 U	1.2 UJ	N/A	1.1 UJ	1.1 U	1.1 UJ
Cobalt	mg/kg	350	**6.3**	N/A	**17**	**5.7 J**	**1.7 B**	**4.7 B**	N/A	**0.82 B**	**0.85 J**	**3.4 B**
Copper	mg/kg	47,000	**11.1**	N/A	**96.4**	**27.5**	**44.2**	**15.2**	N/A	**12.4**	**13.4**	**48**
Iron	mg/kg	820,000	**19,000**	N/A	**136,000**	**50,000**	**173,000**	**16,500**	N/A	**81,000**	**31,400**	**138,000**
Lead	mg/kg	800	**18.5**	N/A	**201**	**62.2**	**21.3**	**14.4**	N/A	**6.2**	**4.8**	**109**
Manganese	mg/kg	26,000	**90**	N/A	**11,400**	**962**	**25,600**	**89.4**	N/A	**13,700 J**	**5,440 J**	**16,400 J**
Mercury	mg/kg	350	**0.11 J+**	N/A	**0.41 J+**	**0.065 J+**	**0.0067 J+**	**0.062 J+**	N/A	**0.0067 J**	0.1 U	**11.2**
Nickel	mg/kg	22,000	**13**	N/A	**34.4**	**21.8**	**24.6**	**11.9**	N/A	**9.3**	**2.9 J**	**23.9**
Selenium	mg/kg	5,800	3.4 U	N/A	3.3 U	**4.6 J**	**2.4 B**	4.2 U	N/A	**2.7 B**	**4.7**	3.3 U
Silver	mg/kg	5,800	2.5 U	N/A	**0.57 J**	5.4 U	2.9 U	3.2 U	N/A	2.6 U	2.2 U	2.5 U
Thallium	mg/kg	12	8.5 U	N/A	8.4 U	**4.5 B**	9.7 U	10.5 U	N/A	8.8 U	7.3 U	8.2 U
Vanadium	mg/kg	5,800	**36.3 J**	N/A	**257 J**	**41.7 J**	**795 J**	**34.1 J**	N/A	**339 J**	**266 J**	**534 J**
Zinc	mg/kg	350,000	**136**	N/A	**592**	**183**	**193**	**38.2**	N/A	**51.7**	**21.6**	**310**
Other												
Cyanide	mg/kg	150	**1.1**	N/A	0.56 U	**2.8**	**0.79**	0.61 U	N/A	**0.15 J**	0.65 U	**1.3**

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-025-SB-5	RW-026-SB-1	RW-026-SB-5	RW-027-SB-1	RW-027-SB-5	RW-027-SB-10	RW-028-SB-1	RW-028-SB-5	RW-029-SB-1	RW-029-SB-7
Metals												
Aluminum	mg/kg	1,100,000	**9,010**	**3,530**	**2,890**	**14,300**	**11,600**	N/A	**18,600**	**17,900**	**19,000**	**7,240**
Antimony	mg/kg	470	2.2 UJ	2.6 UJ	2.9 UJ	3 UJ	3.6 UJ	N/A	2.9 UJ	3.4 UJ	2.8 UJ	3.1 UJ
Arsenic	mg/kg	3	**4.3**	2.2 U	2.4 U	**4.7**	**6.9**	3 U	**4.2**	**5.6**	**17.5**	**3.6**
Barium	mg/kg	220,000	**74.7**	**55.4**	**14**	**91.7**	**32**	N/A	**173**	**327**	**303**	**79.3**
Beryllium	mg/kg	2,300	**0.81**	**0.15 B**	**0.29 B**	**0.98 B**	**2.1**	N/A	**1.2**	**1 B**	**2**	**0.31 B**
Cadmium	mg/kg	980	**0.35 B**	**0.34 B**	1.5 U	**0.52 J**	1.8 U	N/A	**0.56 J**	**0.22 J**	**45.8**	1.5 U
Chromium	mg/kg	120,000	**19.5**	**30.4**	**4.9**	**56.6**	**30.7**	N/A	**465**	**19.7**	**182**	**21.1**
Chromium VI	mg/kg	6.3	1.1 UJ	1.1 UJ	1.1 U	1.2 U	**0.58 J**	N/A	1.3 U	1.2 U	1.1 U	1.3 UJ
Cobalt	mg/kg	350	**3.5 J**	**2.1 J**	**1.7 B**	**25.4**	**5.6 B**	N/A	**4.7 B**	**5.1 B**	**20.2**	**4.9 B**
Copper	mg/kg	47,000	**13**	**22**	**2.5 B**	**28.2**	**5.5 B**	N/A	**74.5**	**22.1**	**548**	**43.1**
Iron	mg/kg	820,000	**13,500**	**25,500**	**4,280**	**29,700**	**115,000**	N/A	**71,500**	**15,700**	**41,900**	**22,400**
Lead	mg/kg	800	**35.1**	**25.9**	2.4 U	**62.7**	**32**	N/A	**67.3**	**45.1**	**229**	**101**
Manganese	mg/kg	26,000	**668 J**	**538 J**	**37.1 J**	**759**	**99.4**	N/A	**9,690**	**1,900**	**7,650**	**402**
Mercury	mg/kg	350	**0.0041 J**	**0.054 J**	0.11 U	**0.12 J**	**0.0049 J**	N/A	**0.035 J**	0.12 U	**0.14 J**	**0.43 J**
Nickel	mg/kg	22,000	**7.4**	**15.1**	**2.3 J**	**14.2 J**	**12 J**	N/A	**13.2 J**	**11.3 J**	**42 J**	**13.8 J**
Selenium	mg/kg	5,800	3 U	3.5 U	3.9 U	4 U	4.9 U	N/A	3.9 U	4.6 U	3.7 U	4.1 U
Silver	mg/kg	5,800	2.2 U	2.6 U	2.9 U	3 U	**1.3 B**	N/A	2.9 U	3.4 U	2.8 U	3.1 U
Thallium	mg/kg	12	7.4 U	8.7 U	9.7 U	9.9 UJ	12.1 UJ	N/A	9.7 UJ	11.4 UJ	9.3 UJ	10.2 UJ
Vanadium	mg/kg	5,800	**40.1 J**	**21.4 J**	**7.5 J**	**253**	**45.8**	N/A	**420**	**70.2**	**182**	**42.1**
Zinc	mg/kg	350,000	**173**	**50.3**	**8**	**182 J**	**35.8 J**	N/A	**150 J**	**55 J**	**7,170 J**	**121 J**
Other												
Cyanide	mg/kg	150	0.61 U	**0.3 J**	0.59 U	0.7 U	0.66 U	N/A	**0.36 J**	0.73 U	**0.14 J**	0.62 U

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-030-SB-1	RW-030-SB-5	RW-030-SB-10	RW-031-SB-1	RW-031-SB-6	RW-032-SB-1	RW-032-SB-5	RW-032-SB-10	RW-033-SB-1	RW-033-SB-6.5
Metals												
Aluminum	mg/kg	1,100,000	**12,500**	**4,370**	N/A	**11,600**	**8,220**	**28,400**	**9,100**	N/A	**14,800**	**16,500**
Antimony	mg/kg	470	2.9 UJ	3.2 UJ	N/A	2.7 UJ	3.1 UJ	2.8 UJ	3.3 UJ	N/A	2.4 UJ	3.5 UJ
Arsenic	mg/kg	3	**6.3**	**7**	**11.9**	**4**	**2.7**	2.4 U	**11.6**	**10**	**6.9**	**9.6**
Barium	mg/kg	220,000	**67.4**	**200**	N/A	**46.6**	**35.8**	**1,140**	**155**	N/A	**186**	**48.8**
Beryllium	mg/kg	2,300	**0.47 B**	1.1 U	N/A	0.88 U	**0.3 B**	**1.5**	**0.59 B**	N/A	**0.95**	**1 B**
Cadmium	mg/kg	980	**0.7 J**	1.6 U	N/A	**0.65 B**	1.5 U	**0.42 B**	**0.65 B**	N/A	**0.45 J**	1.8 U
Chromium	mg/kg	120,000	**1,220**	**32.1**	N/A	**1,320 J**	**116 J**	**30.8 J**	**21 J**	N/A	**120**	**23.9**
Chromium VI	mg/kg	6.3	**2.4 J-**	1.4 U	N/A	**11.1**	1.1 U	1.1 UJ	1.3 UJ	N/A	**0.47 J-**	1.2 UJ
Cobalt	mg/kg	350	**2.1 B**	**2.8 B**	N/A	**1.5 B**	**2.9 B**	**4.4 B**	**7.2 J**	N/A	**12.2**	**4.3 B**
Copper	mg/kg	47,000	**25.6**	**21.8**	N/A	**43.1 J**	**7.1 J**	**80.5 J**	**48.9 J**	N/A	**78.9**	**8.6**
Iron	mg/kg	820,000	**151,000**	**30,800**	N/A	**223,000**	**19,200**	**34,800**	**14,700**	N/A	**1,880**	**1,200**
Lead	mg/kg	800	**25.5**	**240**	N/A	**4.8 J**	**7.2 J**	**35 J**	**168 J**	N/A	**97.1**	**14.8**
Manganese	mg/kg	26,000	**27,100**	**117**	N/A	**27,900**	**1,880**	**5,300**	**368**	N/A	**132 J**	**90.8 J**
Mercury	mg/kg	350	**0.05 J**	**0.074 J**	N/A	0.11 UJ	**0.063 J**	**0.028 J**	**0.98 J**	N/A	**0.044 J**	**0.045 J**
Nickel	mg/kg	22,000	**27.4 J**	**15.8 J**	N/A	**22.1 J**	**6 J**	**7.5 B**	**15.6 J**	N/A	**31.3**	**10.8 B**
Selenium	mg/kg	5,800	3.9 U	4.3 U	N/A	3.5 U	4.1 U	3.8 U	4.4 U	N/A	**1.9 J**	4.7 U
Silver	mg/kg	5,800	2.9 U	3.2 U	N/A	**1.1 B**	3.1 U	2.8 U	3.3 U	N/A	2.4 U	3.5 U
Thallium	mg/kg	12	9.8 UJ	10.7 UJ	N/A	8.8 UJ	10.2 UJ	9.5 UJ	10.9 UJ	N/A	7.9 U	11.8 U
Vanadium	mg/kg	5,800	**795**	**29.6**	N/A	**850**	**76.9**	**120**	**23.3**	N/A	**337 J**	**46.1 J**
Zinc	mg/kg	350,000	**155 J**	**76.9 J**	N/A	**196**	**18.7**	**56.8**	**280**	N/A	**171**	**27.2**
Other												
Cyanide	mg/kg	150	**0.21 J**	0.84 U	N/A	0.69 U	0.63 U	0.68 U	0.64 U	N/A	**0.12 J**	0.59 U

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Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-033-SB-10	RW-034-SB-1	RW-034-SB-5	RW-035-SB-1	RW-035-SB-5	RW-036-SB-1	RW-036-SB-4	RW-036-SB-10	RW-037-SB-1	RW-037-SB-8
Metals												
Aluminum	mg/kg	1,100,000	N/A	**15,800**	**19,000**	**21,200**	**16,200**	**15,400**	**9,960**	N/A	**16,400**	**15,700**
Antimony	mg/kg	470	N/A	2.4 UJ	3.3 UJ	**40.8 J**	2.7 UJ	3.4 UJ	3.2 UJ	N/A	3.4 UJ	2.7 UJ
Arsenic	mg/kg	3	**6 J**	**2.1**	**2.3 B**	**6.3**	2.2 U	**3.8**	**3.3**	**8.5 J**	**4.5**	**12.3**
Barium	mg/kg	220,000	N/A	**140**	**111**	**253**	**24.4**	**207**	**45.3**	N/A	**79.7**	**42.7**
Beryllium	mg/kg	2,300	N/A	**0.9**	**0.82 J**	**1.3**	**0.46 B**	**1.2**	**0.38 B**	N/A	**0.49 B**	**0.67 B**
Cadmium	mg/kg	980	N/A	**1.4**	1.6 U	**60.1**	**0.34 J**	**43.7**	**69.7**	N/A	**10.7**	**35.8**
Chromium	mg/kg	120,000	N/A	**898 J**	**30.6 J**	**302**	**27**	**447**	**12.6**	N/A	**1,030**	**28.3**
Chromium VI	mg/kg	6.3	N/A	1.1 UJ	**0.56 J-**	1.1 U	1.2 U	1.1 U	1.1 U	N/A	1.2 U	**0.48 J**
Cobalt	mg/kg	350	N/A	**1.8 B**	**6.5**	**6.3**	**3.2 J**	**3.2 J**	**4.8 J**	N/A	**1.6 J**	**6**
Copper	mg/kg	47,000	N/A	**42.1**	**12.1**	**445**	**7.7**	**82.5**	**16.1**	N/A	**54.6**	**10.7**
Iron	mg/kg	820,000	N/A	**112,000**	**13,400**	**130,000**	**12,200**	**75,400**	**12,400**	N/A	**156,000**	**17,400**
Lead	mg/kg	800	N/A	**465**	**13**	**3,670**	**18.3**	**2,650**	**34.9**	N/A	**1,090**	**14.6**
Manganese	mg/kg	26,000	N/A	**19,100**	**77.7**	**7,980 J**	**44 J**	**10,600 J**	**85.8 J**	N/A	**24,100 J**	**112 J**
Mercury	mg/kg	350	N/A	**5.4**	**0.037 J**	**0.56**	**0.029 J**	**0.13**	**0.21**	N/A	**0.052 J**	**0.014 J**
Nickel	mg/kg	22,000	N/A	**14.4**	**17.7**	**43.5**	**7.6 B**	**21.3**	**8.6 B**	N/A	**17.1**	**12.2**
Selenium	mg/kg	5,800	N/A	3.2 U	4.4 U	3.6 U	3.5 U	4.5 U	4.2 U	N/A	4.6 U	3.6 U
Silver	mg/kg	5,800	N/A	2.4 U	3.3 U	**0.76 B**	2.7 U	3.4 U	3.2 U	N/A	3.4 U	2.7 U
Thallium	mg/kg	12	N/A	8.1 U	**2.6 B**	9 U	8.8 U	11.2 U	10.6 U	N/A	11.4 U	8.9 U
Vanadium	mg/kg	5,800	N/A	**590**	**40.7**	**560**	**39.7**	**397**	**25.1**	N/A	**1,250**	**33.3**
Zinc	mg/kg	350,000	N/A	**336**	**58.6**	**4,270**	**242**	**3,950**	**3,290**	N/A	**1,700**	**7,650**
Other												
Cyanide	mg/kg	150	N/A	0.53 U	0.57 U	**2.9**	**0.76**	**0.74**	0.66 U	N/A	**0.33 J**	0.57 U

Detections in bold

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Gray highlighting indicates boring locations within the building footprint

Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-037-SB-10	RW-038-SB-1	RW-038-SB-5	RW-039-SB-1	RW-039-SB-5	RW-039-SB-10	RW-040-SB-1	RW-040-SB-6	RW-040-SB-10	RW-041-SB-1
Metals												
Aluminum	mg/kg	1,100,000	N/A	**7,570**	**19,900**	**8,390**	**8,600**	N/A	**11,500**	**17,100**	N/A	**13,200**
Antimony	mg/kg	470	N/A	3.2 UJ	3.5 UJ	3 UJ	3.2 UJ	N/A	2.4 UJ	2.6 UJ	N/A	3 UJ
Arsenic	mg/kg	3	**7 J**	2.7 U	3 U	**4.6**	**3.7**	**14.8 J**	**9.3 J**	**6.6 J**	**7.9 J**	**2.6**
Barium	mg/kg	220,000	N/A	**34**	**91.5**	**88.3**	**27.9**	N/A	**225 J**	**40.4 J**	N/A	**36**
Beryllium	mg/kg	2,300	N/A	1.1 U	**0.37 B**	**0.42 B**	**0.32 B**	N/A	**0.92**	**1.6 J**	N/A	1 U
Cadmium	mg/kg	980	N/A	**0.23 J**	1.8 U	**168**	**7.4**	N/A	**90.6 J**	1.3 U	N/A	**0.43 J**
Chromium	mg/kg	120,000	N/A	**205**	**27.4**	**15.7**	**13**	N/A	**288**	**48.7**	N/A	**1,390**
Chromium VI	mg/kg	6.3	N/A	**2.5 J-**	**0.98 J-**	1.1 U	1.1 UJ	N/A	1.1 UJ	1.2 UJ	N/A	**6 J-**
Cobalt	mg/kg	350	N/A	**1.8 J**	**3.7 B**	**5.4**	**1.9 J**	N/A	**10.6**	**5.2**	N/A	5.1 U
Copper	mg/kg	47,000	N/A	**8.6**	**9.8**	**25.3**	**8.1**	N/A	**70.7**	**15.6**	N/A	**25.1**
Iron	mg/kg	820,000	N/A	**35,800**	**6,920**	**14,400**	**13,600**	N/A	**72,000 J**	**56,900 J**	N/A	**200,000**
Lead	mg/kg	800	N/A	**924**	**224**	**108**	**13.2**	N/A	**3,230 J**	**32.9 J**	N/A	2.5 U
Manganese	mg/kg	26,000	N/A	**5,460 J**	**39.1 J**	**185 J**	**59.5 J**	N/A	**6,630**	**414**	N/A	**29,200**
Mercury	mg/kg	350	N/A	**0.05 J**	**0.048 J**	**0.67**	**0.036 J**	N/A	**0.24 J**	**0.015 J**	N/A	0.1 U
Nickel	mg/kg	22,000	N/A	**6.1 B**	**12**	**9.9 B**	**5.6 B**	N/A	**49 J**	**10.4 J**	N/A	**23.2 J**
Selenium	mg/kg	5,800	N/A	4.3 U	4.7 U	4 U	4.3 U	N/A	3.2 U	3.5 U	N/A	4.1 U
Silver	mg/kg	5,800	N/A	3.2 U	3.5 U	3 U	3.2 U	N/A	**0.35 J**	2.6 U	N/A	**0.47 B**
Thallium	mg/kg	12	N/A	10.6 U	11.8 U	10.1 U	10.7 U	N/A	8 UJ	8.8 UJ	N/A	10.1 UJ
Vanadium	mg/kg	5,800	N/A	**158 J**	**24.5 J**	**18.4**	**20.6**	N/A	**480**	**91.8**	N/A	**894**
Zinc	mg/kg	350,000	N/A	**89.6**	**90.4**	**2,000**	**432**	N/A	**28,300**	**34.7**	N/A	**98.6 J**
Other												
Cyanide	mg/kg	150	N/A	**0.28 J**	0.67 U	0.62 U	0.57 U	N/A	**0.35 J**	**1.8**	N/A	0.63 U

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-041-SB-5	RW-042-SB-1	RW-042-SB-5	RW-043-SB-1	RW-043-SB-8	RW-044-SB-1	RW-044-SB-5	RW-044-SB-10	RW-045-SB-1	RW-045-SB-5
Metals												
Aluminum	mg/kg	1,100,000	**13,400**	**8,710**	**2,960**	**6,880**	**8,560**	**13,800**	**13,300**	N/A	**16,900**	**47,700**
Antimony	mg/kg	470	3.3 UJ	3 UJ	2.5 UJ	2.3 UJ	2.2 UJ	3.3 UJ	3.1 UJ	N/A	2.9 UJ	2.5 UJ
Arsenic	mg/kg	3	**5.6**	**9 J**	2.1 U	**1.7 B**	**2.3**	**4.1**	**4.6**	2.9 U	**2.9**	**4.6**
Barium	mg/kg	220,000	**139**	**131**	**22**	**33.5**	**22.6**	**131**	**23**	N/A	**82.2**	**399**
Beryllium	mg/kg	2,300	**1.4**	**1.3 J**	**0.25 B**	**0.32 B**	**0.27 B**	**1.3**	**0.49 J**	N/A	**0.23 J**	**8.7**
Cadmium	mg/kg	980	**1.5 J**	**10.3 J**	1.2 U	1.2 U	1.1 U	**1.4 B**	1.5 U	N/A	**0.97 B**	**8.2**
Chromium	mg/kg	120,000	**309**	**110 J**	**3.9 J**	**11 J**	**9.9 J**	**266 J**	**23.2 J**	N/A	**1,360 J**	**32.1 J**
Chromium VI	mg/kg	6.3	1.2 U	1.2 UJ	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	**1.3 J-**	N/A	**0.84 J-**	1.2 UJ
Cobalt	mg/kg	350	**5.4 B**	**15 J**	**1.4 J**	**3.8 B**	**4.4 J**	**2.9 B**	**2.5 B**	N/A	4.9 U	**0.58 B**
Copper	mg/kg	47,000	**42.8**	**101 J**	**2.2 J**	**7.4 J**	**6 J**	**23.5**	**6.5**	N/A	**36.7**	**9.9**
Iron	mg/kg	820,000	**43,900**	**72,700**	**2,910**	**7,140**	**9,770**	**43,800**	**22,800**	N/A	**164,000**	**6,460**
Lead	mg/kg	800	**845**	**198 J**	**5.2 J**	**13.2 J**	**5.2 J**	**463**	**18.5**	N/A	**315**	**121**
Manganese	mg/kg	26,000	**3,880**	**1,140**	**35.8**	**76.8**	**67.9**	**6,350**	**14.6**	N/A	**30,200**	**3,900**
Mercury	mg/kg	350	0.12 U	**0.12**	**0.013 J**	**0.055 J**	**0.016 J**	**0.11**	**0.027 J**	N/A	**0.017 J**	0.11 U
Nickel	mg/kg	22,000	**16 J**	**85.4 J**	**2.9 B**	**6 B**	**5.3 B**	**11 J**	**5.4 B**	N/A	**14.6**	**1.8 B**
Selenium	mg/kg	5,800	4.3 U	4 U	3.3 U	3.1 U	2.9 U	4.4 U	4.1 U	N/A	3.9 U	**5.2**
Silver	mg/kg	5,800	3.3 U	3 U	2.5 U	2.3 U	2.2 U	3.3 U	3.1 U	N/A	2.9 U	2.5 U
Thallium	mg/kg	12	10.9 UJ	10.1 U	8.2 U	7.7 UJ	7.2 UJ	11.1 U	10.3 U	N/A	9.8 U	8.2 U
Vanadium	mg/kg	5,800	**148**	**56.5 J**	**6.3 J**	**16.4**	**17.8**	**193**	**40.6**	N/A	**889**	**48.5**
Zinc	mg/kg	350,000	**408 J**	**1,930**	**11**	**20.1**	**13.4**	**495**	**20.9**	N/A	**253**	**443**
Other												
Cyanide	mg/kg	150	**2.4**	**0.88**	**0.17 J**	0.66 U	0.63 U	**0.33 J**	0.56 U	N/A	**0.49 J**	**0.71 J**

Detections in bold

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Gray highlighting indicates boring locations within the building footprint

Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-045-SB-10	RW-046-SB-1	RW-046-SB-5	RW-047-SB-1	RW-047-SB-6	RW-048-SB-1	RW-048-SB-5	RW-049-SB-1	RW-049-SB-5	RW-049-SB-10
Metals												
Aluminum	mg/kg	1,100,000	N/A	**14,300**	**6,090**	**16,500**	**9,620**	**11,900**	**10,900**	**23,800**	**9,540**	N/A
Antimony	mg/kg	470	N/A	3.2 UJ	3.1 UJ	2.4 UJ	3.2 UJ	3 UJ	2.8 UJ	3.4 UJ	3.3 UJ	N/A
Arsenic	mg/kg	3	2.1 U	**5.9**	2.6 U	**4.1**	2.7 U	**4.1**	**2.1 J**	**2.6 J**	**5.6 J**	**7.6 J**
Barium	mg/kg	220,000	N/A	**200**	**18.4**	**131**	**27.4**	**68.6 J**	**43.1 J**	**285**	**22**	N/A
Beryllium	mg/kg	2,300	N/A	**0.9 B**	**0.23 B**	**0.72 J**	**0.47 J**	**0.25 B**	**0.61 B**	**2.8 J**	**0.31 B**	N/A
Cadmium	mg/kg	980	N/A	**3.5**	**0.34 J**	**0.9 B**	1.6 U	**0.57 J**	1.4 U	**1 J**	1.6 U	N/A
Chromium	mg/kg	120,000	N/A	**119**	**10.7**	**230 J**	**19 J**	**504 J**	**14.8 J**	**60.6 J**	**23 J**	N/A
Chromium VI	mg/kg	6.3	N/A	1.2 UJ	1.1 UJ	1.1 UJ	1.2 UJ	1.1 UJ	1.2 UJ	1.2 UJ	**0.52 J-**	N/A
Cobalt	mg/kg	350	N/A	**6.9**	**3 B**	**7.6**	**3.3 B**	**3.5 B**	**2.9 B**	**18.4 J**	**1.9 J**	N/A
Copper	mg/kg	47,000	N/A	**95.2**	**5.1 B**	**41.4**	**4.9 B**	**40.7**	**3.4 B**	**55.1 J**	**10.3 J**	N/A
Iron	mg/kg	820,000	N/A	**68,000**	**9,270**	**37,300**	**17,300**	**73,500**	**5,710**	**54,900**	**22,600**	N/A
Lead	mg/kg	800	N/A	**1,670**	**4.9**	**133**	**15.2**	**1,730 J**	**18.3 J**	**71.5 J**	**7.5 J**	N/A
Manganese	mg/kg	26,000	N/A	**2,930 J**	**91.4 J**	**6,130**	**33**	**14,100 J**	**52.5 J**	**880**	**257**	N/A
Mercury	mg/kg	350	N/A	**0.37**	**0.0099 J**	**0.24**	**0.021 J**	**0.079 J**	**0.045 J**	**0.047 J**	**0.021 J**	N/A
Nickel	mg/kg	22,000	N/A	**26.6**	**10.1 B**	**21.6**	**6.8 B**	**18.2**	**6.8 B**	**69.4 J**	**5 B**	N/A
Selenium	mg/kg	5,800	N/A	4.3 U	4.2 U	3.2 U	4.3 U	4 U	3.7 U	4.6 U	4.3 U	N/A
Silver	mg/kg	5,800	N/A	3.2 U	3.1 U	2.4 U	3.2 U	3 U	2.8 U	3.4 U	3.3 U	N/A
Thallium	mg/kg	12	N/A	10.7 U	10.4 U	8.1 U	10.8 U	10 U	9.4 U	11.5 U	10.8 U	N/A
Vanadium	mg/kg	5,800	N/A	**143 J**	**19.8 J**	**133**	**54.3**	**369 J**	**17.5 J**	**70.9 J**	**34.9 J**	N/A
Zinc	mg/kg	350,000	N/A	**3,950**	**819**	**210**	**18.6**	**186**	**29.1**	**344**	**18.7 B**	N/A
Other												
Cyanide	mg/kg	150	N/A	**3.1**	0.69 U	0.57 U	**0.49 J**	**1.2 J**	**0.18 J**	**0.16 J**	**0.39 J**	N/A

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-050-SB-1	RW-050-SB-4.5	RW-051-SB-1	RW-051-SB-5	RW-051-SB-10	RW-052-SB-1	RW-052-SB-5	RW-053-SB-1	RW-053-SB-5	RW-053-SB-10
Metals												
Aluminum	mg/kg	1,100,000	**11,300**	**5,010**	**13,300**	**35,600**	N/A	**21,600**	**6,420**	**12,900**	**17,800**	N/A
Antimony	mg/kg	470	2.6 UJ	2.2 UJ	3.1 UJ	4.7 UJ	N/A	2.3 UJ	3.3 UJ	3.5 UJ	3.3 UJ	N/A
Arsenic	mg/kg	3	**3.3**	**16.5**	**4.4**	**9.4**	**26.6 J**	**5.7**	**4**	**2.4 J**	**7.3**	**9 J**
Barium	mg/kg	220,000	**71.6**	**65.8**	**64.4**	**427**	N/A	**368**	**237**	**142**	**67.9**	N/A
Beryllium	mg/kg	2,300	0.87 U	**0.17 B**	**0.22 B**	**6.5**	N/A	**1.8**	**0.33 B**	**0.51 J**	**0.75 J**	N/A
Cadmium	mg/kg	980	**0.64 J**	**0.3 J**	**1 B**	**0.87 B**	N/A	**3**	**12.7**	**0.57 B**	**1.5 B**	N/A
Chromium	mg/kg	120,000	**1,480**	**406**	**1,370 J**	**133 J**	N/A	**194 J**	**133**	**21.8 J**	**24.8 J**	N/A
Chromium VI	mg/kg	6.3	**5.2**	1.1 U	**2.9 J-**	1.7 UJ	N/A	1.2 UJ	1.3 UJ	1.2 UJ	1.2 UJ	N/A
Cobalt	mg/kg	350	**1.3 B**	**52**	**1.2 J**	**5.4 J**	N/A	**7.1**	**4.7 B**	**5 B**	**5.5 J**	N/A
Copper	mg/kg	47,000	**43.3**	**986**	**36.6**	**48.5**	N/A	**42.4**	**610**	**222**	**27.1**	N/A
Iron	mg/kg	820,000	**192,000**	**375,000**	**203,000**	**90,600**	N/A	**85,700**	**32,000**	**15,400**	**10,200**	N/A
Lead	mg/kg	800	**7.2**	**139**	**64.4**	**52.9**	N/A	**1,050**	**16,400**	**192**	**186**	N/A
Manganese	mg/kg	26,000	**28,900**	**8,060**	**29,800**	**4,160**	N/A	**6,360**	**11,600**	**409**	**126**	N/A
Mercury	mg/kg	350	0.1 U	**0.0049 J**	**0.4 J+**	**0.063 J+**	N/A	**0.24**	**2.6**	**0.14**	**0.034 J**	N/A
Nickel	mg/kg	22,000	**43.9 J**	**132 J**	**19.8**	**23.5**	N/A	**20.1**	**23.2**	**12.5**	**21.6**	N/A
Selenium	mg/kg	5,800	3.5 U	3 U	4.1 U	**4.7 B**	N/A	3.1 U	4.4 U	4.6 U	4.4 U	N/A
Silver	mg/kg	5,800	**0.84 B**	**3.2**	3.1 U	4.7 U	N/A	**0.29 J**	**22.8**	3.5 U	3.3 U	N/A
Thallium	mg/kg	12	8.7 UJ	7.4 UJ	10.2 U	15.8 U	N/A	7.8 U	11.1 U	11.5 U	11 U	N/A
Vanadium	mg/kg	5,800	**911**	**1,740**	**902 J**	**86.5 J**	N/A	**208**	**249**	**31.1**	**32.8**	N/A
Zinc	mg/kg	350,000	**175 J**	**1,010 J**	**407**	**144**	N/A	**744**	**6,690**	**246**	**430**	N/A
Other												
Cyanide	mg/kg	150	**0.24 J**	**0.52 J**	**0.15 J**	**0.45 J**	N/A	**0.58 J**	**0.35 J**	**0.59 J**	0.7 U	N/A

Detections in bold

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

N/A: This parameter was not analyzed for this sample.

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

Gray highlighting indicates boring locations within the building footprint

Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-054-SB-1	RW-054-SB-5	RW-055-SB-1	RW-055-SB-5	RW-055-SB-7	RW-055-SB-10	RW-056-SB-1	RW-056-SB-5	RW-057-SB-1	RW-057-SB-3
Metals												
Aluminum	mg/kg	1,100,000	**9,810**	**19,000**	**16,600**	**15,200**	**8,520**	N/A	**14,300**	**41,300**	N/A	N/A
Antimony	mg/kg	470	3 UJ	3 UJ	2.8 UJ	3.1 UJ	3.1 UJ	N/A	2.9 UJ	3.4 UJ	N/A	N/A
Arsenic	mg/kg	3	**4.6**	**2.6**	**4.3**	**3.6**	**6.2**	**4 J**	**2.1 J**	2.9 U	**31.8**	**6.4**
Barium	mg/kg	220,000	**66.5**	**80.3 J**	**222**	**37.2**	**60**	N/A	**53.1**	**407**	**1,670 J**	**454 J**
Beryllium	mg/kg	2,300	**0.37 B**	**0.6 B**	**1.8**	**0.93 B**	**0.32 J**	N/A	0.98 U	**6.4**	N/A	N/A
Cadmium	mg/kg	980	**1.3 J**	1.5 U	**0.66 B**	1.6 U	**13.3**	N/A	**0.55 J**	**1.5 J**	**1,420 J**	**1,290 J**
Chromium	mg/kg	120,000	**155**	**36.2 J**	**774 J**	**31.3 J**	**31.5 J**	N/A	**1,430**	**8**	**16.3 J**	**22.9 J**
Chromium VI	mg/kg	6.3	1.1 UJ	**0.74 J-**	1.1 UJ	**0.63 J-**	1.2 UJ	N/A	**5.3 J-**	1.2 UJ	N/A	N/A
Cobalt	mg/kg	350	**4.9 B**	**2.5 J**	**3.5 B**	**3.4 J**	**5.2 B**	N/A	4.9 U	**1.2 B**	N/A	N/A
Copper	mg/kg	47,000	**53.4**	**8.4**	**253**	**11.5**	**84.5**	N/A	**127**	**3.2 B**	N/A	N/A
Iron	mg/kg	820,000	**33,600**	**18,300**	**150,000**	**32,600**	**19,400**	N/A	**168,000**	**10,100**	N/A	N/A
Lead	mg/kg	800	**979**	**269 J**	**44,700**	**79**	**2,860**	N/A	**101**	**47.6**	**1,730**	**743**
Manganese	mg/kg	26,000	**3,350 J**	**28.8 J**	**24,500**	**78.1**	**660**	N/A	**30,000 J**	**2,520 J**	N/A	N/A
Mercury	mg/kg	350	**0.22**	**0.019 J**	**0.02 J**	**0.0058 J**	**0.74**	N/A	**0.058 J**	0.12 U	0.12 U	**0.085 J**
Nickel	mg/kg	22,000	**16.4**	**7.6 B**	**26.6**	**7.4 B**	**17.6**	N/A	**14.3**	**2.6 B**	N/A	N/A
Selenium	mg/kg	5,800	4 U	**2.2 B**	3.7 U	4.2 U	4.2 U	N/A	3.9 U	**6.8**	4.3 U	**2.5 B**
Silver	mg/kg	5,800	3 U	3 U	**48.4**	3.1 U	3.1 U	N/A	2.9 U	3.4 U	**4.5**	**1.7 J**
Thallium	mg/kg	12	10 U	9.9 U	9.2 U	10.4 U	10.4 U	N/A	9.8 U	11.5 U	N/A	N/A
Vanadium	mg/kg	5,800	**151 J**	**41.8 J**	**1,500**	**53.1**	**26.7**	N/A	**864 J**	**52.7 J**	N/A	N/A
Zinc	mg/kg	350,000	**599**	**226**	**194**	**58.7**	**9,550**	N/A	**206**	**11,900**	N/A	N/A
Other												
Cyanide	mg/kg	150	**1.3 J**	0.6 U	0.65 U	0.62 U	**1.3**	N/A	**0.18 J**	**0.27 J**	N/A	N/A

Detections in bold

R: The analytical result was rejected during validation.

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

N/A: This parameter was not analyzed for this sample.

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Gray highlighting indicates boring locations within the building footprint

Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-057-SB-6	RW-058-SB-1	RW-058-SB-2	RW-058-SB-8	RW-059-SB-1	RW-059-SB-3	RW-059-SB-6	RW-060-SB-1	RW-060-SB-4	RW-060-SB-7
Metals												
Aluminum	mg/kg	1,100,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	mg/kg	470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	mg/kg	3	**3.2**	**80.6 J**	**8.9 J**	**2.5**	**235**	**6.4**	**4.3**	**2.3 J**	**4.7**	**5**
Barium	mg/kg	220,000	**13.6 J**	**216**	**53.7**	**27**	**946**	**166 J**	**16.3 J**	**49.2**	**26**	**1,590**
Beryllium	mg/kg	2,300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	mg/kg	980	**10.3 J**	**91.5 J**	**32 J**	**17.4**	**226**	**38.2 J**	**1.6 J**	**3.4**	**11.9**	**23.1**
Chromium	mg/kg	120,000	**6.9 J**	**37.5 J**	**15.9 J**	**11.9**	**115 J**	**16.2 J**	**9.9 J**	**3 B**	**10.7**	**27.1**
Chromium VI	mg/kg	6.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cobalt	mg/kg	350	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper	mg/kg	47,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	mg/kg	820,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	mg/kg	800	**4.5**	**29.8 J**	**10.7 J**	**4.6**	**3,130 J**	**363**	**4.8**	**150**	**243**	**23.8**
Manganese	mg/kg	26,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	mg/kg	350	**0.0089 J**	**0.19**	**0.062 J**	**0.0047 J**	**0.12**	**0.75**	**0.015 J**	**0.14**	**0.02 J**	**0.0037 J**
Nickel	mg/kg	22,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Selenium	mg/kg	5,800	3.2 U	3.3 U	3 U	3.5 U	**3 J**	3.5 U	4.4 U	4 U	3.6 U	3.8 U
Silver	mg/kg	5,800	2.4 U	2.5 U	2.3 U	2.6 U	2.4 U	**2 J**	3.3 U	3 U	2.7 U	2.9 U
Thallium	mg/kg	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	mg/kg	5,800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	mg/kg	350,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other												
Cyanide	mg/kg	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Detections in bold

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-061-SB-1	RW-061-SB-2	RW-061-SB-7	RW-062-SB-1	RW-062-SB-3	RW-062-SB-10	RW-063-SB-1	RW-063-SB-5	RW-063-SB-8	RW-064-SB-1
Metals												
Aluminum	mg/kg	1,100,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	mg/kg	470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	mg/kg	3	**5.6 J**	**3.9**	**11.3**	**15.1 J**	**4.3 J**	**8.6 J**	**4.4**	**8.5**	**2.8 B**	**9.6**
Barium	mg/kg	220,000	**676**	**75.1**	**35.3**	**1,180**	**32.8**	**59.7**	**71.2**	**129**	**30.4**	**243**
Beryllium	mg/kg	2,300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	mg/kg	980	**210 J**	**8.3**	**1.1 B**	**10.7 J**	1.4 U	1.4 U	**6.8**	**53.5 J**	**57.5 J**	**2.5 J**
Chromium	mg/kg	120,000	**57.5 J**	**12.5**	**25.1**	**165 J**	**14.9 J**	**23.8 J**	**19.6**	**55.8**	**7.6**	**332**
Chromium VI	mg/kg	6.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cobalt	mg/kg	350	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper	mg/kg	47,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	mg/kg	820,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	mg/kg	800	**677 J**	**102**	**12.7**	**901 J**	**16.3 J**	**13.3 J**	**75.4 J**	**297 J**	**15.3 J**	**56.8 J**
Manganese	mg/kg	26,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	mg/kg	350	0.12 U	**0.48**	**0.029 J**	**0.37**	**0.079 J**	**0.016 J**	**0.39**	**0.25**	**1.5**	**0.014 J**
Nickel	mg/kg	22,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Selenium	mg/kg	5,800	**2 B**	3.1 U	3.9 U	4.4 U	3.7 U	3.7 U	3.6 U	3.6 U	4.6 U	3.8 U
Silver	mg/kg	5,800	2.4 U	2.3 U	3 U	**1 B**	2.8 U	2.8 U	2.7 U	**0.91 B**	3.5 U	2.9 U
Thallium	mg/kg	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	mg/kg	5,800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	mg/kg	350,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other												
Cyanide	mg/kg	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Detections in bold

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-064-SB-5	RW-064-SB-8	RW-065-SB-1	RW-065-SB-5	RW-065-SB-9	RW-066-SB-1	RW-066-SB-4	RW-066-SB-6	RW-067-SB-1	RW-067-SB-2
Metals												
Aluminum	mg/kg	1,100,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	mg/kg	470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	mg/kg	3	**17.9**	**5.7**	**7.9**	**6.6**	**3.1**	2.3 U	**4.4**	**1.6 B**	**5.2**	**8.7**
Barium	mg/kg	220,000	**4,070**	**93.6**	**256**	**58.7**	**9.9**	**26.8 J**	**21.6 J**	**27.9 J**	**77 J**	**75 J**
Beryllium	mg/kg	2,300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	mg/kg	980	**1.7 J**	**15.1 J**	**0.73 B**	1.3 U	**2.1**	**6.7**	**1.5 B**	**15.8**	**837**	**4.6**
Chromium	mg/kg	120,000	**576**	**637**	**197**	**10.5**	**7.3**	**4.7**	**10.9**	**15.8**	**11.6**	**15.8**
Chromium VI	mg/kg	6.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cobalt	mg/kg	350	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper	mg/kg	47,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	mg/kg	820,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	mg/kg	800	**102 J**	**34.9 J**	**175**	**64.9**	**1.9 B**	**5.5**	**5.3**	**20.2**	**107**	**137**
Manganese	mg/kg	26,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	mg/kg	350	**0.028 J**	**0.0095 J**	**0.39**	**1.6**	**0.013 J**	**0.0081 J**	**0.013 J**	**0.011 J**	**0.0062 J**	**2.6**
Nickel	mg/kg	22,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Selenium	mg/kg	5,800	3.2 U	2.7 U	**2.9 B**	3.5 U	3.5 U	3.7 U	3.2 U	3.1 U	3.7 U	4.4 U
Silver	mg/kg	5,800	2.4 U	2 U	2.4 U	2.7 U	2.6 U	2.8 U	2.4 U	2.3 U	**4.3**	3.3 U
Thallium	mg/kg	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	mg/kg	5,800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	mg/kg	350,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other												
Cyanide	mg/kg	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Detections in bold

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Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-067-SB-8	RW-068-SB-1	RW-068-SB-5	RW-068-SB-7	RW-069-SB-1	RW-069-SB-3	RW-069-SB-10	RW-070-SB-1	RW-070-SB-3	RW-070-SB-7
Metals												
Aluminum	mg/kg	1,100,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	mg/kg	470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	mg/kg	3	**2.3 J**	**4.1**	**32.8**	**46.9**	**199**	**6.9**	**3.1 D6**	**14.3**	**184**	**12.2**
Barium	mg/kg	220,000	**12 J**	**83**	**168**	**403**	**560 J**	**66.4 J**	**18.3**	**219**	**107**	**74.3**
Beryllium	mg/kg	2,300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	mg/kg	980	**0.48 J**	**0.28 B**	**1,170**	**1,310**	**93.9**	**3,530**	**1.5**	**16.4**	**11.8**	**80.5**
Chromium	mg/kg	120,000	**7.2**	**16.2**	**294**	**146**	**52.3**	**12.5**	**10**	**272**	**121**	**36**
Chromium VI	mg/kg	6.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cobalt	mg/kg	350	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper	mg/kg	47,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	mg/kg	820,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	mg/kg	800	**3.6**	**69.8**	**597**	**448**	**353**	**400**	**4.5 D6**	**97**	**481**	**86.7**
Manganese	mg/kg	26,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	mg/kg	350	**0.0028 J**	**0.14**	**0.34**	**0.49**	**0.31**	**0.028 J**	**0.02 J**	**0.08 J**	**0.26**	**0.13**
Nickel	mg/kg	22,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Selenium	mg/kg	5,800	4.1 U	3.3 U	5.5 U	5.2 U	3.4 U	4.2 U	3.9 U	3.7 U	**7**	4.1 U
Silver	mg/kg	5,800	3.1 U	2.5 U	**6.5**	3.9 U	2.6 U	**18.5**	2.9 U	**1.8 B**	**8**	3.1 U
Thallium	mg/kg	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	mg/kg	5,800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	mg/kg	350,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other												
Cyanide	mg/kg	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Detections in bold

R: The analytical result was rejected during validation.

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

UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.

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

J+: This positive result reported for this analyte is a quantitative estimate, but may be biased high.

J-: The positive result reported for this analyte is a quantitative estimate, but may be biased low.

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

N/A: This parameter was not analyzed for this sample.

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

Gray highlighting indicates boring locations within the building footprint

Table 2
Summary of Inorganics Detected in Soil
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-076-SB-1	RW-076-SB-6	RW-077-SB-1	RW-077-SB-5	RW-077-SB-10	RW-078-SB-1	RW-078-SB-5	RW-078-SB-10	RW-079-SB-1	RW-079-SB-5
Metals												
Aluminum	mg/kg	1,100,000	**7,070**	**11,300**	**41,600**	**15,600**	N/A	**11,600**	**6,240**	N/A	**25,400**	**6,230**
Antimony	mg/kg	470	1.9 UJ	2.3 UJ	2.3 UJ	3.1 UJ	N/A	1.7 UJ	3.2 UJ	N/A	2.3 UJ	2.8 UJ
Arsenic	mg/kg	3	**29.6 J**	**3 J**	**5.1 J**	**132 J**	**1.8 J**	**13.7 J**	**32.4 J**	**3.1**	**5.7 J**	**2.7 J**
Barium	mg/kg	220,000	**93.8 J**	**34.1 J**	**515 J**	**121 J**	N/A	**156 J**	**172 J**	N/A	**165 J**	**54.7 J**
Beryllium	mg/kg	2,300	**0.26 B**	**0.25 J**	**7.3**	**0.77 J**	N/A	**0.82**	**0.47 J**	N/A	**0.58 J**	**0.3 J**
Cadmium	mg/kg	980	**2.7 J**	1.1 UJ	**0.63 B**	**1.7 J**	N/A	**8.8 J**	**4.8 J**	N/A	**3.2 J**	1.4 UJ
Chromium	mg/kg	120,000	**709**	**24.8**	**6.9**	**18.7**	N/A	**430**	**33.8**	N/A	**918**	**11.5**
Chromium VI	mg/kg	6.3	1.1 UJ	1.1 UJ	1.1 UJ	1.3 UJ	N/A	1.1 UJ	1.2 UJ	N/A	1.1 UJ	1.1 UJ
Cobalt	mg/kg	350	**22.6**	**2.3 J**	**0.82 J**	**13.7**	N/A	**12.1**	**10.2**	N/A	**4.8**	**3.2 J**
Copper	mg/kg	47,000	**284**	**8.6**	**7.4**	**217**	N/A	**126**	**416**	N/A	**63.8**	**14.9**
Iron	mg/kg	820,000	**255,000**	**15,200**	**8,560**	**66,800**	N/A	**167,000**	**62,900**	N/A	**173,000**	**8,240**
Lead	mg/kg	800	**276**	**9.2**	**7.4**	**3,980**	**7.8**	**1,420**	**346**	N/A	**259**	**54.6**
Manganese	mg/kg	26,000	**21,100**	**204**	**3,760**	**2,660**	N/A	**12,500**	**1,300**	N/A	**27,700**	**196**
Mercury	mg/kg	350	**0.06 J**	**0.35 J**	0.1 UJ	**0.024 J**	N/A	**0.42 J**	**0.091 J**	N/A	**0.098 J**	**0.5 J**
Nickel	mg/kg	22,000	**79.3 J**	**6.5 J**	**1.6 J**	**25.1 J**	N/A	**53.5 J**	**23 J**	N/A	**37.1 J**	**5.5 J**
Selenium	mg/kg	5,800	2.5 U	3 U	**2.4 B**	4.2 U	N/A	2.3 U	4.3 U	N/A	3.1 U	3.7 U
Silver	mg/kg	5,800	**1.3 B**	2.3 U	2.3 U	**2.4 B**	N/A	1.7 U	**1.1 B**	N/A	**3.1**	2.8 U
Thallium	mg/kg	12	**1.3 J**	7.6 U	7.8 U	10.4 U	N/A	5.7 U	10.8 U	N/A	7.8 U	9.4 U
Vanadium	mg/kg	5,800	**1,480**	**46.9**	**34**	**184**	N/A	**923**	**53.3**	N/A	**1,030**	**37.2**
Zinc	mg/kg	350,000	**590 J**	**20.7 J**	**38.7 J**	**636 J**	N/A	**2,070 J**	**1,720 J**	N/A	**390 J**	**46.9 J**
Other												
Cyanide	mg/kg	150	**0.92**	**0.83**	**0.36 J**	**8.9**	N/A	**2.6**	**1.3**	N/A	**2**	**0.31 J**

Detections in bold

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J-: The positive result reported for this analyte is a quantitative estimate, but may be biased low.

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

N/A: This parameter was not analyzed for this sample.

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

Gray highlighting indicates boring locations within the building footprint

Table 3
Summary of Organics Detected in Groundwater
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW02-PZM000	RW02-PZM020	RW07-PZM004	RW07-PZM017	RW10-PZM004	RW10-PZM020	RW19-PZM000	RW19-PZM020	RW20-PZM000	RW20-PZM020
Volatile Organic Compounds												
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	2.7	1 U	**0.3 J**	**4.8**	**7.3**	1 U	**1.7**	1 U	1 U	1 U	1 U
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	**1.3**	1 U	**0.45 J**	1 U	1 U	1 U	1 U
1,2-Dichloroethene (Total)	µg/L	70	2 U	**0.51 J**	2 U	2 U	2 U	**2.9**	2 U	2 U	2 U	2 U
2-Butanone (MEK)	µg/L	5,600	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)	µg/L	1,200	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	µg/L	14,000	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	**1.1**	1 U	1 U	1 U	1 U
Carbon disulfide	µg/L	810	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	1 U	**0.51 J**	1 U	1 U	1 U	**2.8**	1 U	**0.44 J**	1 U	1 U
Cyclohexane	µg/L	13,000	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	µg/L	450	1 U	1 U	1 U	1 U	**1.7**	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1,000	1 U	1 U	1 U	**0.43 J**	1 U	**0.35 J**	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1 U	1 U	1 U	**0.53 J**	**4.2**	**6.9**	1 U	1 U	**0.6 J**	**0.69 J**
Vinyl chloride	µg/L	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes	µg/L	10,000	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Semi-Volatile Organic Compounds*												
1,4-Dioxane	µg/L	0.46	0.1 U	**0.15**	0.1 UJ	**1.8**	0.1 U	**0.8**	0.1 U	**0.28**	**0.53**	**0.38**
2,3,4,6-Tetrachlorophenol	µg/L	240	1 U	1 U	1 U	1 U	**0.56 J**	1 U	1 U	1 U	1 U	1 U
2,4-Dimethylphenol	µg/L	360	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Methylnaphthalene	µg/L	36	0.1 U	0.1 U	0.1 U	**0.3**	**0.049 J**	**0.56**	0.1 U	0.1 U	0.1 U	0.1 U
3&4-Methylphenol(m&p Cresol)	µg/L	930	2 U	2 U	2 U	2 U	2.1 U	2 U	2.1 U	2 U	2 U	2 U
Acenaphthene	µg/L	530	0.1 U	**0.36**	0.1 U	**1.6**	0.1 U	**0.51**	0.1 U	0.1 U	0.1 UJ	**0.04 J**
Acenaphthylene	µg/L	530	0.1 U	**2.6**	0.1 U	**0.66**	0.1 U	**0.83**	0.1 U	0.1 U	0.1 UJ	0.1 U
Anthracene	µg/L	1,800	0.1 U	0.1 U	0.1 U	**0.4**	**0.044 J**	**0.11**	**0.015 J**	0.1 U	0.1 U	**0.042 J**
Benz[a]anthracene	µg/L	0.012	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U
Benzo[a]pyrene	µg/L	0.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo[b]fluoranthene	µg/L	0.034	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo[k]fluoranthene	µg/L	0.34	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-Ethylhexyl)phthalate	µg/L	6	1 U	1 U	**0.22 J**	1 U	1 U	1 U	1 U	**0.22 J**	1 U	1 U
Caprolactam	µg/L	9,900	2.5 U	2.5 U	2.6 UJ	2.5 U	2.6 U	2.6 U	2.6 U	2.5 U	2.6 U	**0.3 J**
Carbazole	µg/L		1 U	**0.25 J**	1 U	**1.5**	1 U	**0.69 J**	1 U	1 U	1 U	**0.29 J**
Chrysene	µg/L	3.4	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U
Fluoranthene	µg/L	800	0.1 U	0.1 U	0.1 U	**0.011 J**	**0.015 J**	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	**0.041 J**
Fluorene	µg/L	290	0.1 U	0.1 U	0.1 U	**0.024 J**	**0.022 J**	**0.02 J**	0.1 U	0.1 U	0.1 UJ	**0.2**
Naphthalene	µg/L	0.17	0.1 U	**0.09 J**	**0.058 J**	**2.1**	**1.5**	**1.9**	**0.023 B**	**0.031 B**	0.1 U	**0.089 J**
Pentachlorophenol	µg/L	1	2.5 UJ	2.5 U	2.6 U	2.5 U	**2.2 J**	2.6 U	2.6 U	2.5 U	2.6 U	2.6 U
Phenanthrene	µg/L		0.1 U	0.1 U	0.1 U	**0.53**	**0.026 J**	**0.084 J**	0.1 U	0.1 U	0.1 U	**0.35**
Phenol	µg/L	5,800	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Pyrene	µg/L	120	0.1 U	0.1 U	0.1 U	0.1 U	**0.029 J**	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	**0.021 J**
TPH/Oil and Grease												
Diesel Range Organics	µg/L	47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	µg/L	47	4,900 U	4,820 U	4,870 U	4,850 U	**21,400**	4,800 U	4,800 U	4,820 U	4,800 U	4,800 U

Detections in bold

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

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

N/A: This parameter was not analyzed for this sample.

*PAH compounds were analyzed via SIM

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

Table 3
Summary of Organics Detected in Groundwater
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-002-PZ	RW-006-PZ	RW-011-PZ	RW-021-PZ	RW-025-PZ	RW-027-PZ	RW-048-PZ	RW-050-PZ
Volatile Organic Compounds										
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	**1.2**	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	2.7	**0.25 J**	1 U	1 U	1 U	**40.7**	**0.4 J**	1 U	1 U
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	**0.7 J**	1 U	1 U	1 U
1,2-Dichloroethene (Total)	µg/L	70	2 U	2 U	**1.5 J**	2 U	2 U	2 U	**0.76 J**	2 U
2-Butanone (MEK)	µg/L	5,600	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**4 J**
4-Methyl-2-pentanone (MIBK)	µg/L	1,200	10 U	10 U	10 U	10 U	**1.1 J**	10 U	10 U	10 U
Acetone	µg/L	14,000	10 U	10 U	10 U	**5.6 J**	10 U	10 U	10 U	10 U
Benzene	µg/L	5	1 U	1 U	**0.58 J**	1 U	1 U	1 U	1 U	**2.8**
Carbon disulfide	µg/L	810	1 U	1 U	1 U	1 U	1 UJ	**0.62 J**	1 U	1 UJ
cis-1,2-Dichloroethene	µg/L	70	1 U	1 U	**1.4**	1 U	1 U	1 U	**0.63 J**	**0.38 J**
Cyclohexane	µg/L	13,000	10 U	10 U	**0.24 J**	10 U	10 U	10 U	10 U	**0.84 J**
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	**2.7**	1 U	1 U	**0.73 J**
Isopropylbenzene	µg/L	450	1 U	1 U	1 U	1 U	**0.24 J**	1 U	1 U	1 U
Toluene	µg/L	1,000	1 U	1 U	**0.43 J**	1 U	**1.8**	1 U	1 U	**1.3**
Trichloroethene	µg/L	5	1 U	1 U	**1**	1 U	1 U	1 U	**1.5**	**6.2**
Vinyl chloride	µg/L	2	1 U	1 U	**0.41 J**	1 U	**0.21 J**	1 U	1 U	1 U
Xylenes	µg/L	10,000	3 U	3 U	3 U	3 U	**4.2**	3 U	3 U	**0.73 J**
Semi-Volatile Organic Compounds*										
1,4-Dioxane	µg/L	0.46	**0.13**	**0.16**	**0.051 J**	**0.53**	**0.53**	**0.92**	**0.73**	**0.034 J**
2,3,4,6-Tetrachlorophenol	µg/L	240	**0.59 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2,4-Dimethylphenol	µg/L	360	1 U	1 U	1 U	1 U	**0.86 J**	1 U	1 U	1 U
2-Methylnaphthalene	µg/L	36	0.1 U	0.1 U	**0.65**	0.1 U	**0.15**	0.1 U	0.1 U	**0.026 J**
3&4-Methylphenol(m&p Cresol)	µg/L	930	2 U	2.1 U	2.1 U	2.1 U	**0.62 J**	2.1 U	2.1 U	2.1 U
Acenaphthene	µg/L	530	0.1 U	0.1 U	**0.29**	0.1 U	**0.35**	0.1 U	0.1 U	**0.032 J**
Acenaphthylene	µg/L	530	0.1 U	0.1 U	**0.62**	0.1 U	**0.021 J**	0.1 U	0.1 U	0.1 U
Anthracene	µg/L	1,800	**0.045 J**	**0.39**	**0.26**	0.1 U	**0.21**	0.1 U	0.1 U	0.1 U
Benz[a]anthracene	µg/L	0.012	**0.018 J**	**0.03 J**	**0.054 J**	0.1 U	**0.035 J**	0.1 U	**0.018 J**	**0.018 J**
Benzo[a]pyrene	µg/L	0.2	0.1 U	0.1 U	**0.021 J**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo[b]fluoranthene	µg/L	0.034	0.1 U	0.1 U	**0.043 J**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo[k]fluoranthene	µg/L	0.34	0.1 U	0.1 U	**0.018 J**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-Ethylhexyl)phthalate	µg/L	6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**0.47 J**
Caprolactam	µg/L	9,900	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
Carbazole	µg/L		**0.37 J**	1 U	**1.4**	1 U	**0.36 J**	1 U	1 U	1 U
Chrysene	µg/L	3.4	0.1 U	0.1 U	**0.033 J**	0.1 U	**0.016 J**	0.1 U	**0.0085 J**	0.1 U
Fluoranthene	µg/L	800	**0.051 J**	0.1 U	**0.45**	0.1 U	**0.4**	**0.027 J**	**0.033 J**	**0.048 J**
Fluorene	µg/L	290	**0.038 J**	**0.044 J**	**0.8**	0.1 U	**0.34**	**0.023 J**	0.1 U	**0.025 J**
Naphthalene	µg/L	0.17	**0.033 B**	**0.036 B**	**6.4**	**0.025 B**	**1.1**	**0.027 B**	**0.027 B**	**0.13**
Pentachlorophenol	µg/L	1	2.6 U	2.6 U	2.6 U	2.6 U	**0.77 J**	2.6 U	2.6 U	2.6 U
Phenanthrene	µg/L		**0.066 J**	**0.032 J**	**1.7**	0.1 U	**0.42**	0.1 U	0.1 U	**0.054 J**
Phenol	µg/L	5,800	1 U	1 U	**0.22 J**	1 U	**0.66 J**	1 U	1 U	1 U
Pyrene	µg/L	120	**0.036 J**	**0.019 J**	**0.3**	0.1 U	**0.34**	**0.028 J**	**0.026 J**	**0.042 J**
TPH/Oil and Grease										
Diesel Range Organics	µg/L	47	N/A	N/A	**171**	N/A	N/A	**233 J**	N/A	N/A
Oil and Grease	µg/L	47	**1,000 J**	4,850 U	4,870 U	**1,000 J**	4,820 U	4,820 U	4,820 U	4,850 U

Detections in bold

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

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

N/A: This parameter was not analyzed for this sample.

*PAH compounds were analyzed via SIM

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

Table 4
Summary of Inorganics Detected in Groundwater
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW02-PZM000	RW02-PZM020	RW07-PZM004	RW07-PZM017	RW10-PZM004	RW10-PZM020	RW19-PZM000	RW19-PZM020	RW20-PZM000	RW20-PZM020
Total Metals												
Aluminum	µg/L	20,000	**42.6 B**	**32.5 B**	**29.8 B**	**38.1 B**	**121**	**206**	**248**	**35.5 B**	**315**	**24.1 B**
Antimony	µg/L	6	**2.5 B**	**11**	6 U	**7.3**	**2.3 J**	**7.9**	**2.3 B**	6 U	**2.2 J**	6 U
Arsenic	µg/L	10	**116**	**6.9**	5 U	5 U	**7.4 J**	**3.3 J**	**14.6 J**	5 U	**118**	**3.7 J**
Barium	µg/L	2,000	**26.4**	**8.1 B**	**47.2**	**9.9 B**	**14.2**	**13.7**	**12.4**	**34.3**	**11.6**	**28.7**
Beryllium	µg/L	4	1 U	**0.39 B**	1 U	1 U	1 U	1 U	1 U	1 U	**0.37 B**	1 U
Cadmium	µg/L	5	**31.3**	**47.2**	**3.2**	**9,780**	3 U	**10,200**	3 U	**41.9**	**0.58 B**	**0.59 J**
Chromium	µg/L	100	**17.1**	5 U	**1.9 B**	5 U	**0.98 J**	5 U	**24.4**	**0.89 J**	**0.83 J**	5 U
Chromium VI	µg/L	0.035	**13**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cobalt	µg/L	6	5 U	**113**	**0.7 J**	**144**	5 U	**114**	**1.5 J**	**38.5**	5 U	**53.1**
Copper	µg/L	1,300	**3 J**	5 U	5 U	**1.5 J**	5 U	**7.8**	**4.2 B**	**12**	5 U	**6**
Iron	µg/L	14,000	70 U	**443,000**	**41 B**	**283,000**	70 U	**202,000**	**448**	**37,000**	**103**	**226,000**
Manganese	µg/L	430	**4.7 B**	**19,000**	**5,480**	**17,500**	**1.9 J**	**18,000**	**0.89 J**	**2,580**	**3.8 J**	**9,210**
Nickel	µg/L	390	**0.63 B**	**63.2**	**2.3 B**	**109**	10 U	**92.8**	**0.76 B**	**12.6**	**0.66 B**	**40**
Selenium	µg/L	50	**5.3 B**	8 U	8 U	8 U	**4.9 J**	8 U	**3.6 J**	8 U	**3.4 B**	8 U
Silver	µg/L	94	6 U	**7.6**	6 U	**5.2 B**	6 U	**4.1 B**	6 U	**0.62 B**	6 U	**4.5 J**
Thallium	µg/L	2	**4.1 J**	10 U	10 U	10 U	**3.9 B**	10 U	**4.2 B**	50 U	10 U	10 U
Vanadium	µg/L	86	**196**	**7.5**	**64.4**	**5.9**	**154**	**5.6**	**260**	**1.5 B**	**71**	**4 B**
Zinc	µg/L	6,000	**912**	**576,000**	**925**	**387,000**	**1.4 B**	**509,000**	10 U	**7,000**	10 U	**82,800**
Dissolved Metals												
Aluminum, Dissolved	µg/L	20,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony, Dissolved	µg/L	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic, Dissolved	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barium, Dissolved	µg/L	2,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium, Dissolved	µg/L	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium, Dissolved	µg/L	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium, Dissolved	µg/L	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cobalt, Dissolved	µg/L	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper, Dissolved	µg/L	1,300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron, Dissolved	µg/L	14,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese, Dissolved	µg/L	430	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury, Dissolved	µg/L	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nickel, Dissolved	µg/L	390	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Selenium, Dissolved	µg/L	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silver, Dissolved	µg/L	94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Thallium, Dissolved	µg/L	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium, Dissolved	µg/L	86	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc, Dissolved	µg/L	6,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other												
Cyanide	µg/L	200	10 U	10 U	10 U	10 U	10 U	10 U	**1,330**	10 U	**215**	10 U

Detections in bold

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

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

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

N/A: This parameter was not analyzed for this sample.

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

Table 4
Summary of Inorganics Detected in Groundwater
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-002-PZ	RW-006-PZ	RW-011-PZ	RW-021-PZ	RW-025-PZ	RW-027-PZ	RW-048-PZ	RW-050-PZ
Total Metals										
Aluminum	µg/L	20,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	µg/L	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	µg/L	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barium	µg/L	2,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium	µg/L	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	µg/L	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium	µg/L	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium VI	µg/L	0.035	10 U	10 U	10 U	10 U	**5 J**	10 U	10 U	**5 J**
Cobalt	µg/L	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper	µg/L	1,300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	µg/L	14,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	µg/L	430	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	µg/L	390	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Selenium	µg/L	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silver	µg/L	94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Thallium	µg/L	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	µg/L	86	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	µg/L	6,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dissolved Metals										
Aluminum, Dissolved	µg/L	20,000	**47.5 B**	**171**	**540**	50 U	**1,540**	**54.2**	**34.2 J**	**55.8**
Antimony, Dissolved	µg/L	6	6 U	**2.2 J**	6 U	6 U	6 U	6 U	6 U	6 U
Arsenic, Dissolved	µg/L	10	**3.7 J**	5 U	**6.4**	**21.7**	**10.1**	**4.2 B**	**15.5**	**5.7**
Barium, Dissolved	µg/L	2,000	**17.2**	**12.7**	**83.3**	**118**	**26.3**	**30.2**	**59.2**	**11.3**
Beryllium, Dissolved	µg/L	4	1 U	**1**	1 U	**0.36 J**	1 U	1 U	**0.35 J**	1 U
Cadmium, Dissolved	µg/L	5	**102**	**20.1**	3 U	**0.84 B**	3 U	3 U	**1.1 B**	3 U
Chromium, Dissolved	µg/L	100	**1 J**	5 U	**2.4 J**	5 U	**1.7 J**	5 U	5 U	**0.92 J**
Cobalt, Dissolved	µg/L	6	**1.4 J**	**42.4**	5 U	5 U	5 U	**51.1**	**41.3**	5 U
Copper, Dissolved	µg/L	1,300	**1.5 B**	**1.5 B**	5 U	**2.2 B**	5 U	5 U	**1.5 J**	5 U
Iron, Dissolved	µg/L	14,000	**2,460**	**54,200**	**44.4 J**	**73,200**	**51.9 B**	**11,600**	**90,800**	**25 B**
Manganese, Dissolved	µg/L	430	**5,150**	**3,220**	**3.9 B**	**2,030**	**1 B**	**1,250**	**3,860**	**22.5**
Mercury, Dissolved	µg/L	2	0.2 U	0.2 U	0.2 U	0.2 U	**0.03 J**	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	µg/L	390	**3.1 J**	**37**	**1.2 J**	**1.9 J**	**3.6 B**	**51.3**	**20.2**	**3 B**
Selenium, Dissolved	µg/L	50	8 U	8 U	8 U	8 U	**5.3 B**	8 U	8 U	**3.4 B**
Silver, Dissolved	µg/L	94	6 U	**1.1 B**	6 U	**1.2 B**	6 U	6 U	**1.7 B**	6 U
Thallium, Dissolved	µg/L	2	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**3.6 J**
Vanadium, Dissolved	µg/L	86	**13**	**1.7 B**	**114**	**2.2 J**	**34.8**	**0.88 J**	**2.3 B**	**59.3**
Zinc, Dissolved	µg/L	6,000	**5,520**	**245,000**	10 U	**1.9 B**	**0.8 B**	**1,180**	**1,810**	**0.75 B**
Other										
Cyanide	µg/L	200	10 U	10 U	10 U	**18**	**4.5 J**	10 U	10 U	10 U

Detections in bold

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

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

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

N/A: This parameter was not analyzed for this sample.

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

Table 5A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021-SB		RW-021A-SB		RW-021B-SB		RW-021C-SB		RW-021D-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	108	45	144	24	78	35	240	86	37	26
2	17	12	76	19	59	154	23	18	99	26
3	39	102	21	10	27	157	19	12	107	54
4	232	41	1,913	71	27	199	15	10	214	186
5	35	28	> 10%	3,890	21	125	16	11	966	177
6			312	28						
7			145	21						
8			231	34						
9			27	11						
10			18	9						

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021E-SB		RW-021F-SB		RW-021G-SB		RW-021H-SB		RW-021I-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	58	23	110	25	47	21	1,210	74	1,671	109
2	15	22	154	25	40	62	983	70	31	24
3	66	22	49	18	22	35	780	62	149	25
4	190	23	302	33	49	12	18	13	134	25
5	4,742	133	340	51	55	13	51	14	26	54
6	Refusal									
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021J-SB		RW-021K-SB		RW-021L-SB		RW-021M-SB		RW-021N-SB		RW-021O-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	250	64	17	13	166	71	76	18	130	56	134	25
2	16	55	216	27	17	79	155	70	103	76	734	72
3	80	14	26	14	35	33	202	251	26	21	37	29
4	19	11	16	11	39	30	36	40	1,529	70	4,935	198
5	28	11	261	34	48	18	31	19	76	18	532	98
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5A
Soil Screening XRF Results (RW-021-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-021P-SB		RW-021Q-SB		RW-021R-SB		RW-021S-SB		RW-021T-SB		RW-021U-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	218	32	86	33	65	28	120	33	185	46	110	43
2	199	198	151	34	34	49	447	46	154	36	73	20
3	120	72	44	24	14	11	191	24	350	55	622	47
4	8,903	1,748	119	24	15	11	210	35	168	25	3,907	131
5	35	15	87	17	16	12	33	18	21	12	63	14
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052-SB		RW-052A-SB		RW-052AA-SB		RW-052B-SB		RW-052BB-SB		RW-052BBB-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	41	15	766	42	21	16	216	28	43	24	38	23
2	3,210	105	1,147	46	73	39	131	20	1,038	53	6,792	137
3	Concrete		Concrete		93	16	49	13	21,305	294	47	15
4			660	42	12	10	26	12	49	13	51	16
5	4,413	117	124	47	16	10	Brick/Concrete		17	9	61	18
6	Refusal						161	36				
7							287	30				
8							227	23				
9							29	13				
10							26	12				

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052C-SB		RW-052CC-SB		RW-052CCC-SB		RW-052D-SB		RW-052DD-SB		RW-052E-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	186	27	27	21	1,996	83	197	26	26	19	67	18
2	1,540	72	79	18	1,169	113	77	15	16	11	223	25
3	540	30	3,347	105	554	41	9	7	621	44	4,670	107
4	1,091	55	500	33	107	23	20	10	11	9	Concrete	
5	1,678	68	488	33	782	42	15	9	15	9	4,444	106
6											21	12
7											16	8
8											16	12
9											23	10
10											45	11

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052EE-SB		RW-052EEE-SB		RW-052F-SB		RW-052FF-SB		RW-052FFF-SB		RW-052G-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	217	39	74	21	28	15	353	31	57	16	1,715	68
2	10,431	197	108	21	63	61	6,647	203	599	37	17,920	254
3	130	19	2,940	118	13,953	197	1,219	70	23	12	5,103	122
4	77	21	11,868	355	6,123	106	3,642	245	24	16	114	22
5	13	9	303	27	7,694	173	Refusal		10	9	122	22
6					Concrete						66	16
7					107	16					Refusal	
8					144	29						
9					13	9						
10					12	19						

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052GG-SB		RW-052-GGG		RW-052H-SB		RW-052HH-SB		RW-052I-SB		RW-052II-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	552	111	74	27	1,878	70	30	24	77	21	726	52
2	206	36	1,615	71	130	21	1,330	59	66	16	979	51
3	Refusal		Concrete		545	47	26,142	317	2,344	88	10	8
4			19	11	749	43	1,321	63	2,658	81	12	9
5			512	51	615	40	596	44	9,271	161	13	9
6									12	9		
7									Refusal			
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052J-SB		RW-052JJ-SB		RW-052K-SB		RW-052KK-SB		RW-052L-SB		RW-052LL-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	182	37	44	18	223	53	2,890	95	50	24	19	16
2	6,783	37	1,954	99	49	16	82	16	85	17	5,746	130
3	6,366	112	Refusal		5,013	155	71	15	486	40	4,230	107
4	602	148			2,736	92	25	11	63	18	1,134	49
5	Refusal				499	37	13	9	65	14	17	10
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052M-SB		RW-052MM-SB		RW-052N-SB		RW-052NN-SB		RW-052O-SB		RW-052OO-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	271	29	21	13	1,036	52	2,463	81	302	26	23	18
2	3,550	97	1,528	71	375	32	160	26	696	47	2,213	75
3	422	61	229	26	3,372	153	51	13	4,102	95	94	20
4	158	39	970	46	499	35	169	20	1,048	49	39	12
5	27	11	36	14	11	9	133	17	5,277	175	1,513	66
6									Refusal			
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052P-SB		RW-052PP-SB		RW-052Q-SB		RW-052QQ-SB		RW-052R-SB		RW-052RR-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	157	35	23	17	147	27	1,444	55	33,848	339	129	32
2	107	23	592	35	303	28	173	23	303	33	11	9
3	9,366	193	318	27	Concrete		54	13	440	33	Concrete	
4	151	19	157	20	34	11	66	13	1,966	71	27	11
5	257	26	86	15	25	10	36	11	240	25	36	13
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052S-SB		RW-052SS-SB		RW-052T-SB		RW-052TT-SB		RW-052U-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	22	19	166	25	1,782	72	28	20	168	31
2	51	13	1,365	92	122	22	10,094	193	1,795	68
3	1,474	59	360	35	6,404	126	Refusal		9,226	161
4	1,979	86	35	14	1,891	70			95	16
5	Refusal		66	16	895	68			103	16
6										
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052UU-SB		RW-052V-SB		RW-052VV-SB		RW-052W-SB		RW-052X-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	53	24	90	21	117	33	29,761	489	250	33
2	44	15	62,292	606	28	20	276	30	8,153	211
3	21	11	180	24	941	46	207	24	4,842	124
4	15	11	Refusal		577	67	39	10	11,436	255
5	47	14			25	11	11	9	218	23
6										
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5B
Soil Screening XRF Results (RW-052-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-052XX-SB		RW-052Y-SB		RW-052YY-SB		RW-052Z-SB		RW-052ZZ-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	27	18	14	12	257	31	843	48	1,990	212
2	539	54	368	108	150	32	151	20	1,148	57
3	603	151	11	9	57	17	108	17	199	24
4	24	12	18	10	29	17	196	23	204	25
5	17	11	50	13	19	11	93	16	34	14
6										
7										
8										
9										
10										

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5C
Soil Screening XRF Results (RW-055-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-055-SB 6.28.16		RW-055-SB 6.29.16		RW-055A-SB		RW-055B-SB		RW-055E-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	25	19	14	11	250	30	441	47	22	17
2	254	53	881	92	330	39	154	33	414	75
3	3,316	102	2,780	84	26	10	18	10	2,199	88
4	218	22	745	48	10	8	40	14	Refusal	
5	19	10	335	28	17	9	25	11		
6	44	14			91	27	54	14		
7	45	14			45	13	27	15		
8	30	11			11	10	17	19		
9	61	14			15	10	18	11		
10	660	54			19	9	17	9		

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5C
Soil Screening XRF Results (RW-055-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-055F-SB		RW-055G-SB		RW-055H-SB		RW-055I-SB		RW-055J-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	18	14	Poor Recovery		226	32	329	45	97	21
2	101	25			13	10	308	41	176	25
3	75	15	27	20	1,181	77	321	31	865	56
4	19	10	1,476	86	111	18	1,693	62	28	10
5	25	11	1,871	69	145	20	24	10	66	15
6			1,136	61						
7			380	32						
8			107	26						
9			44	15						
10			10	8						

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 5C
Soil Screening XRF Results (RW-055-SB)
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

XRF Readings (mg/kg)

Boring ID	RW-055K-SB		RW-055L-SB		RW-055M-SB		RW-055N-SB		RW-055O-SB		RW-055P-SB	
Depth (ft)	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic	Lead	Arsenic
1	191	27	19	16	17	11	20	16	20	16	41	13
2	172	29	52	25	478	36	416	41	311	37	24	11
3	22	11	21	11	1,426	63	1,093	56	113	18	1,446	75
4	12	10	14	9	1,085	77	326	29	57	18	141	157
5	35	12	109	27	21	16	27	12	86	18	23	17
6												
7												
8												
9												
10												

Red highlighted cells indicate lead/arsenic exceedance of delineation criteria
Gray highlighted cells indicate non-detects (reporting XRF detection limit)

Table 6
Soil Delineation TCLP Results
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	TCLP Criteria	Sample ID									
			021 Arsenic Waste		021 Lead Waste		052 Waste		055 Waste		RW-055-SB-1	
Arsenic	mg/L	5	**0.0038**	JB	**0.026**	JB	**0.0092**	JB	**0.003**	JB	**0.0093**	JB
Barium	mg/L	100	**0.8**	J	**1**		**0.17**	JB	**0.2**	JB	**0.77**	J
Cadmium	mg/L	1	**0.077**		**0.31**		**0.0035**	JB	0.05	U	**0.00059**	JB
Chromium	mg/L	5	0.05	U	**0.0012**	JB	0.05	U	**0.0019**	JB	**0.011**	JB
Lead	mg/L	5	**0.92**		**0.4**		**0.94**		**0.014**	J	0.25	U
Mercury	mg/L	0.2	0.001	U	**0.00008**	J	0.001	U	0.001	U	0.001	U
Selenium	mg/L	1	**0.011**	JB	**0.013**	JB	**0.0047**	JB	**0.013**	JB	0.1	U
Silver	mg/L	5	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U

Detections in bold

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

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

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

NA: This parameter was not analyzed for this sample.

There were no exceedances of TCLP criteria in the results above.

Table 7 - Parcel A3 (RWM)
COPC Screening Analysis

Parameter	CAS#	Location of Max Result	Max Detection (mg/kg)	Final Flag	Min Detection (mg/kg)	Average Detection (mg/kg)	Total Samples	Frequency of Detection (%)	Cancer TR=1E-06 (mg/kg)	Non-Cancer HQ=0.1 (mg/kg)	COPC?
1,1,2-Trichloroethane	79-00-5	RW-010-SB-10	0.00053	J	0.00053	0.001	120	0.83	5.05	0.631	no
1,1-Biphenyl	92-52-4	RW-043-SB-8	11.3		0.016	1.20	122	12.30	409	20	no
1,1-Dichloroethane	75-34-3	RW-032-SB-5	0.0077		0.0033	0.01	119	1.68	15.5	23,400	no
1,2,3-Trichlorobenzene	87-61-6	RW-055-SB-7	0.096	B	0.096	0.10	119	0.84		93.4	no
1,2-Dibromo-3-chloropropane	96-12-8	RW-047-SB-6	0.24	J	0.24	0.24	119	0.84	0.064	2.5	YES (C)
1,2-Dichloroethane	107-06-2	RW-014-SB-5	0.0011	J	0.0011	0.001	119	0.84	2.04	13.7	no
1,4-Dichlorobenzene	106-46-7	RW-055-SB-7	39.8		39.8	39.8	119	0.84	11.4	2,530	YES (C)
2,4,5-Trichlorophenol	95-95-4	RW-037-SB-8	0.022	J	0.022	0.02	97	1.03		8,210	no
2,4-Dimethylphenol	105-67-9	RW-078-SB-1	0.023	J	0.016	0.02	98	3.06		1,640	no
2-Butanone (MEK)	78-93-3	RW-033-SB-6.5	0.081		0.00091	0.01	119	47.06		19,300	no
2-Hexanone	591-78-6	RW-033-SB-6.5	0.011	J	0.0013	0.01	119	3.36		134	no
2-Methylnaphthalene	91-57-6	RW-043-SB-8	273		0.002	4.22	126	57.94		301	no
2-Methylphenol	95-48-7	RW-004-SB-5	0.015	J	0.015	0.02	99	1.01		4,100	no
4-Methyl-2-pentanone (MIBK)	108-10-1	RW-033-SB-6.5	0.0063	J	0.0014	0.003	119	2.52		13,900	no
Acenaphthene	83-32-9	RW-015-SB-5	6.3		0.0026	0.37	126	44.44		4,520	no
Acenaphthylene	208-96-8	RW-052-SB-5	1.7		0.0012	0.15	126	46.83			no
Acetone	67-64-1	RW-022-SB-8.5	0.29	J	0.0048	0.04	121	78.51		67,000	no
Acetophenone	98-86-2	RW-077-SB-1	0.1		0.019	0.04	122	4.10		11,700	no
Aluminum	7429-90-5	RW-045-SB-5	47,700		2,890	14,709	121	100.00		112,000	no
Anthracene	120-12-7	RW-020-SB-7	30.5	J	0.0011	1.09	126	68.25		22,600	no
Antimony	7440-36-0	RW-035-SB-1	40.8	J	1.4	9.58	120	5.00		46.7	no
Aroclor 1242	53469-21-9	RW-051-SB-1	0.42		0.22	0.32	59	3.39	0.95		no
Aroclor 1248	12672-29-6	RW-030-SB-1	0.13		0.031	0.08	59	5.08	0.954		no
Aroclor 1254	11097-69-1	RW-035-SB-1	6.7		0.02	1.61	59	8.47	0.972	1.47	YES (C/NC)
Aroclor 1260	11096-82-5	RW-019-SB-1	0.62		0.015	0.18	59	11.86	0.991		no
Arsenic	7440-38-2	RW-021-SB-1	492		1.6	15.8	260	88.46	3	47.9	YES (C/NC)
Barium	7440-39-3	RW-064-SB-5	4,070		1.7	169	233	100.00		21,700	no
Benzaldehyde	100-52-7	RW-033-SB-1	5.1	B	0.018	0.47	89	28.09	818	11,700	no
Benzene	71-43-2	RW-055-SB-7	0.96		0.00038	0.04	119	22.69	5.08	42.3	no
Benzo[a]anthracene	56-55-3	RW-020-SB-7	60.9	J	0.0022	1.67	126	80.16	21		YES (C)
Benzo[a]pyrene	50-32-8	RW-020-SB-7	42.8	J	0.0026	1.48	126	72.22	2.1	22	YES (C/NC)
Benzo[b]fluoranthene	205-99-2	RW-020-SB-7	76.3	J	0.004	2.38	126	77.78	21		YES (C)
Benzo[g,h,i]perylene	191-24-2	RW-052-SB-5	5.8		0.0016	0.34	126	78.57			no
Benzo[k]fluoranthene	207-08-9	RW-020-SB-7	36	J	0.0014	1.11	126	76.98	210		no

Table 7 - Parcel A3 (RWM)
COPC Screening Analysis

Parameter	CAS#	Location of Max Result	Max Detection (mg/kg)	Final Flag	Min Detection (mg/kg)	Average Detection (mg/kg)	Total Samples	Frequency of Detection (%)	Cancer TR=1E-06 (mg/kg)	Non-Cancer HQ=0.1 (mg/kg)	COPC?
Beryllium	7440-41-7	RW-045-SB-5	8.7		0.15	1.23	121	90.08	6,950	229	no
bis(2-Ethylhexyl)phthalate	117-81-7	RW-039-SB-1	0.78	J	0.017	0.42	122	5.74	164	1,640	no
Bromoform	75-25-2	RW-047-SB-1	0.0054	J	0.0054	0.01	119	0.84	85.7	2,340	no
Cadmium	7440-43-9	RW-069-SB-3	3,530		0.18	114	233	83.26	9,260	98.2	YES (NC)
Caprolactam	105-60-2	RW-008-SB-5	0.028	B	0.028	0.03	122	0.82		39,800	no
Carbazole	86-74-8	RW-033-SB-1	60.1		0.023	2.66	122	21.31			no
Carbon disulfide	75-15-0	RW-028-SB-5	0.087		0.0015	0.01	119	68.91		347	no
Chloroform	67-66-3	RW-033-SB-1	0.0062	J	0.0062	0.01	119	0.84	1.38	103	no
Chloromethane	74-87-3	RW-035-SB-5	0.00051	J	0.00051	0.001	119	0.84		46.3	no
Chromium	7440-47-3	RW-016-SB-1	1,530		1.1	179	233	100.00			no
Chromium VI	18540-29-9	RW-031-SB-1	11.1		0.45	2.84	121	21.49	6.33	348	YES (C)
Chrysene	218-01-9	RW-020-SB-7	56.6	J	0.00074	1.58	126	82.54	2,100		no
cis-1,2-Dichloroethene	156-59-2	RW-033-SB-6.5	0.12		0.0041	0.03	120	7.50		234	no
Cobalt	7440-48-4	RW-050-SB-4.5	52		0.58	6.47	121	95.87	1,850	34.7	YES (NC)
Copper	7440-50-8	RW-050-SB-4.5	986		2.2	82.9	121	100.00		4,670	no
Cyanide	57-12-5	RW-077-SB-5	8.9		0.1	0.86	121	61.16		14.7	no
Cyclohexane	110-82-7	RW-077-SB-5	0.0089	J	0.00061	0.004	119	12.61		2,740	no
Dibenz[a,h]anthracene	53-70-3	RW-052-SB-5	2.7		0.0046	0.26	126	47.62	2.1		YES (C)
Diesel Range Organics	DRO	RW-033-SB-1	956		40.5	286	12	58.33		620	YES (NC)
Di-n-butylphthalate	84-74-2	RW-036-SB-1	0.078	J	0.036	0.06	122	1.64		8,210	no
Di-n-ocytlphthalate	117-84-0	RW-025-SB-1	0.3	J	0.3	0.30	122	0.82		821	no
Ethylbenzene	100-41-4	RW-055-SB-7	8.4		0.0011	0.92	120	9.17	25.4	2,050	no
Fluoranthene	206-44-0	RW-020-SB-7	142	J	0.002	3.88	126	81.75		3,010	no
Fluorene	86-73-7	RW-015-SB-5	9.5		0.00067	0.37	126	75.40		3,010	no
Gasoline Range Organics	GRO	RW-033-SB-6.5	9.5		5	7.25	24	8.33		620	no
Indeno[1,2,3-c,d]pyrene	193-39-5	RW-052-SB-5	6.2		0.0059	0.58	126	53.17	21		no
Iron	7439-89-6	RW-050-SB-4.5	375,000		1,200	63,123	121	100.00		81,800	YES (NC)
Isopropylbenzene	98-82-8	RW-047-SB-10	1.2	J	0.0024	0.44	120	5.83		995	no
Lead^	7439-92-1	RW-055-SB-1	44,700		1.5	518	234	96.58		800	YES (NC)
Manganese	7439-96-5	RW-019-SB-4	54,000		14.6	7,401	122	100.00		2,560	YES (NC)
Mercury	7439-97-6	RW-025-SB-1	11.2		0.0028	0.24	232	88.79		35	no
Methyl Acetate	79-20-9	RW-079-SB-5	0.0023	J	0.0022	0.002	119	1.68		117,000	no
Methylene Chloride	75-09-2	RW-024-SB-6	0.007		0.002	0.004	120	39.17	1,020	316	no
Naphthalene	91-20-3	RW-043-SB-8	75		0.0013	1.77	126	66.67	16.7	58.5	YES (C/NC)
Nickel	7440-02-0	RW-050-SB-4.5	132	J	1.6	21.3	121	100.00	64,100	2,240	no

Table 7 - Parcel A3 (RWM)
COPC Screening Analysis

Parameter	CAS#	Location of Max Result	Max Detection (mg/kg)	Final Flag	Min Detection (mg/kg)	Average Detection (mg/kg)	Total Samples	Frequency of Detection (%)	Cancer TR=1E-06 (mg/kg)	Non-Cancer HQ=0.1 (mg/kg)	COPC?
Oil and Grease	O&G	RW-029-SB-7	39,600		101	2,105	118	100.00		620	YES (NC)
PCBs (total)*	1336-36-3	RW-035-SB-1	6.7	J	0.083	0.83	59	20.34	0.942		YES (C)
Phenanthrene	85-01-8	RW-020-SB-7	111	J	0.0069	3.80	126	69.84			no
Phenol	108-95-2	RW-024-SB-1	1.3		0.038	0.54	104	3.85		24,600	no
Pyrene	129-00-0	RW-020-SB-7	105	J	0.0022	3.18	126	84.13		2,260	no
Selenium	7782-49-2	RW-070-SB-3	7		1.9	3.27	233	11.16		584	no
Silver	7440-22-4	RW-064-SB-12	58.4		0.29	5.38	233	17.17		584	no
Styrene	100-42-5	RW-052-SB-5	0.41		0.3	0.36	119	1.68		3,480	no
Tetrachloroethene	127-18-4	RW-010-SB-10	0.001	J	0.001	0.001	120	0.83	103	38.9	no
Thallium	7440-28-0	RW-006-SB-1	6.6	J	1.3	3.75	121	3.31		1.17	YES (NC)
Toluene	108-88-3	RW-055-SB-7	0.75		0.00026	0.03	119	28.57		4,680	no
Trichloroethene	79-01-6	RW-010-SB-7	6.1		0.0008	0.37	119	16.81	6.04	1.87	YES (C/NC)
Vanadium	7440-62-2	RW-009-SB-1	3,070	J	6.3	361	121	100.00		583	YES (NC)
Xylenes	1330-20-7	RW-043-SB-8	6.4		0.0011	1.13	119	5.88		249	no
Zinc	7440-66-6	RW-005-SB-1	67,900		8	2,685	121	100.00		35,000	YES (NC)

J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

COPC = Constituent of Potential Concern
C = Compound was identified as a cancer COPC
NC = Compound was identified as a non-cancer COPC
TR = Target Risk
HQ = Hazard Quotient

*PCBs (total) include the sum of all detected aroclor mitures, including those without regional screening levels (e.g. Aroclor 1262, Aroclor 1268) which are not diplayed.
^The COPC screening level for lead was not adjusted to the HQ=0.1 because lead is not assessed in the SLRA. The 800 mg/kg PAL is relevant to the Adult Lead Model procedure.

Table 8 - Parcel A3 (RWM)
Development Area
Assessment of Lead

Exposure Unit	Pre/Post-Delineation	Surface/Sub-Surface	Arithmetic Mean (mg/kg)
Outside Building Footprint* (31.05 ac.)	Pre-Delineation	Surface	370.59
		Sub-Surface	196.03
		Pooled	269.74
	Post-Delineation	Surface	370.59
		Sub-Surface	196.03
		Pooled	269.74
Inside Building Footprint (22.46 ac.)	Pre-Delineation	Surface	1,841.58
		Sub-Surface	605.72
		Pooled	1,206.95
	Post-Delineation	Surface	1,242.55
		Sub-Surface	1,380.60
		Pooled	1,346.53

*No delineation data was collected from the EU Outside of Building Footprints

Adult Lead Model (ALM) Risk Levels	
Soil Concentration (mg/kg)	Probability of Blood Concentration of 10 ug/dL
2,737 mg/kg	5%
3,417 mg/kg	10%

Table 9 - Parcel A3 (RWM)
EPCs - Surface Soils

Parameter	Cancer COPC Screening Level (mg/kg)	Non-Cancer COPC Screening Level (mg/kg)	EPC Type Outside Building Footprint	EPC Outside Building Footprint (mg/kg)	EPC Type Inside Building Footprint	EPC Inside Building Footprint (mg/kg)
Arsenic	3.00	47.9	95% KM (Chebyshev) UCL	**78.8**	95% KM (BCA) UCL	**104**
Benzo[a]anthracene	21.0		95% KM (Chebyshev) UCL	2.36	99% KM (Chebyshev) UCL	3.33
Benzo[a]pyrene	2.10	22.0	95% KM (Chebyshev) UCL	**2.17**	99% KM (Chebyshev) UCL	**2.73**
Benzo[b]fluoranthene	21.0		95% KM (Chebyshev) UCL	3.95	99% KM (Chebyshev) UCL	4.51
Cadmium	9,260	98.2	99% KM (Chebyshev) UCL	**1,154**	99% KM (Chebyshev) UCL	41.0
Chromium VI	6.33	348	95% KM (t) UCL	1.70	95% KM (Percentile Bootstrap) UCL	2.81
Cobalt	1,850	34.7	95% Adjusted Gamma UCL	11.1	95% Adjusted Gamma KM-UCL	8.04
Dibenz[a,h]anthracene	2.10		95% KM (Chebyshev) UCL	0.45	95% Adjusted Gamma KM-UCL	0.24
Iron		81,800	95% Student's-t UCL	111,400	95% Adjusted Gamma UCL	132,400
Manganese		2,560	95% Student's-t UCL	12,556	95% Chebyshev (Mean, Sd) UCL	23,453
Naphthalene	16.7	58.5	95% KM (Chebyshev) UCL	0.21	99% KM (Chebyshev) UCL	0.90
PCBs (total)	0.94		95% KM (t) UCL	0.16	95% Adjusted Gamma KM-UCL	**1.22**
Aroclor 1254	NE	1.47	97.5% KM (Chebyshev) UCL	0.15	95% KM (t) UCL	0.65
Trichloroethene	6.04	1.87	95% KM (t) UCL	0.07	95% KM (Percentile Bootstrap) UCL	0.01
Vanadium		583	95% Adjusted Gamma UCL	1,082	95% Student's-t UCL	626
Zinc		35,000	97.5% Chebyshev (Mean, Sd) UCL	30,390	95% Chebyshev (Mean, Sd) UCL	5,319

Bold indicates EPC higher than lowest COPC SL
COPC = Constituent of Potential Concern
NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only. The carcinogenic risk is evaluated with total PCBs.
Benzo[a]pyrene screening level was derived from the USEPA IRIS Recent Additions dated January 19, 2017
PAH compounds screening levels were adjusted based on the relative potency factor

Table 10 - Parcel A3 (RWM)
EPCs - Sub-Surface Soils

Parameter	Cancer COPC Screening Level (mg/kg)	Non-Cancer COPC Screening Level (mg/kg)	EPC Type Outside Building Footprint	EPC Outside Building Footprint (mg/kg)	EPC Type Inside Building Footprint	EPC Inside Building Footprint (mg/kg)
Arsenic	3.00	47.9	97.5% KM (Chebyshev) UCL	**43.6**	95% KM (BCA) UCL	**9.44**
Benzo[a]anthracene	21.0		99% KM (Chebyshev) UCL	**24.6**	99% KM (Chebyshev) UCL	8.45
Benzo[a]pyrene	2.10	22.0	99% KM (Chebyshev) UCL	**17.5**	99% KM (Chebyshev) UCL	**6.31**
Benzo[b]fluoranthene	21.0		99% KM (Chebyshev) UCL	**31.5**	99% KM (Chebyshev) UCL	9.07
Cadmium	9,260	98.2	99% KM (Chebyshev) UCL	950	99% KM (Chebyshev) UCL	25.1
Chromium VI	6.33	348	95% KM (t) UCL	0.60	95% KM (t) UCL	0.81
Cobalt	1,850	34.7	95% H-UCL	6.62	95% Chebyshev (Mean, Sd) UCL	13.9
Dibenz[a,h]anthracene	2.10		95% KM (t) UCL	0.15	95% Adjusted Gamma KM-UCL	0.48
Iron		81,800	95% Adjusted Gamma UCL	35,652	95% Chebyshev (Mean, Sd)	79,381
Manganese		2,560	95% Adjusted Gamma UCL	2,450	97.5% Chebyshev (Mean, Sd) UCL	12,501
Naphthalene	16.7	58.5	99% KM (Chebyshev) UCL	**29.8**	99% KM (Chebyshev) UCL	11.2
Trichloroethene	6.04	1.87	95% KM (t) UCL	0.01	95% GROS Adjusted Gamma UCL	**2.19**
Vanadium		583	95% H-UCL	155	95% Chebyshev (Mean, Sd) UCL	588
Zinc		35,000	97.5% Chebyshev (Mean, Sd) UCL	5,398	95% Chebyshev (Mean, Sd) UCL	3,392

Bold indicates EPC higher than lowest COPC SL
COPC = Constituent of Potential Concern
Benzo[a]pyrene screening level was derived from the USEPA IRIS Recent Additions dated January 19, 2017
PAH compounds screening levels were adjusted based on the relative potency factor

Table 11 - Parcel A3 (RWM)
EPCs - Pooled Soils

Parameter	Cancer COPC Screening Level (mg/kg)	Non-Cancer COPC Screening Level (mg/kg)	EPC Type Outside Building Footprint	EPC Outside Building Footprint (mg/kg)	EPC Type Inside Building Footprint	EPC Inside Building Footprint (mg/kg)
Arsenic	3.00	47.9	95% KM (Chebyshev) UCL	**42.5**	95% KM (BCA) UCL	**22.6**
Benzo[a]anthracene	21.0		99% KM (Chebyshev) UCL	13.4	97.5% KM (Chebyshev) UCL	3.42
Benzo[a]pyrene	2.10	22.0	99% KM (Chebyshev) UCL	**9.67**	97.5% KM (Chebyshev) UCL	**2.62**
Benzo[b]fluoranthene	21.0		99% KM (Chebyshev) UCL	17.5	97.5% KM (Chebyshev) UCL	3.89
Cadmium	9,260	98.2	99% KM (Chebyshev) UCL	565	97.5% KM (Chebyshev) UCL	18.3
Chromium VI	6.33	348	95% KM (BCA) UCL	1.17	95% GROS Approximate Gamma UCL	2.04
Cobalt	1,850	34.7	95% H-UCL	8.45	95% KM (BCA) UCL	7.98
Dibenz[a,h]anthracene	2.10		95% GROS Approximate UCL	0.24	95% KM (Chebyshev) UCL	0.33
Iron		81,800	95% Approximate Gamma UCL	72,223	95% Chebyshev (Mean, Sd) UCL	107,300
Manganese		2,560	95% Adjusted Gamma UCL	8,103	95% Chebyshev (Mean, Sd) UCL	14,966
Naphthalene	16.7	58.5	99% KM (Chebyshev) UCL	15.7	97.5% KM (Chebyshev) UCL	4.06
PCBs (total)	0.94		95% KM (t) UCL	0.16	95% Adjusted Gamma KM-UCL	**1.22**
Aroclor 1254	NE	1.47	97.5% KM (Chebyshev) UCL	0.15	95% KM (t) UCL	0.65
Trichloroethene	6.04	1.87	99% KM (Chebyshev) UCL	0.13	97.5% KM (Chebyshev) UCL	0.67
Vanadium		583	95% Chebyshev (Mean, Sd) UCL	770	95% Chebyshev (Mean, Sd) UCL	609
Zinc		35,000	95% Chebyshev (Mean, Sd) UCL	12,633	95% H-UCL	2,630

Bold indicates EPC higher than lowest COPC SL
COPC = Constituent of Potential Concern
NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only. The carcinogenic risk is evaluated with total PCBs.
Benzo[a]pyrene screening level was derived from the USEPA IRIS Recent Additions dated January 19, 2017
PAH compounds screening levels were adjusted based on the relative potency factor

Table 12 - Parcel A3 (RWM)
Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organ	Outside Building Footprint (31.1 ac.)					Inside Building Footprint (22.5 ac.)				
			Composite Worker					Composite Worker			
			RSLs		Risk Estimates			RSLs		Risk Estimates	
		EPC mg/kg	Cancer	Non-Cancer	Risk	HQ	EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	78.8	3.0	479	2.6E-05	0.2	104	3.0	479	3.5E-05	0.2
Benzo[a]anthracene		2.36	21.0		1.1E-07		3.33	21.0		1.6E-07	
Benzo[a]pyrene	**Developmental**	2.17	2.1	220	1.0E-06	0.01	2.73	2.1	220	1.3E-06	0.01
Benzo[b]fluoranthene		3.95	21.0		1.9E-07		4.51	21.0		2.1E-07	
Cadmium	**Urinary**	1,154	9,260	982	1.2E-07	1	41.0	9,260	982	4.4E-09	0.04
Chromium VI	**Respiratory**	1.70	6.33	3,480	2.7E-07	0.0005	2.81	6.33	3,480	4.4E-07	0.0008
Cobalt	**None Specified**	11.1	1,850	347	6.0E-09	0.03	8.04	1,850	347	4.3E-09	0.02
Dibenz[a,h]anthracene		0.45	2.1		2.1E-07		0.24	2.1		1.1E-07	
Iron	**None Specified**	111,400		818,000		0.1	132,400		818,000		0.2
Manganese	**Nervous**	12,556		25,600		0.5	23,453		25,600		0.9
Naphthalene	**Nervous; Respiratory**	0.21	16.7	585	1.3E-08	0.0004	0.90	16.7	585	5.4E-08	0.002
PCBs (total)		0.16	0.942		1.7E-07		1.22	0.942		1.3E-06	
Aroclor 1254	**Dermal; Immune; Ocular**	0.15	NE	14.7		0.01	0.65	NE	14.7		0.04
Trichloroethene	**Cardiovascular; Developmental; Immune**	0.07	6.04	18.7	1.2E-08	0.004	0.01	6.04	18.7	1.7E-09	0.0005
Vanadium	**Dermal**	1,082		5,830		0.2	626		5,830		0.1
Zinc	**Hematologic; Immune**	30,390		350,000		0.09	5,319		350,000		0.02
					3E-05	↓				**4E-05**	↓

RSLs were obtained from the EPA Regional Screening Levels at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only. The carcinogenic risk is evaluated with total PCBs.

Total HI	Dermal	0
	Immune	0
	Cardiovascular	0
	Urinary	1
	Respiratory	0
	Nervous	0
	Developmental	0
	Hematologic	0
	Ocular	0
	None Specified	0

Total HI	Dermal	0
	Immune	0
	Cardiovascular	0
	Urinary	0
	Respiratory	0
	Nervous	1
	Developmental	0
	Hematologic	0
	Ocular	0
	None Specified	0

Table 13 - Parcel A3 (RWM)
Sub-Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organ	Outside Building Footprint (31.1 ac.)					Inside Building Footprint (22.5 ac.)				
			Composite Worker					Composite Worker			
			RSLs		Risk Estimates			RSLs		Risk Estimates	
		EPC mg/kg	Cancer	Non-Cancer	Risk	HQ	EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	43.6	3.0	479	1.5E-05	0.09	9.44	3.0	479	3.1E-06	0.02
Benzo[a]anthracene		24.6	21.0		1.2E-06		8.45	21.0		4.0E-07	
Benzo[a]pyrene	**Developmental**	17.5	2.1	220	8.3E-06	0.08	6.31	2.1	220	3.0E-06	0.03
Benzo[b]fluoranthene		31.5	21.0		1.5E-06		9.07	21.0		4.3E-07	
Cadmium	**Urinary**	950	9,260	982	1.0E-07	1	25.1	9,260	982	2.7E-09	0.03
Chromium VI	**Respiratory**	0.60	6.33	3,480	9.5E-08	0.0002	0.81	6.33	3,480	1.3E-07	0.0002
Cobalt	**None Specified**	6.62	1,850	347	3.6E-09	0.02	13.9	1,850	347	7.5E-09	0.04
Dibenz[a,h]anthracene		0.15	2.1		7.1E-08		0.48	2.1		2.3E-07	
Iron	**None Specified**	35,652		818,000		0.04	79,381		818,000		0.1
Manganese	**Nervous**	2,450		25,600		0.1	12,501		25,600		0.5
Naphthalene	**Nervous; Respiratory**	29.8	16.7	585	1.8E-06	0.05	11.2	16.7	585	6.7E-07	0.02
Trichloroethene	**Cardiovascular; Developmental; Immune**	0.01	6.04	18.7	1.7E-09	0.0005	2.19	6.04	18.7	3.6E-07	0.1
Vanadium	**Dermal**	155		5,830		0.03	588		5,830		0.1
Zince	**Hematologic; Immune**	5,398		350,000		0.02	3,392		350,000		0.01
					3E-05	↓				**8E-06**	↓

RSLs were obtained from the EPA Regional Screening Levels at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

Total HI	Cardiovascular	0
	Dermal	0
	Urinary	1
	Respiratory	0
	Nervous	0
	Developmental	0
	Immune	0
	Hematologic	0
	None Specified	0

Total HI	Cardiovascular	0
	Dermal	0
	Urinary	0
	Respiratory	0
	Nervous	1
	Developmental	0
	Immune	0
	Hematologic	0
	None Specified	0

Table 14 - Parcel A3 (RWM)
Pooled Soils
Composite Worker Risk Ratios

Parameter	Target Organ	Outside Building Footprint (31.1 ac.)					Inside Building Footprint (22.5 ac.)				
			Composite Worker					Composite Worker			
			RSLs		Risk Estimates			RSLs		Risk Estimates	
		EPC mg/kg	Cancer	Non-Cancer	Risk	HQ	EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	42.5	3.0	479	1.4E-05	0.09	22.6	3.0	479	7.5E-06	0.05
Benzo[a]anthracene		13.4	21.0		6.4E-07		3.42	21.0		1.6E-07	
Benzo[a]pyrene	**Developmental**	9.67	2.10	220	4.6E-06	0.04	2.62	2.1	220	1.2E-06	0.01
Benzo[b]fluoranthene		17.5	21.0		8.3E-07		3.89	21.0		1.9E-07	
Cadmium	**Urinary**	565	9,260	982	6.1E-08	0.6	18.3	9,260	982	2.0E-09	0.02
Chromium VI	**Respiratory**	1.17	6.33	3,480	1.8E-07	0.0003	2.04	6.33	3,480	3.2E-07	0.0006
Cobalt	**None Specified**	8.45	1,850	347	4.6E-09	0.02	7.98	1,850	347	4.3E-09	0.02
Dibenz[a,h]anthracene		0.24	2.1		1.1E-07		0.33	2.1		1.6E-07	
Iron	**None Specified**	72,223		818,000		0.09	107,300		818,000		0.1
Manganese	**Nervous**	8,103		25,600		0.3	14,966		25,600		0.6
Naphthalene	**Nervous; Respiratory**	15.7	16.7	585	9.4E-07	0.03	4.06	16.7	585	2.4E-07	0.007
PCBs (total)		0.16	0.942		1.7E-07		1.22	0.942		1.3E-06	
Aroclor 1254	**Dermal; Immune; Ocular**	0.15	NE	14.7		0.01	0.65	NE	14.7		0.04
Trichloroethene	**Cardiovascular; Developmental; Immune**	0.13	6.04	18.7	2.2E-08	0.007	0.67	6.04	18.7	1.1E-07	0.04
Vanadium	**Dermal**	770		5,830		0.1	609		5,830		0.1
Zinc	**Hematologic; Immune**	12,633		350,000		0.04	2,630		350,000		0.008
					2E-05	↓				**1E-05**	↓

RSLs were obtained from the EPA Regional Screening Levels at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only. The carcinogenic risk is evaluated with total PCBs.

Total HI	Dermal	0
	Immune	0
	Cardiovascular	0
	Urinary	1
	Respiratory	0
	Nervous	0
	Developmental	0
	Hematologic	0
	Ocular	0
	None Specified	0

Total HI	Dermal	0
	Immune	0
	Cardiovascular	0
	Urinary	0
	Respiratory	0
	Nervous	1
	Developmental	0
	Hematologic	0
	Ocular	0
	None Specified	0

Table 15 - Parcel A3 (RWM)
Surface Soils
Construction Worker Risk Ratios

		120 Days	Outside Building Footprint (31.1 ac.)				60 Days	Inside Building Footprint (22.5 ac.)			
			Construction Worker					Construction Worker			
			SSLs		Risk Estimates			SSLs		Risk Estimates	
Parameter	**Target Organ**	**EPC mg/kg**	**Cancer**	**Non-Cancer**	**Risk**	**HQ**	**EPC mg/kg**	**Cancer**	**Non-Cancer**	**Risk**	**HQ**
Arsenic	**Cardiovascular; Dermal**	78.8	31.5	201	2.5E-06	0.4	104	63.0	401	1.7E-06	0.3
Benzo[a]anthracene		2.36	305		7.7E-09		3.33	575		5.8E-09	
Benzo[a]pyrene	**Developmental**	2.17	35.7	14.2	6.1E-08	0.2	2.73	70.4	21.6	3.9E-08	0.1
Benzo[b]fluoranthene		3.95	355		1.1E-08		4.51	700		6.4E-09	
Cadmium	**Urinary**	1,154	45,339	623	2.5E-08	2	41.0	78,861	1,236	5.2E-10	0.03
Chromium VI	**Respiratory**	1.70	44.8	1,668	3.8E-08	0.001	2.81	88.9	3,333	3.2E-08	0.0008
Cobalt	**None Specified**	11.1	9,068	1,967	1.2E-09	0.006	8.04	15,772	3,884	5.1E-10	0.002
Dibenz[a,h]anthracene		0.45	37.1		1.2E-08		0.24	74.2		3.2E-09	
Iron	**None Specified**	111,400		501,128		0.2	132,400		1,002,256		0.1
Manganese	**Nervous**	12,556		8,618		1	23,453		16,862		1
Naphthalene	**Nervous; Respiratory**	0.21	31.2	45.5	6.7E-09	0.005	0.90	46.4	67.5	1.9E-08	0.01
PCBs (total)		0.16	9.89		1.6E-08		1.22	17.1		7.1E-08	
Aroclor 1254	**Dermal; Immune; Ocular**	0.15	NE	15.6		0.01	0.65	NE	31.2		0.02
Trichloroethene	**Cardiovascular; Developmental; Immune**	0.07	12.3	1.45	5.7E-09	0.05	0.01	18.4	2.16	5.4E-10	0.005
Vanadium	**Dermal**	1,082		3,326		0.3	626		6,623		0.09
Zinc	**Hematologic; Immune**	30,390		214,769		0.1	5,319		429,538		0.01
					3E-06	↓				**2E-06**	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness

NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only. The carcinogenic risk is evaluated with total PCBs.

Total HI	Dermal	1
	Immune	0
	Cardiovascular	0
	Urinary	2
	Respiratory	0
	Nervous	1
	Developmental	0
	Hematologic	0
	Ocular	0
	None Specified	0

Total HI	Dermal	0
	Immune	0
	Cardiovascular	0
	Urinary	0
	Respiratory	0
	Nervous	1
	Developmental	0
	Hematologic	0
	Ocular	0
	None Specified	0

Table 16 - Parcel A3 (RWM)
Sub-Surface Soils
Construction Worker Risk Ratios

		120 Day	Outside Building Footprint (31.1 ac.)				60 Day	Inside Building Footprint (22.5 ac.)			
			Construction Worker					Construction Worker			
			SSLs		Risk Estimates			SSLs		Risk Estimates	
Parameter	**Target Organ**	**EPC mg/kg**	**Cancer**	**Non-Cancer**	**Risk**	**HQ**	**EPC mg/kg**	**Cancer**	**Non-Cancer**	**Risk**	**HQ**
Arsenic	**Cardiovascular; Dermal**	43.6	31.5	201	1.4E-06	0.2	9.44	63.0	401	1.5E-07	0.02
Benzo[a]anthracene		24.6	305		8.1E-08		8.45	575		1.5E-08	
Benzo[a]pyrene	**Developmental**	17.5	35.7	14.2	4.9E-07	1	6.31	70.4	21.6	9.0E-08	0.3
Benzo[b]fluoranthene		31.5	355		8.9E-08		9.07	700		1.3E-08	
Cadmium	**Urinary**	950	45,339	623	2.1E-08	2	25.1	78,861	1,236	3.2E-10	0.02
Chromium VI	**Respiratory**	0.60	44.8	1,668	1.3E-08	0.0004	0.81	88.9	3,333	9.1E-09	0.0002
Cobalt	**None Specified**	6.62	9,068	1,967	7.3E-10	0.003	13.9	15,772	3,884	8.8E-10	0.004
Dibenz[a,h]anthracene		0.15	37.1		4.0E-09		0.48	74.2		6.5E-09	
Iron	**None Specified**	35,652		501,128		0.07	79,381		1,002,256		0.08
Manganese	**Nervous**	2,450		8,618		0.3	12,501		16,862		0.7
Naphthalene	**Nervous; Respiratory**	29.8	31.2	45.5	9.6E-07	0.7	11.2	46.4	67.5	2.4E-07	0.2
Trichloroethene	**Cardiovascular; Developmental; Immune**	0.01	12.3	1.45	8.1E-10	0.007	2.19	18.4	2.16	1.2E-07	1
Vanadium	**Dermal**	155		3,326		0.05	588		6,623		0.09
Zinc	**Hematologic; Immune**	5,398		214,769		0.03	3,392		429,538		0.008
					3E-06	↓				**6E-07**	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002

Guidance Equation Input Assumptions:

- 5 cars/day (2 tons/car)
- 5 trucks/day (20 tons/truck)
- 3 meter source depth thickness

Total HI	Cardiovascular	0
	Dermal	0
	Urinary	2
	Respiratory	1
	Nervous	1
	Developmental	1
	Immune	0
	Hematologic	0
	None Specified	0

Total HI	Cardiovascular	1
	Dermal	0
	Urinary	0
	Respiratory	0
	Nervous	1
	Developmental	1
	Immune	1
	Hematologic	0
	None Specified	0

Table 17 - Parcel A3 (RWM)
Pooled Soils
Construction Worker Risk Ratios

		120 Day	Outside Building Footprint (31.1 ac.)				60 Day	Inside Building Footprint (22.5 ac.)			
			Construction Worker					Construction Worker			
			SSLs		Risk Estimates			SSLs		Risk Estimates	
Parameter	**Target Organ**	**EPC mg/kg**	**Cancer**	**Non-Cancer**	**Risk**	**HQ**	**EPC mg/kg**	**Cancer**	**Non-Cancer**	**Risk**	**HQ**
Arsenic	**Cardiovascular; Dermal**	42.5	31.5	201	1.3E-06	0.2	22.6	63.0	401	3.6E-07	0.06
Benzo[a]anthracene		13.4	305		4.4E-08		3.42	575		5.9E-09	
Benzo[a]pyrene	**Developmental**	9.67	35.7	14.2	2.7E-07	0.7	2.62	70.4	21.6	3.7E-08	0.1
Benzo[b]fluoranthene		17.5	355		4.9E-08		3.89	700		5.6E-09	
Cadmium	**Urinary**	565	45,339	623	1.2E-08	0.9	18.3	78,861	1,236	2.3E-10	0.01
Chromium VI	**Respiratory**	1.17	44.8	1,668	2.6E-08	0.0007	2.04	88.9	3,333	2.3E-08	0.0006
Cobalt	**None Specified**	8.45	9,068	1,967	9.3E-10	0.004	7.98	15,772	3,884	5.1E-10	0.002
Dibenz[a,h]anthracene		0.24	37.1		6.5E-09		0.33	74.2		4.4E-09	
Iron	**None Specified**	72,223		501,128		0.1	107,300		1,002,256		0.1
Manganese	**Nervous**	8,103		8,618		0.9	14,966		16,862		0.9
Naphthalene	**Nervous; Respiratory**	15.7	31.2	45.5	5.0E-07	0.3	4.06	46.4	67.5	8.8E-08	0.06
PCBs (total)		0.16	9.89		1.6E-08		1.22	17.1		7.1E-08	
Aroclor 1254	**Dermal; Immune; Ocular**	0.15	NE	15.6		0.01	0.65	NE	31.2		0.02
Trichloroethene	**Cardiovascular; Developmental; Immune**	0.13	12.3	1.45	1.1E-08	0.09	0.67	18.4	2.16	3.6E-08	0.3
Vanadium	**Dermal**	770		3,326		0.2	609		6,623		0.09
Zinc	**Hematologic; Immune**	12,633		214,769		0.06	2,630		429,538		0.006
					2E-06	↓				**6E-07**	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness

NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only.
The carcinogenic risk is evaluated with total PCBs.

Total HI	Dermal	0
	Immune	0
	Cardiovascular	0
	Urinary	1
	Respiratory	0
	Nervous	1
	Developmental	1
	Hematologic	0
	Ocular	0
	None Specified	0

Total HI	Dermal	0
	Immune	0
	Cardiovascular	0
	Urinary	0
	Respiratory	0
	Nervous	1
	Developmental	0
	Hematologic	0
	Ocular	0
	None Specified	0

Table 18a
Vapor Intrusion Criteria Comparison

Sample Location	Parameter	Result (ug/L)	Final Flag	Target Groundwater Concentration (ug/L) TCR=1E-05 or THQ=1	Comparison = Result / Target	Exceeds Criteria	Toxicity Type
RW-021-PZ	Cyanide	18		3.5	5.14	YES	NC
RW-025-PZ	Cyanide	4.5	J	3.5	1.29	YES	NC
RW19-PZM000	Cyanide	1330		3.5	380.00	YES	NC
RW20-PZM000	Cyanide	215		3.5	61.43	YES	NC

NC indicates non-carcinogenic
J: The positive result reported for this analyte is a quantitative estimate.

Table 18b
Cumulative Vapor Intrusion Criteria Comparison

				Inside Building Footprint (22.5 ac.)							
				RW-048-PZ		RW-050-PZ		RW10-PZM004		RW10-PZM020	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk
Cancer Risk											
1,4-Dioxane	SVOC		130,000	0.73	5.6E-11	0.034 J	2.6E-12	0.1 U	0	0.8	6.2E-11
Naphthalene	SVOC		200	0.027 B	1.4E-09	0.13	6.5E-09	1.5	7.5E-08	1.9	9.5E-08
1,1-Dichloroethane	VOC		330	1 U	0	1 U	0	1 U	0	1.7	5.2E-08
Benzene	VOC		69	1 U	0	2.8	4.1E-07	1 U	0	1.1	1.6E-07
Ethylbenzene	VOC		150	1 U	0	0.73 J	4.9E-08	1 U	0	1 U	0
Trichloroethene	VOC		74	1.5	2.0E-07	6.2	8.4E-07	4.2	5.7E-07	6.9	9.3E-07
Vinyl chloride	VOC		25	1 U	0	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Cancer Risk					2E-07		1E-06		6E-07		1E-06
Non-Cancer Hazard											
				Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ
Cyanide	Other	None Specified	3.5	10 U	0	10 U	0	10 U	0	10 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1.5	0.07	6.2	0.3	4.2	0.2	6.9	0.3
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0

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

Conc. = Concentration
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

Table 18b
Cumulative Vapor Intrusion Criteria Comparison

				Outside Building Footprint (31.1 ac.)							
				RW-002-PZ		RW-006-PZ		RW-011-PZ		RW-021-PZ	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk
Cancer Risk											
1,4-Dioxane	SVOC		130,000	0.13	1.0E-11	0.16	1.2E-11	0.051 J	3.9E-12	0.53	4.1E-11
Naphthalene	SVOC		200	0.033 B	1.7E-09	0.036 B	1.8E-09	6.4	3.2E-07	0.025 B	1.3E-09
1,1-Dichloroethane	VOC		330	0.25 J	7.6E-09	1 U	0	1 U	0	1 U	0
Benzene	VOC		69	1 U	0	1 U	0	0.58 J	8.4E-08	1 U	0
Ethylbenzene	VOC		150	1 U	0	1 U	0	1 U	0	1 U	0
Trichloroethene	VOC		74	1 U	0	1 U	0	1	1.4E-07	1 U	0
Vinyl chloride	VOC		25	1 U	0	1 U	0	0.41 J	1.6E-07	1 U	0
Cumulative Vapor Intrusion Cancer Risk					9E-09		2E-09		7E-07		1E-09
Non-Cancer Hazard											
				Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ
Cyanide	Other	None Specified	3.5	10 U	0	10 U	0	10 U	0	18	5
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		5
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	1 U	0	1	0.05	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0

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

Conc. = Concentration
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

Table 18b
Cumulative Vapor Intrusion Criteria Comparison

				Outside Building Footprint (31.1 ac.)							
				RW-025-PZ		RW-027-PZ		RW02-PZM000		RW02-PZM020	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk
Cancer Risk											
1,4-Dioxane	SVOC		130,000	0.53	4.1E-11	0.92	7.1E-11	0.1 U	0	0.15	1.2E-11
Naphthalene	SVOC		200	1.1	5.5E-08	0.027 B	1.4E-09	0.1 U	0	0.09 J	4.5E-09
1,1-Dichloroethane	VOC		330	40.7	1.2E-06	0.4 J	1.2E-08	1 U	0	0.3 J	9.1E-09
Benzene	VOC		69	1 U	0	1 U	0	1 U	0	1 U	0
Ethylbenzene	VOC		150	2.7	1.8E-07	1 U	0	1 U	0	1 U	0
Trichloroethene	VOC		74	1 U	0	1 U	0	1 U	0	1 U	0
Vinyl chloride	VOC		25	0.21 J	8.4E-08	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Cancer Risk					2E-06		1E-08		0E+00		1E-08
Non-Cancer Hazard											
				Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ
Cyanide	Other	None Specified	3.5	4.5 J	1	10 U	0	10 U	0	10 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					1		0		0		0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0

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

Conc. = Concentration
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

Table 18b
Cumulative Vapor Intrusion Criteria Comparison

				Outside Building Footprint (31.1 ac.)							
				RW07-PZM004		RW07-PZM017		RW19-PZM000		RW19-PZM020	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk
Cancer Risk											
1,4-Dioxane	SVOC		130,000	0.1 UJ	0	1.8	1.4E-10	0.1 U	0	0.28	2.2E-11
Naphthalene	SVOC		200	0.058 J	2.9E-09	2.1	1.1E-07	0.023 B	1.2E-09	0.031 B	1.6E-09
1,1-Dichloroethane	VOC		330	4.8	1.5E-07	7.3	2.2E-07	1 U	0	1 U	0
Benzene	VOC		69	1 U	0	1 U	0	1 U	0	1 U	0
Ethylbenzene	VOC		150	1 U	0	1 U	0	1 U	0	1 U	0
Trichloroethene	VOC		74	1 U	0	0.53 J	7.2E-08	1 U	0	1 U	0
Vinyl chloride	VOC		25	1 U	0	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Cancer Risk					2E-07		4E-07		1E-09		2E-09
Non-Cancer Hazard											
				Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ
Cyanide	Other	None Specified	3.5	10 U	0	10 U	0	1,330	380	10 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		380		0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	0.53 J	0.02	1 U	0	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0

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

Conc. = Concentration
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

Table 18b
Cumulative Vapor Intrusion Criteria Comparison

				Outside Building Footprint (31.1 ac.)			
				RW20-PZM000		RW20-PZM020	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Cancer Risk	Conc. (ug/L)	Cancer Risk
Cancer Risk							
1,4-Dioxane	SVOC		130,000	0.53	4.1E-11	0.38	2.9E-11
Naphthalene	SVOC		200	0.1 U	0	0.089 J	4.5E-09
1,1-Dichloroethane	VOC		330	1 U	0	1 U	0
Benzene	VOC		69	1 U	0	1 U	0
Ethylbenzene	VOC		150	1 U	0	1 U	0
Trichloroethene	VOC		74	0.6 J	8.1E-08	0.69 J	9.3E-08
Vinyl chloride	VOC		25	1 U	0	1 U	0
Cumulative Vapor Intrusion Cancer Risk					8E-08		1E-07
Non-Cancer Hazard							
				Conc. (ug/L)	Non-Cancer HQ	Conc. (ug/L)	Non-Cancer HQ
Cyanide	Other	None Specified	3.5	215	61	10 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					61		0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	0.6 J	0.03	0.69 J	0.03
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0

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

Conc. = Concentration
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

Table 19
Ambient Water Quality Criteria Comparison

Sample Location	Parameter	Result (ug/L)	Final Flag	Consumption of Organism Only (ug/L)	Comparison= Result / Target	Exceeds Consumption of Organism Only	Salt Water Chronic (ug/L)	Comparison = Result / Target	Exceeds Salt Water Chronic
RW-011-PZ	Arsenic, Dissolved	6.4		1.4	4.57	YES	36	0.18	no
RW-011-PZ	Benzo[a]anthracene	0.054	J	0.18	0.30	no	0.027	2.00	YES
RW-011-PZ	Benzo[a]pyrene	0.021	J	0.18	0.12	no	0.014	1.50	YES
RW-011-PZ	Aluminum, Dissolved	540		N/A	0.00	no	87	6.21	YES
RW-011-PZ	Naphthalene	6.4		N/A	0.00	no	1.4	4.57	YES
RW-011-PZ	Vanadium, Dissolved	114		N/A	0.00	no	50	2.28	YES
RW-025-PZ	Arsenic, Dissolved	10.1		1.4	7.21	YES	36	0.28	no
RW-025-PZ	Benzo[a]anthracene	0.035	J	0.18	0.19	no	0.027	1.30	YES
RW-025-PZ	Cyanide	4.5	J	140	0.03	no	1	4.50	YES
RW-025-PZ	Aluminum, Dissolved	1,540		N/A	0.00	no	87	17.7	YES
RW19-PZM000	Arsenic	14.6	J	1.4	10.4	YES	36	0.41	no
RW19-PZM000	Cyanide	1,330		140	9.50	YES	1	1,330	YES
RW19-PZM000	Thallium	4.2	B	0.47	8.94	YES	17	0.25	no
RW19-PZM000	Vanadium	260		N/A	0.00	no	50	5.20	YES
RW19-PZM000	Aluminum	248		N/A	0.00	no	87	2.85	YES
RW19-PZM000	Cobalt	1.5	J	N/A	0.00	no	1	1.50	YES
RW19-PZM000	Copper	4.2	B	N/A	0.00	no	3.1	1.35	YES
RW19-PZM020	Zinc	7,000		26000	0.27	no	81	86.4	YES
RW19-PZM020	Nickel	12.6		4600	0.00	no	8.2	1.54	YES
RW19-PZM020	Cobalt	38.5		N/A	0.00	no	1	38.5	YES
RW19-PZM020	Iron	37,000		N/A	0.00	no	1000	37	YES
RW19-PZM020	Manganese	2,580		N/A	0.00	no	100	25.8	YES
RW19-PZM020	Cadmium	41.9		N/A	0.00	no	8.8	4.76	YES
RW19-PZM020	Copper	12		N/A	0.00	no	3.1	3.87	YES
RW19-PZM020	Silver	0.62	B	N/A	0.00	no	0.36	1.72	YES
RW20-PZM000	Arsenic	118		1.4	84.3	YES	36	3.28	YES
RW20-PZM000	Cyanide	215		140	1.54	YES	1	215	YES
RW20-PZM000	Aluminum	315		N/A	0.00	no	87	3.62	YES
RW20-PZM000	Vanadium	71		N/A	0.00	no	50	1.42	YES
RW20-PZM020	Zinc	82,800		26000	3.18	YES	81	1,022	YES
RW20-PZM020	Arsenic	3.7	J	1.4	2.64	YES	36	0.10	no
RW20-PZM020	Nickel	40		4600	0.01	no	8.2	4.88	YES
RW20-PZM020	Iron	226,000		N/A	0.00	no	1000	226	YES
RW20-PZM020	Manganese	9,210		N/A	0.00	no	100	92.1	YES
RW20-PZM020	Cobalt	53.1		N/A	0.00	no	1	53.1	YES
RW20-PZM020	Silver	4.5	J	N/A	0.00	no	0.36	12.5	YES
RW20-PZM020	Copper	6		N/A	0.00	no	3.1	1.94	YES

N/A indicates no criteria
Highlight indicates exceedance of criteria
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

APPENDIX A

TRADEPOINT ATLANTIC
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219

July 8, 2016

Maryland Department of Environment
1800 Washington Boulevard
Baltimore MD, 21230

Attention: Ms. Barbara Brown

Subject: Request to Enter Temporary CHS Review
Tradepoint Atlantic Parcel A-3

Dear Ms. Brown:

The conduct of any environmental assessment and cleanup activities on the Tradepoint Atlantic property, as well as any associated development, is subject to the requirements outlined in the following agreements:

- 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).

On September 11, 2014, Tradepoint Atlantic submitted an application to the Maryland Department of the Environment's (Department) Voluntary Cleanup Program (VCP). Parcel A-3 is part of the acreage that remains subject to the Multimedia Consent Decree between Bethlehem Steel Corporation, the United States Environmental Protection Agency (EPA), and the Department (effective October 8, 1997), as amended.

In consultation with the Department, Tradepoint Atlantic affirms that it desires to accelerate the assessment, remediation and redevelopment of certain sub-parcels within the larger site due to current market conditions. To that end, the Department and Tradepoint Atlantic agree that the Controlled Hazardous Substance (CHS) Act (Section 7-222 of the Environment Article) and the CHS Response Plan (COMAR 26.14.02) shall serve as the governing statutory and regulatory authority for completing the development activities on Parcel A-3 and complement the statutory requirements of the Voluntary Cleanup Program (Section 7-501 of the Environment Article). Upon submission of a Site Response and Development Work Plan and completion of the remedial activities for the sub-parcel, the Department shall issue a "No Further Action" letter upon a recordation of an environmental covenant describing any necessary land use controls for the specific sub-parcel. At such time that all the sub-parcels within the

TRADEPOINT ATLANTIC
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219

larger parcel have completed remedial activities, Tradepoint Atlantic shall submit to the Department a request for issuing a Certificate of Completion (COC) as well as all pertinent information concerning completion of remedial activities conducted on the parcel. Once the VCP has completed its review of the submitted information it shall issue a COC for the entire parcel described in Tradepoint Atlantic's VCP application.

Alternatively, Tradepoint Atlantic or other entity may elect to submit an application for a specific sub-parcel and submit it to the VCP for review and acceptance. If the application is received after the cleanup and redevelopment activities described in this work plan are implemented and a No Further Action letter is issued by the Department pursuant to the CHS Act, the VCP shall prepare a No Further Requirements Determination for the sub-parcel.

If Tradepoint Atlantic or other entity has not carried out cleanup and redevelopment activities described in the work plan, the cleanup and redevelopment activities may be conducted under the oversight authority of either the VCP or the CHS Act, so long as those activities comport with this work plan.

Engineering and institutional controls approved as part of this Site Response and Development Work Plan shall be described in documentation submitted to the Department demonstrating that the exposure pathways on the sub-parcel are addressed in a manner that protects public health and the environment. This information shall support Tradepoint Atlantic's request for the issuance of a COC for the larger parcel.

Please do not hesitate to contact Tradepoint Atlantic for further information.

Thank you,

Justin Dunn
Director of Development
1600 Sparrows Point Boulevard
Baltimore, MD 21219

APPENDIX B


RW-059-SB-1
Arsenic: 235
Lead: 3,130 J
RW-059-SB-3
Arsenic: 6.4
RW-059-SB-6
Arsenic: 4.3
RW-058-SB-1
Arsenic: 80.6 J
RW-058-SB-2
Arsenic: 8.9 J
RW-058-SB-8
RW-065-SB-1
Arsenic: 7.9
RW-065-SB-5
Arsenic: 6.6
RW-065-SB-9
Arsenic: 3.1
RW-063-SB-1
Arsenic: 4.4
RW-063-SB-5
Arsenic: 8.5
RW-063-SB-8
RW-064-SB-1
Arsenic: 9.6
Manganese: 27,400 E
RW-064-SB-5
Arsenic: 17.9
RW-064-SB-8
Arsenic: 5.7
RW-070-SB-1
Arsenic: 14.3
RW-070-SB-3
Arsenic: 184
RW-070-SB-7
Arsenic: 12.2
RW-057-SB-1
Arsenic: 31.8
Cadmium: 1,420 J
Lead: 1,730
RW-057-SB-3
Arsenic: 6.4
Cadmium: 1,290 J
RW-057-SB-6
Arsenic: 3.2
RW-067-SB-1
Arsenic: 5.2
RW-067-SB-2
Arsenic: 8.7
RW-067-SB-8
RW-066-SB-1
RW-066-SB-4
Arsenic: 4.4
RW-066-SB-6
RW-062-SB-1
Arsenic: 15.1 J
Lead: 901 J
RW-062-SB-3
Arsenic: 4.3 J
RW-062-SB-10
Arsenic: 8.6 J
RW-061-SB-1
Arsenic: 5.6 J
RW-061-SB-2
Arsenic: 3.9
RW-061-SB-7
Arsenic: 11.3
RW-060-SB-1
RW-060-SB-4
Arsenic: 4.7
RW-060-SB-7
Arsenic: 5.0
RW-069-SB-1
Arsenic: 199
RW-069-SB-3
Arsenic: 6.9
Cadmium: 3,530
RW-069-SB-10
Arsenic: 3.1 D6
RW-068-SB-1
Arsenic: 4.1
RW-068-SB-5
Arsenic: 32.8
Cadmium: 1,170
RW-068-SB-7
Arsenic: 46.9
Cadmium: 1,310
Development Area
Note:
Only 0 to 10 foot samples were used in the risk analysis
Parcel A3 (Rod & Wire Mill)
PDI Soil Inorganic Exceedances (mg/kg)
November 3, 2016
Figure
App-1
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 160443M-1
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Remedial Design Boring
Parcel A3 (RWM) boundary


RW-063-PZ
Antimony (T): 8.6
Arsenic (T): 60.2
Cadmium (T): 434
Cobalt (T): 76.3
Iron (T): 159,000 J
Manganese (T): 26,600
Zinc (T): 592,000 J
RW07-PZM017
Antimony (T): 7.3
Cadmium (T): 9,780
Cobalt (T): 144
Iron (T): 283,000
Manganese (T): 17,500
Zinc (T): 387,000
RW-057-PZ
Antimony (T): 17.9
Arsenic (T): 12.0
Cadmium (T): 44,500
Cobalt (T): 238
Iron (T): 134,000 J
Manganese (T): 16,400
Zinc (T): 658,000 J
RW19-PZM020
Cadmium (T): 41.9
Cobalt (T): 38.5
Iron (T): 37,000
Manganese (T): 2,580
Zinc (T): 7,000
RW-067-PZ
Antimony (T): 16.3
Cadmium (T): 311
Cobalt (T): 142
Iron (T): 400,000 J
Manganese (T): 28,200
Zinc (T): 784,000 J
RW-070-PZ
Cobalt (T): 13.0
Iron (T): 713,000 J
Manganese (T): 33,300
Zinc (T): 65,400 J
RW02-PZM020
Antimony (T): 11.0
Cadmium (T): 47.2
Cobalt (T): 113
Iron (T): 443,000
Manganese (T): 19,000
Zinc (T): 576,000
RW10-PZM020
Antimony (T): 7.9
Cadmium (T): 10,200
Cobalt (T): 114
Iron (T): 202,000
Manganese (T): 18,000
Zinc (T): 509,000
RW20-PZM020
Cobalt (T): 53.1
Iron (T): 226,000
Manganese (T): 9,210
Zinc (T): 82,800
Development Area
Parcel A3 (Rod & Wire Mill)
PDI Groundwater Inorganic Exceedances (ug/L)
Intermediate Hydrogeologic Zone
November 3, 2016
Figure
App-2
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 150298M
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 75 150 300
Feet
Existing Site-wide Well (Intermediate)
Remedial Design Piezometer (Intermediate)
Parcel A3 (RWM) boundary
(T) = Total Metals
(D) = Dissolved Metals

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-057-SB-1	RW-057-SB-3	RW-057-SB-6	RW-057-SB-15	RW-057-SB-16	RW-057-SB-23	RW-057-SB-29	RW-057-SB-32
Validated Metals										
Arsenic	mg/kg	3	**31.8**	**6.4**	**3.2**	**9.3**	**1.9 J**	**1.8 J**	2.2 U	1.9 U
Barium	mg/kg	220,000	**1,670 J**	**454 J**	**13.6 J**	**20.7 J**	**24.2 J**	**62.2 J**	**1.7 B**	**29.4 J**
Cadmium	mg/kg	980	**1,420 J**	**1,290 J**	**10.3 J**	**164 J**	**323 J**	**6.9 J**	**5.2 J**	**76.3 J**
Chromium	mg/kg	120,000	**16.3 J**	**22.9 J**	**6.9 J**	**10.5 J**	**13.3 J**	**38.3 J**	**1.1 J**	**27.1 J**
Lead	mg/kg	800	**1,730**	**743**	**4.5**	**5**	**6.3**	**13**	2.2 U	**6.3**
Mercury	mg/kg	350	0.12 U	**0.085 J**	**0.0089 J**	**0.0087 J**	**0.017 J**	**0.03 J**	0.11 U	**0.0064 J**
Selenium	mg/kg	5,800	4.3 U	**2.5 B**	3.2 U	4.6 U	3.8 U	3.5 U	3.5 U	3 U
Silver	mg/kg	5,800	**4.5**	**1.7 J**	2.4 U	3.5 U	2.8 U	2.6 U	2.6 U	2.3 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**32,300 E**	**17700**	**4740**	**5700**	**6380**	**14900**	**417**	**5820**
Antimony	mg/kg	470	**2.6 J**	3.2 U	2.4 U	3.5 U	2.8 U	2.6 U	2.6 U	2.3 U
Beryllium	mg/kg	2,300	**2.3**	**0.85 J**	**0.17 J**	**0.27 J**	**0.31 J**	**0.81 J**	0.87 U	**0.38 J**
Cobalt	mg/kg	350	**3.3 J**	**5.8**	**1.6 J**	**6.7**	**2.3 J**	**11.1**	4.4 U	**6.2**
Copper	mg/kg	47,000	**237**	**90.1**	**4.8**	**5.9**	**7.8**	**17.7**	4.4 U	**12.8**
Iron	mg/kg	820,000	**31,400 E**	**18200**	**7340**	**6460**	**4520**	**22,800 E**	**899**	**3800**
Manganese	mg/kg	26,000	**6,840 E**	**3,150 E**	**38.9**	**39**	**41.4**	**151**	**4.7**	**36.3**
Nickel	mg/kg	22,000	**14.3**	**13**	**3.2 J**	**7.4 J**	**5.7 J**	**30.6**	8.7 U	**19.9**
Thallium	mg/kg	12	10.8 U	10.7 U	8 U	11.5 U	9.5 U	8.8 U	8.7 U	7.6 U
Vanadium	mg/kg	5,800	**607**	**107**	**12.6**	**12.9**	**16.8**	**48.1**	**1.5 J**	**21.1**
Zinc	mg/kg	350,000	**49,700 E**	**29,700 E**	**885**	**820**	**1050**	**1170**	**84.3**	**685**

Detections in bold

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

UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.

E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-058-SB-1	RW-058-SB-2	RW-058-SB-8	RW-058-SB-15	RW-058-SB-20	RW-058-SB-22	RW-058-SB-28	RW-058-SB-32
Validated Metals										
Arsenic	mg/kg	3	**80.6 J**	**8.9 J**	**2.5**	**4.9 J**	2.2 U	**6.2 J**	**1.6 B**	**5.8 J**
Barium	mg/kg	220,000	**216**	**53.7**	**27**	**16.2**	**11.5**	**36.3**	**33**	**107**
Cadmium	mg/kg	980	**91.5 J**	**32 J**	**17.4**	**4.9 J**	**0.32 B**	**1.5 J**	**54.3 J**	**0.41 B**
Chromium	mg/kg	120,000	**37.5 J**	**15.9 J**	**11.9**	**10.6 J**	**7.7 J**	**24.5 J**	**23.1 J**	**46 J**
Lead	mg/kg	800	**29.8 J**	**10.7 J**	**4.6**	**3.4 J**	**3.6 J**	**9.6 J**	**6.6 J**	**8.9 J**
Mercury	mg/kg	350	**0.19**	**0.062 J**	**0.0047 J**	**0.016 J**	**0.0029 J**	**0.026 J**	**0.0062 J**	**0.045 J**
Selenium	mg/kg	5,800	3.3 U	3 U	3.5 U	4.7 U	3.5 U	3.3 U	2.9 U	5.1 U
Silver	mg/kg	5,800	2.5 U	2.3 U	2.6 U	3.5 U	2.6 U	2.5 U	2.2 U	3.8 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**21,500 E**	**11100**	**9230**	**6770**	**4510**	**9140**	**9420**	**11200**
Antimony	mg/kg	470	2.5 U	2.3 U	2.6 U	3.5 U	2.6 U	2.5 U	2.2 U	3.8 U
Beryllium	mg/kg	2,300	**1.7**	**0.42 J**	**0.35 J**	**0.21 J**	0.88 U	**0.37 J**	**0.42 J**	**2**
Cobalt	mg/kg	350	**10.8**	**5.3**	**2.4 J**	**1.5 J**	**1.1 J**	**2.8 J**	**4.2**	**38**
Copper	mg/kg	47,000	**34.9**	**7.4**	**9.4**	**11.6**	**4.7**	**12.7**	**7.4**	**33.4**
Iron	mg/kg	820,000	**30,200 E**	**15,400 E**	**6890**	**10100**	**4630**	**28,800 E**	**16,100 E**	**11900**
Manganese	mg/kg	26,000	**569**	**246**	**48.1**	**28**	**35.1**	**106**	**79.1**	**49.6**
Nickel	mg/kg	22,000	**20.8**	**7.6**	**9**	**4.2 J**	**3.2 J**	**10.6**	**10.8**	**35.6**
Thallium	mg/kg	12	8.3 U	7.6 U	8.7 U	11.7 U	8.8 U	8.2 U	7.4 U	12.7 U
Vanadium	mg/kg	5,800	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/kg	350,000	**1,720 E**	**709**	**342**	**210**	**348**	**885**	**738**	**78.4**

Detections in bold

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

UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.

E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-059-SB-1	RW-059-SB-3	RW-059-SB-6	RW-059-SB-11	RW-059-SB-20	RW-059-SB-23	RW-059-SB-26	RW-059-SB-34
Validated Metals										
Arsenic	mg/kg	3	**235**	**6.4**	**4.3**	**2.2**	2.9 U	**24.3**	3.3 U	**2.7 B**
Barium	mg/kg	220,000	**946**	**166 J**	**16.3 J**	**10.8 J**	**8.8 J**	**78.3 J**	**130 J**	**67.2 J**
Cadmium	mg/kg	980	**226**	**38.2 J**	**1.6 J**	**8.5 J**	**64.9 J**	**180 J**	**29.1 J**	**36.7 J**
Chromium	mg/kg	120,000	**115 J**	**16.2 J**	**9.9 J**	**5 J**	**6.9 J**	**67.1 J**	**35.6 J**	**50.2 J**
Lead	mg/kg	800	**3,130 J**	**363**	**4.8**	**2.7**	2.9 U	**27.8**	**21.7**	**13.1**
Mercury	mg/kg	350	**0.12**	**0.75**	**0.015 J**	**0.0045 J**	**0.0087 J**	**0.044 J**	**0.021 J**	**0.047 J**
Selenium	mg/kg	5,800	**3 J**	3.5 U	4.4 U	2.6 U	4.6 U	5.1 U	5.2 U	**2.6 B**
Silver	mg/kg	5,800	2.4 U	**2 J**	3.3 U	2 U	3.4 U	3.8 U	3.9 U	3.4 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**34,800 E**	**7030**	**6630**	**2810**	**2040**	**17300**	**19100**	**12300**
Antimony	mg/kg	470	2.4 U	2.6 U	3.3 U	2 U	3.4 U	3.8 U	3.9 U	3.4 U
Beryllium	mg/kg	2,300	**2.6**	**0.59 J**	1.1 U	**0.15 J**	1.1 U	**0.79 J**	**2.4**	**2.2**
Cobalt	mg/kg	350	**3.3 J**	**2.2 J**	**1.2 J**	**0.61 J**	**1.2 J**	**11.8**	**18.9**	**36.8**
Copper	mg/kg	47,000	**228**	**105**	**7.1**	**7.3**	5.7 U	**345**	**22.2**	**28.4**
Iron	mg/kg	820,000	**20,500 E**	**10500**	**8950**	**2380**	**1180**	**17700**	**17500**	**16400**
Manganese	mg/kg	26,000	**9,550 E**	**294**	**104**	**22.4**	**26.9**	**148**	**162**	**79.6**
Nickel	mg/kg	22,000	**18.6**	**8.1 J**	**3.2 J**	**1.9 J**	**1.9 J**	**22.5**	**44.8**	**40.7**
Thallium	mg/kg	12	8 U	8.7 U	11.1 U	6.5 U	11.5 U	12.7 U	13.1 U	11.4 U
Vanadium	mg/kg	5,800	**645**	**17.2**	**15.4**	**9.8**	**6.8**	**36.9**	**52.6**	**67**
Zinc	mg/kg	350,000	**17,600 E**	**5,300 E**	**565**	**147**	**1110**	**3,850 E**	**699**	**1390**

Detections in bold

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UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.

E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-060-SB-1	RW-060-SB-4	RW-060-SB-7	RW-060-SB-12	RW-060-SB-20	RW-060-SB-22	RW-060-SB-26	RW-060-SB-33
Validated Metals										
Arsenic	mg/kg	3	**2.3 J**	**4.7**	**5**	**2.1 J**	**8**	**3**	**3.3**	**4.6**
Barium	mg/kg	220,000	**49.2**	**26**	**1,590**	**38.4**	**18.5**	**67**	**6.4 J**	**58.4**
Cadmium	mg/kg	980	**3.4**	**11.9**	**23.1**	**17.1**	**23**	**1.2 B**	**0.58 B**	**183**
Chromium	mg/kg	120,000	**3 B**	**10.7**	**27.1**	**16.1**	**10.5**	**40**	**5.1**	**36.7**
Lead	mg/kg	800	**150**	**243**	**23.8**	**8**	**2.7**	**14.9**	2.6 U	**7.8**
Mercury	mg/kg	350	**0.14**	**0.02 J**	**0.0037 J**	**0.039 J**	**0.0095 J**	**0.026 J**	0.11 U	**0.03 J**
Selenium	mg/kg	5,800	4 U	3.6 U	3.8 U	4.1 U	3.6 U	3.4 U	4.2 U	3 U
Silver	mg/kg	5,800	3 U	2.7 U	2.9 U	3 U	2.7 U	2.6 U	3.2 U	2.3 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**1060**	**5880**	**16100**	**10400**	**3860**	**14400**	**1130**	**9600**
Antimony	mg/kg	470	3 U	2.7 U	2.9 U	**2.2 J**	2.7 U	2.6 U	3.2 U	2.3 U
Beryllium	mg/kg	2,300	1 U	**0.15 J**	**0.54 J**	**0.39 J**	**0.47 J**	**2**	1.1 U	**0.52 J**
Cobalt	mg/kg	350	5 U	**1.7 J**	**4.5 J**	**7.2**	**9.1**	**19**	5.3 U	**8.8**
Copper	mg/kg	47,000	**9.2**	**17.2**	**12.5**	**11.3**	**5.9**	**21.8**	**2.4 J**	**19.3**
Iron	mg/kg	820,000	**2200**	**12700**	**14800**	**7920**	**4950**	**19,700 E**	**10200**	**9260**
Manganese	mg/kg	26,000	**17.3**	**37**	**88.5**	**75.3**	**34.4**	**194**	**28.3**	**47.8**
Nickel	mg/kg	22,000	10 U	**5 J**	**11.5**	**17.4**	**10.4**	**35.1**	**1 J**	**16.7**
Thallium	mg/kg	12	10 U	9.1 U	9.5 U	10.2 U	8.9 U	8.5 U	10.6 U	7.6 U
Vanadium	mg/kg	5,800	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/kg	350,000	**88.2**	**188**	**1090**	**362**	**883**	**4,040 E**	**67.4**	**824**

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D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-061-SB-1	RW-061-SB-2	RW-061-SB-7	RW-061-SB-11	RW-061-SB-19	RW-061-SB-21	RW-061-SB-29	RW-061-SB-34
Validated Metals										
Arsenic	mg/kg	3	**5.6 J**	**3.9**	**11.3**	2.2 U	**2.3 J**	**5**	**6.8**	3.4 U
Barium	mg/kg	220,000	**676**	**75.1**	**35.3**	**39.6**	**76.6**	**66.5**	**54.4**	**43**
Cadmium	mg/kg	980	**210 J**	**8.3**	**1.1 B**	**7.8**	**3**	**0.56 B**	**73.9**	2 U
Chromium	mg/kg	120,000	**57.5 J**	**12.5**	**25.1**	**18.2**	**43.1**	**36.8**	**43.6**	**37.9 J**
Lead	mg/kg	800	**677 J**	**102**	**12.7**	**16.6**	**13.8**	**13.4**	**12.5**	**8.5 J**
Mercury	mg/kg	350	0.12 U	**0.48**	**0.029 J**	**0.02 J**	**0.02 J**	**0.026 J**	**0.028 J**	**0.021 J**
Selenium	mg/kg	5,800	**2 B**	3.1 U	3.9 U	3.5 U	4.3 U	5.2 U	3.8 U	5.4 U
Silver	mg/kg	5,800	2.4 U	2.3 U	3 U	2.6 U	3.2 U	3.9 U	2.9 U	4.1 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**39,100 E**	**6810**	**13100**	**10200**	**13700**	**13800**	**12000**	**9110**
Antimony	mg/kg	470	2.4 U	2.3 U	3 U	2.6 U	3.2 U	3.9 U	2.9 U	4.1 U
Beryllium	mg/kg	2,300	**2.8**	**0.53 J**	**0.52 J**	**0.39 J**	**0.79 J**	**1.6**	**0.61 J**	**1.3 J**
Cobalt	mg/kg	350	**3.5 J**	**7.4**	**3.1 J**	**3.9 J**	**6.5**	**15.3**	**43**	**9.3**
Copper	mg/kg	47,000	**179**	**89.4**	**15.2**	**14.2**	**23.8**	**20**	**30**	**19.4**
Iron	mg/kg	820,000	**17,500 E**	**8060**	**19,900 E**	**6160**	**30,300 E**	**24100**	**7510**	**56,700 E**
Manganese	mg/kg	26,000	**7,310 E**	**191**	**61.1**	**50.2**	**170**	**156**	**68.1**	**379**
Nickel	mg/kg	22,000	**13.7**	**10.7**	**10.9**	**11.1**	**18.8**	**29**	**31**	**18.1**
Thallium	mg/kg	12	8 U	7.7 U	9.8 U	8.7 U	10.7 U	12.9 U	9.5 U	13.5 U
Vanadium	mg/kg	5,800	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/kg	350,000	**14,700 E**	**952**	**1000**	**284**	**2,960 E**	**127**	**1670**	**70.3**

Detections in bold

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D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-062-SB-1	RW-062-SB-3	RW-062-SB-10	RW-062-SB-15	RW-062-SB-20	RW-062-SB-22	RW-062-SB-30	RW-062-SB-32
Validated Metals										
Arsenic	mg/kg	3	**15.1 J**	**4.3 J**	**8.6 J**	**5.9 J**	**2.2 J**	3 U	**4.2**	**3.5**
Barium	mg/kg	220,000	**1,180**	**32.8**	**59.7**	**38**	**8.9**	**64.6**	**4.3 J**	**73.8**
Cadmium	mg/kg	980	**10.7 J**	1.4 U	1.4 U	**3.7 J**	**3.3 J**	**0.22 B**	**1.9**	**16**
Chromium	mg/kg	120,000	**165 J**	**14.9 J**	**23.8 J**	**17 J**	**7.9 J**	**35.3 J**	**9.2**	**50**
Lead	mg/kg	800	**901 J**	**16.3 J**	**13.3 J**	**9.6 J**	**1.5 J**	**12 J**	2.4 U	**9.7**
Mercury	mg/kg	350	**0.37**	**0.079 J**	**0.016 J**	**0.022 J**	**0.007 J**	**0.022 J**	0.1 U	**0.034 J**
Selenium	mg/kg	5,800	4.4 U	3.7 U	3.7 U	3.4 U	3.1 U	4.8 U	3.8 U	4.2 U
Silver	mg/kg	5,800	**1 B**	2.8 U	2.8 U	2.5 U	2.3 U	3.6 U	2.9 U	3.2 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**12400**	**9110**	**14100**	**9760**	**2330**	**12800**	**611**	**12600**
Antimony	mg/kg	470	**3.3**	2.8 U	2.8 U	**1.3 J**	2.3 U	3.6 U	2.9 U	3.2 U
Beryllium	mg/kg	2,300	**1.1 J**	**0.3 J**	**0.52 J**	**0.46 J**	**0.25 J**	**2**	0.96 U	**2.2**
Cobalt	mg/kg	350	**6.3**	**7.6**	**4.4 J**	**5.5**	**0.98 J**	**16.3**	4.8 U	**8.8**
Copper	mg/kg	47,000	**304**	**7.3**	**11.5**	**11.5**	**3.9**	**19.5**	4.8 U	**19.3**
Iron	mg/kg	820,000	**45,100 E**	**13500**	**15600**	**9490**	**4610**	**41,800 E**	**4450**	**16200**
Manganese	mg/kg	26,000	**2,320 E**	**148**	**35**	**61.2**	**27.2**	**578**	**6**	**89**
Nickel	mg/kg	22,000	**41.5**	**6.7 J**	**10.8**	**14**	**2.6 J**	**35**	9.6 U	**20.4**
Thallium	mg/kg	12	11.1 U	9.3 U	9.3 U	8.4 U	7.7 U	12.1 U	9.6 U	10.6 U
Vanadium	mg/kg	5,800	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/kg	350,000	**1520**	**625**	**35.7**	**359**	**491**	**874**	**66.5**	**855**

Detections in bold

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E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-063-SB-1	RW-063-SB-5	RW-063-SB-8	RW-063-SB-13	RW-063-SB-19	RW-063-SB-25	RW-063-SB-30	RW-063-SB-34
Validated Metals										
Arsenic	mg/kg	3	**4.4**	**8.5**	**2.8 B**	**2.6 B**	3.3 U	**3.6**	**15.4**	**3.5**
Barium	mg/kg	220,000	**71.2**	**129**	**30.4**	**38**	**31.1**	**64.6**	**82**	**18.4**
Cadmium	mg/kg	980	**6.8**	**53.5 J**	**57.5 J**	1.7 UJ	**3.9 J**	1.6 UJ	1.8 UJ	**2 J**
Chromium	mg/kg	120,000	**19.6**	**55.8**	**7.6**	**16.5**	**14.7**	**36.8**	**38.7**	**20.3**
Lead	mg/kg	800	**75.4 J**	**297 J**	**15.3 J**	**7.6 J**	**7.3 J**	**12.3 J**	**20.6 J**	**6.5 J**
Mercury	mg/kg	350	**0.39**	**0.25**	**1.5**	**0.0053 J**	**0.011 J**	**0.036 J**	**0.021 J**	**0.0089 J**
Selenium	mg/kg	5,800	3.6 U	3.6 U	4.6 U	4.4 U	5.3 U	4.2 U	4.9 U	3.3 U
Silver	mg/kg	5,800	2.7 U	**0.91 B**	3.5 U	3.3 U	4 U	3.2 U	3.7 U	2.4 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**8130**	**10800**	**3550**	**10700**	**7490**	**16300**	**20500**	**6300**
Antimony	mg/kg	470	2.7 U	2.7 U	3.5 U	3.3 U	4 U	3.2 U	3.7 U	2.4 U
Beryllium	mg/kg	2,300	**0.48 J**	**0.57 J**	1.2 U	**0.31 J**	**0.25 J**	**0.8 J**	**1.5**	**0.33 J**
Cobalt	mg/kg	350	**4.6**	**6.3**	**1.9 J**	**4.5 J**	**3.2 J**	**18.5**	**22.4**	**2.2 J**
Copper	mg/kg	47,000	**21.6**	**112**	**10.1**	**10.8**	**6.9**	**20.2**	**23**	**4 J**
Iron	mg/kg	820,000	**13400**	**36,400 E**	**3080**	**10100**	**12000**	**32,200 E**	**47,100 E**	**6960**
Manganese	mg/kg	26,000	**405**	**1240**	**30.9**	**67.1**	**45.8**	**133**	**755**	**36.2**
Nickel	mg/kg	22,000	**8.8 J**	**15.1**	**4.6 J**	**12.4**	**8.2 J**	**15.4**	**40.1**	**5.5 J**
Thallium	mg/kg	12	8.9 U	9 U	11.6 U	11 U	13.2 U	10.6 U	12.3 U	8.2 U
Vanadium	mg/kg	5,800	**34.4**	**172**	**7.8**	**18.5**	**16**	**56.9**	**38.2**	**27.2**
Zinc	mg/kg	350,000	**748**	**4,390 E**	**2,820 E**	**1150**	**1100**	**72.7**	**1270**	**1,770 E**

Detections in bold

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E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-064-SB-1	RW-064-SB-5	RW-064-SB-8	RW-064-SB-12	RW-064-SB-16	RW-064-SB-21	RW-064-SB-29	RW-064-SB-32
Validated Metals										
Arsenic	mg/kg	3	**9.6**	**17.9**	**5.7**	**53.6**	2.7 U	**16.6**	**3**	**17**
Barium	mg/kg	220,000	**243**	**4,070**	**93.6**	**989**	**11**	**66.2**	**5 J**	**16.7**
Cadmium	mg/kg	980	**2.5 J**	**1.7 J**	**15.1 J**	**3,130 J**	**157 J**	**32.8 J**	**1.1 J**	**3.8**
Chromium	mg/kg	120,000	**332**	**576**	**637**	**49.8**	**10.1**	**36.7**	**4.9**	**13.1**
Lead	mg/kg	800	**56.8 J**	**102 J**	**34.9 J**	**2,880 J**	**13.9 J**	**16.5 J**	**1.7 J**	**7.4**
Mercury	mg/kg	350	**0.014 J**	**0.028 J**	**0.0095 J**	**0.11 J**	**0.0083 J**	**0.018 J**	0.1 U	**0.021 J**
Selenium	mg/kg	5,800	3.8 U	3.2 U	2.7 U	12.7 U	4.3 U	**2.1 J**	3.1 U	3.2 U
Silver	mg/kg	5,800	2.9 U	2.4 U	2 U	**58.4**	3.2 U	**0.41 J**	2.3 U	2.4 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**11100**	**13400**	**4620**	**15600**	**1490**	**14600**	**1340**	**4420**
Antimony	mg/kg	470	2.9 U	2.4 U	2 U	9.5 U	3.2 U	2.6 U	2.3 U	2.4 U
Beryllium	mg/kg	2,300	**0.4 J**	**0.37 J**	**0.31 J**	**0.62 J**	**0.21 J**	**2.1**	0.77 U	**0.33 J**
Cobalt	mg/kg	350	**6.9**	**9.8**	**6.3**	**14 J**	**3.9 J**	**25.7**	**0.53 J**	**2.6 J**
Copper	mg/kg	47,000	**80.9**	**197**	**45.3**	**1350**	**16.8**	**22.7**	3.9 U	**9.9**
Iron	mg/kg	820,000	**156,000 E**	**173,000 E**	**138,000 E**	**126,000 E**	**3020**	**80,900 E**	**1480**	**7430**
Manganese	mg/kg	26,000	**27,400 E**	**18,600 E**	**9,910 E**	**12,900 E**	**173**	**1070**	**20.8**	**70.3**
Nickel	mg/kg	22,000	**60.8**	**69.3**	**33.6**	**79.3**	**3.6 J**	**31.2**	**1.3 J**	**4 J**
Thallium	mg/kg	12	9.5 U	7.9 U	6.8 U	31.7 U	10.8 U	8.7 U	7.7 U	7.9 U
Vanadium	mg/kg	5,800	**492**	**601**	**532**	**28.3**	**9.9**	**47.9**	**2.6 J**	**17**
Zinc	mg/kg	350,000	**238**	**452**	**3,040 E**	**117,000 E**	**1280**	**7,030 E**	**439**	**2,650 E**

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E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-065-SB-1	RW-065-SB-5	RW-065-SB-9	RW-065-SB-15	RW-065-SB-19	RW-065-SB-24	RW-065-SB-26	RW-065-SB-35
Validated Metals										
Arsenic	mg/kg	3	**7.9**	**6.6**	**3.1**	**5.2**	**2.1**	**8.4**	**3.3**	**14.7 J**
Barium	mg/kg	220,000	**256**	**58.7**	**9.9**	**54.7**	**54.6**	**71.8**	**60.3**	**37.5 J**
Cadmium	mg/kg	980	**0.73 B**	1.3 U	**2.1**	**8.1**	**2**	**37.2**	**14.7**	**65.5 J**
Chromium	mg/kg	120,000	**197**	**10.5**	**7.3**	**24.9**	**29.3**	**38**	**34.3**	**20.7**
Lead	mg/kg	800	**175**	**64.9**	**1.9 B**	**8.1**	**17**	**12.6**	**13**	**7.4**
Mercury	mg/kg	350	**0.39**	**1.6**	**0.013 J**	**0.019 J**	**0.034 J**	**0.0073 J**	**0.031 J**	0.12 UJ
Selenium	mg/kg	5,800	**2.9 B**	3.5 U	3.5 U	4 U	2.7 U	3.4 U	3.6 U	3.7 U
Silver	mg/kg	5,800	2.4 U	2.7 U	2.6 U	3 U	2 U	2.6 U	2.7 U	2.8 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**24,600 E**	**5720**	**3250**	**12000**	**14,400 E**	**17,700 E**	**14900**	**9150**
Antimony	mg/kg	470	2.4 U	2.7 U	2.6 U	3 U	2 U	2.6 U	2.7 U	2.8 U
Beryllium	mg/kg	2,300	**1.2**	**0.33 J**	0.87 U	**0.62 J**	**0.65 J**	**2.8**	**2.4**	**1.4**
Cobalt	mg/kg	350	**4.7**	**2.9 J**	**1.4 J**	**4.3 J**	**4.4**	**37.3**	**18.6**	**18.9**
Copper	mg/kg	47,000	**45.2**	**13.5**	**3.2 J**	**12.3**	**16.5**	**21.4**	**20.1**	**13**
Iron	mg/kg	820,000	**27,200 E**	**7320**	**5600**	**12000**	**9280**	**16800**	**29,000 E**	**11900**
Manganese	mg/kg	26,000	**5,150 E**	**159**	**53.6**	**60.5**	**66**	**160**	**298**	**100**
Nickel	mg/kg	22,000	**19.8**	**5.7 J**	**2.9 J**	**10.1**	**11.6**	**81.4**	**41.2**	**36.2**
Thallium	mg/kg	12	7.9 U	8.8 U	8.7 U	9.9 U	6.7 U	8.6 U	8.9 U	9.4 U
Vanadium	mg/kg	5,800	**878**	**14**	**40.1**	**31.1**	**36.9**	**49.5**	**45**	**27.5**
Zinc	mg/kg	350,000	**194**	**34.9**	**430**	**1580**	**1140**	**6,270 E**	**4,230 E**	**3980**

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-066-SB-1	RW-066-SB-4	RW-066-SB-6	RW-066-SB-11	RW-066-SB-20	RW-066-SB-22	RW-066-SB-27	RW-066-SB-35
Validated Metals										
Arsenic	mg/kg	3	2.3 U	**4.4**	**1.6 B**	**5.1**	**5.9**	**4.6**	**11.7**	**4.1**
Barium	mg/kg	220,000	**26.8 J**	**21.6 J**	**27.9 J**	**35.3 J**	**9.7 J**	**68.9 J**	**60.3 J**	**2.6 J**
Cadmium	mg/kg	980	**6.7**	**1.5 B**	**15.8**	**5.5**	**21.1**	**0.21 J**	**6.7**	**0.2 J**
Chromium	mg/kg	120,000	**4.7**	**10.9**	**15.8**	**18.2**	**8**	**40.1**	**31.1**	**3.8**
Lead	mg/kg	800	**5.5**	**5.3**	**20.2**	**13**	**2.7**	**15.6**	**20.2**	2.3 U
Mercury	mg/kg	350	**0.0081 J**	**0.013 J**	**0.011 J**	**0.009 J**	**0.0083 J**	**0.015 J**	**0.01 J**	0.11 U
Selenium	mg/kg	5,800	3.7 U	3.2 U	3.1 U	4.5 U	2.8 U	4.5 U	3.7 U	3.7 U
Silver	mg/kg	5,800	2.8 U	2.4 U	2.3 U	3.4 U	2.1 U	3.4 U	2.8 U	2.8 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**3530**	**8200**	**9750**	**11500**	**2720**	**15800**	**15600**	**646**
Antimony	mg/kg	470	2.8 U	2.4 U	2.3 U	3.4 U	2.1 U	3.4 U	2.8 U	2.8 U
Beryllium	mg/kg	2,300	**0.2 J**	**0.38 J**	**0.32 J**	**0.46 J**	**0.23 J**	**1.4**	**1.4**	0.94 U
Cobalt	mg/kg	350	**3.3 J**	**2.2 J**	**2.1 J**	**4.3 J**	**24.9**	**18.7**	**22.4**	4.7 U
Copper	mg/kg	47,000	**5**	**5.7**	**9.6**	**15.5**	**3.4 J**	**22.1**	**21.6**	**2 J**
Iron	mg/kg	820,000	**3680**	**12200**	**8140**	**9870**	**2220**	**24,000 E**	**46,800 E**	**1470**
Manganese	mg/kg	26,000	**71.7**	**42.7**	**42.9**	**52.6**	**26.9**	**338**	**657**	**21.7**
Nickel	mg/kg	22,000	**4.3 J**	**6.3 J**	**4.3 J**	**10.2 J**	**34.2**	**36.1**	**37**	9.4 U
Thallium	mg/kg	12	9.3 U	8 U	**1.2 J**	11.2 U	7.1 U	11.2 U	9.3 U	9.4 U
Vanadium	mg/kg	5,800	**6.6**	**20.8**	**30.4**	**18.1**	**9.4**	**49.2**	**30.3**	**1.9 J**
Zinc	mg/kg	350,000	**511**	**378**	**679**	**427**	**406**	**4,210 E**	**3,640 E**	**582**

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-067-SB-1	RW-067-SB-2	RW-067-SB-8	RW-067-SB-12	RW-067-SB-19	RW-067-SB-25	RW-067-SB-26	RW-067-SB-35
Validated Metals										
Arsenic	mg/kg	3	**5.2**	**8.7**	**2.3 J**	**4.1**	**7.2**	**9.3**	**5.6**	**3.3**
Barium	mg/kg	220,000	**77 J**	**75 J**	**12 J**	**36.7 J**	**21.5 J**	**13.1 J**	**29.8 J**	**19.5 J**
Cadmium	mg/kg	980	**837**	**4.6**	**0.48 J**	**23**	**32.1**	**1.8**	**3.3**	**5.9**
Chromium	mg/kg	120,000	**11.6**	**15.8**	**7.2**	**27.1**	**13.1**	**7.8**	**14.6**	**14.9**
Lead	mg/kg	800	**107**	**137**	**3.6**	**12.4**	**3.9**	**3.7**	**3.3**	**5.3**
Mercury	mg/kg	350	**0.0062 J**	**2.6**	**0.0028 J**	**0.018 J**	**0.0032 J**	**0.0083 J**	**0.0065 J**	**0.003 J**
Selenium	mg/kg	5,800	3.7 U	4.4 U	4.1 U	4.1 U	3.1 U	2.7 U	5 U	2.8 U
Silver	mg/kg	5,800	**4.3**	3.3 U	3.1 U	3.1 U	2.3 U	2.1 U	3.7 U	2.1 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**7150**	**5750**	**4220**	**14300**	**4310**	**2860**	**4520**	**6550**
Antimony	mg/kg	470	**1.7 J**	3.3 U	3.1 U	3.1 U	2.3 U	2.1 U	3.7 U	2.1 U
Beryllium	mg/kg	2,300	**0.35 J**	**0.33 J**	**0.19 J**	**0.66 J**	**0.41 J**	**0.25 J**	**0.22 J**	**0.23 J**
Cobalt	mg/kg	350	**3.1 J**	**3.7 J**	**0.82 J**	**4.4 J**	**8.2**	**11.3**	**1.1 J**	**2.4 J**
Copper	mg/kg	47,000	**227**	**35.3**	**3.1 J**	**7.4**	**5.5**	**4.7**	**4.8 J**	**5.8**
Iron	mg/kg	820,000	**12300**	**11200**	**5740**	**14100**	**7960**	**6670**	**49,600 E**	**6110**
Manganese	mg/kg	26,000	**531**	**223**	**20.9**	**70.5**	**53.2**	**51.9**	**69.3**	**80.3**
Nickel	mg/kg	22,000	**8.6 J**	**8.5 J**	**2.7 J**	**12**	**17.5**	**8.9**	**3.9 J**	**6.6 J**
Thallium	mg/kg	12	9.2 U	10.9 U	10.2 U	10.2 U	7.7 U	6.8 U	12.4 U	7 U
Vanadium	mg/kg	5,800	**21.3**	**13.7**	**12.1**	**28.8**	**12.4**	**8.5**	**21.4**	**23.6**
Zinc	mg/kg	350,000	**51,000 E**	**663**	**402**	**3,030 E**	**1130**	**1090**	**1900**	**2,270 E**

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-068-SB-1	RW-068-SB-5	RW-068-SB-7	RW-068-SB-12	RW-068-SB-17	RW-068-SB-22	RW-068-SB-26	RW-068-SB-32
Validated Metals										
Arsenic	mg/kg	3	**4.1**	**32.8**	**46.9**	**3.2**	**4.2**	**1.8 J**	**10.5**	**10.8**
Barium	mg/kg	220,000	**83**	**168**	**403**	**28.2**	**38.4**	**56.4**	**74.1**	**87.4**
Cadmium	mg/kg	980	**0.28 B**	**1,170**	**1,310**	**1.8**	**0.41 B**	1.2 UB	2.2 U	**0.26 B**
Chromium	mg/kg	120,000	**16.2**	**294**	**146**	**61.6**	**10.6**	**30.4**	**34.5**	**40**
Lead	mg/kg	800	**69.8**	**597**	**448**	**12.1**	**5.8**	**12.2**	**18.5**	**21.4**
Mercury	mg/kg	350	**0.14**	**0.34**	**0.49**	**0.1 J**	0.21 U	**0.017 J**	**0.017 J**	**0.0072 J**
Selenium	mg/kg	5,800	3.3 U	5.5 U	5.2 U	4.7 U	6.6 U	3.1 U	6 U	5.6 U
Silver	mg/kg	5,800	2.5 U	**6.5**	3.9 U	3.6 U	4.9 U	2.3 U	**0.49 B**	4.2 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**10500**	**8870**	**8680**	**3640**	**7200**	**10500**	**18700**	**21800**
Antimony	mg/kg	470	2.5 U	4.2 U	3.9 U	3.6 U	4.9 U	2.3 U	4.5 U	4.2 U
Beryllium	mg/kg	2,300	**0.7 J**	**0.79 J**	**0.99 J**	**0.25 J**	**0.77 J**	**0.91**	**1.4 J**	**1.6**
Cobalt	mg/kg	350	**5.1**	**5.8 J**	**18**	**3.1 J**	**10.2**	**6.1**	**17.3**	**21.5**
Copper	mg/kg	47,000	**19.6**	**329**	**265**	**12.9**	**7.8 J**	**9.8**	**22.5**	**26.4**
Iron	mg/kg	820,000	**14100**	**29,100 E**	**78,200 E**	**12200**	**13500**	**9380**	**57,800 E**	**51,100 E**
Manganese	mg/kg	26,000	**460**	**838**	**1310**	**1240**	**84.2**	**84.2**	**1660**	**1050**
Nickel	mg/kg	22,000	**11.5**	**15.3**	**678**	**8.8 J**	**11.9 J**	**17.2**	**36.4**	**44.2**
Thallium	mg/kg	12	8.2 U	13.8 U	13.1 U	11.8 U	16.4 U	7.7 U	14.9 U	14 U
Vanadium	mg/kg	5,800	**24**	**63.9**	**142**	**102**	**12.7**	**35.5**	**35.2**	**39.7**
Zinc	mg/kg	350,000	**117**	**14,800 E**	**63,800 E**	**1260**	**7,650 E**	**1,840 E**	**105**	**285**

Detections in bold

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

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

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

UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.

E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-069-SB-1	RW-069-SB-3	RW-069-SB-10	RW-069-SB-12	RW-069-SB-20	RW-069-SB-23	RW-069-SB-28	RW-069-SB-35
Validated Metals										
Arsenic	mg/kg	3	**199**	**6.9**	**3.1 D6**	3 U	**1.6 J**	**2.2**	**10.2**	**11.9**
Barium	mg/kg	220,000	**560 J**	**66.4 J**	**18.3**	**64**	**17.2**	**61.7**	**68.5**	**30.8**
Cadmium	mg/kg	980	**93.9**	**3,530**	**1.5**	**0.25 J**	**8.2**	**0.66 B**	**0.37 B**	**0.29 B**
Chromium	mg/kg	120,000	**52.3**	**12.5**	**10**	**25.6**	**8.8**	**36.5**	**33.1**	**19.3**
Lead	mg/kg	800	**353**	**400**	**4.5 D6**	**13.6**	**2.9**	**14.4**	**17.5**	**9.9**
Mercury	mg/kg	350	**0.31**	**0.028 J**	**0.02 J**	**0.025 J**	**0.004 J**	**0.018 J**	0.14 U	0.11 U
Selenium	mg/kg	5,800	3.4 U	4.2 U	3.9 U	4.8 U	2.9 U	3 U	4.2 U	4.7 U
Silver	mg/kg	5,800	2.6 U	**18.5**	2.9 U	3.6 U	2.2 U	2.2 U	**0.95 B**	3.5 U
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**19,000 E**	**2410**	**6880**	**13100**	**3240**	**13700**	**17500**	**9500**
Antimony	mg/kg	470	2.6 U	**6.3**	2.9 U	3.6 U	2.2 U	2.2 U	3.2 U	3.5 U
Beryllium	mg/kg	2,300	**2**	1.1 U	**0.38 J**	**0.52 J**	**0.5 J**	**1.4**	**1.7**	**0.96 J**
Cobalt	mg/kg	350	**7.3**	**5.4**	**1.5 J**	**4.7 J**	**3.3 J**	**17.2**	**18.2**	**23.5**
Copper	mg/kg	47,000	**73**	**672**	**4.8 J**	**11**	**5**	**20.2**	**20.8**	**11.5**
Iron	mg/kg	820,000	**26,100 E**	**28,100 E**	**8950**	**9640**	**1740**	**20,500 E**	**65,400 E**	**18200**
Manganese	mg/kg	26,000	**4,290 E**	**1420**	**26.1**	**58.1**	**22.5**	**216**	**1560**	**312**
Nickel	mg/kg	22,000	**15.5**	**16.4**	**4.6 J**	**13.7**	**6.2 J**	**30.7**	**36.9**	**41**
Thallium	mg/kg	12	8.5 U	10.6 U	9.8 U	12 U	7.2 U	7.4 U	10.6 U	11.7 U
Vanadium	mg/kg	5,800	**142**	**9**	**15.9**	**26.1**	**11.9**	**47.2**	**33.7**	**20.3**
Zinc	mg/kg	350,000	**5,010 E**	**99,700 E**	**891**	**953**	**745**	**4,360 E**	**3,650 E**	**3,310 E**

Detections in bold

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

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

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

UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.

E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 1
Pre-Design Investigation Soil Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-070-SB-1	RW-070-SB-3	RW-070-SB-7	RW-070-SB-15	RW-070-SB-20	RW-070-SB-22	RW-070-SB-27	RW-070-SB-32
Validated Metals										
Arsenic	mg/kg	3	**14.3**	**184**	**12.2**	2.6 U	2.7 U	**22.8**	**8.6**	**8.9**
Barium	mg/kg	220,000	**219**	**107**	**74.3**	**74**	**5.6 J**	**72.5**	**70.6**	**76.3**
Cadmium	mg/kg	980	**16.4**	**11.8**	**80.5**	1.5 U	1.6 U	**0.2 B**	**0.36 B**	**0.42 B**
Chromium	mg/kg	120,000	**272**	**121**	**36**	**18.3**	**7.4**	**40.3**	**33.7**	**34.7**
Lead	mg/kg	800	**97**	**481**	**86.7**	**7.9**	2.7 U	**17.7**	**16.1**	**17.5**
Mercury	mg/kg	350	**0.08 J**	**0.26**	**0.13**	**0.0064 J**	**0.0092 J**	**0.028 J**	**0.011 J**	**0.013 J**
Selenium	mg/kg	5,800	3.7 U	**7**	4.1 U	4.1 U	4.3 U	3.8 U	4.9 U	4.9 U
Silver	mg/kg	5,800	**1.8 B**	**8**	3.1 U	3.1 U	3.2 U	2.8 U	3.7 U	**0.41 B**
Non-Validated Metals										
Aluminum	mg/kg	1,100,000	**15000**	**13200**	**11800**	**11700**	**1430**	**16800**	**17900**	**18700**
Antimony	mg/kg	470	2.8 U	2.4 U	3.1 U	3.1 U	3.2 U	2.8 U	**3.7**	3.7 U
Beryllium	mg/kg	2,300	**1**	**0.8 J**	**0.61 J**	**0.76 J**	**0.35 J**	**1.6**	**1.3**	**1.4**
Cobalt	mg/kg	350	**7.2**	**37.9**	**3.7 J**	**3.7 J**	5.4 U	**17.9**	**17.4**	**17.5**
Copper	mg/kg	47,000	**59**	**233**	**48.4**	**9.2**	**3.3 J**	**24.3**	**22.1**	**22.6**
Iron	mg/kg	820,000	**94,700 E**	**201,000 E**	**20,600 E**	**7120**	**10200**	**24,000 E**	**47300**	**51,300 E**
Manganese	mg/kg	26,000	**17,200 E**	**5,040 E**	**355**	**40.8**	**15.3**	**210**	**897**	**1280**
Nickel	mg/kg	22,000	**23.6**	**29.4**	**10.1 J**	**10.3**	**1.3 J**	**32.6**	**35.8**	**36.3**
Thallium	mg/kg	12	9.2 U	**3.3 J**	10.3 U	10.2 U	10.8 U	9.4 U	12.3 U	**12.2**
Vanadium	mg/kg	5,800	**352**	**219**	**78.8**	**20.1**	**3.2 J**	**48.5**	**33.5**	**34.1**
Zinc	mg/kg	350,000	**1650**	**1270**	**2,220 E**	**812**	**205**	**3,280 E**	**127**	**125**

Detections in bold

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

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

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

UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.

E: Analyte concentration exceeded the calibration range. The reported result is estimated (laboratory flag).

D6: The relative percent difference between the sample and sample duplicate exceeded control limits (laboratory flag).

NA: This parameter was not analyzed for this sample.

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

Table 2
Pre-Design Investigation Groundwater Analytical Data
Parcel A3
Tradepoint Atlantic
Sparrows Point, Maryland

Parameter	Units	PAL	RW-057-PZ	RW-063-PZ	RW-067-PZ	RW-070-PZ	RW02-PZM020	RW07-PZM017	RW10-PZM020	RW19-PZM020	RW20-PZM020
Total Metals											
Aluminum	µg/L	20,000	**230**	**22.8 J**	50 U	50 U	**32.5 B**	**38.1 B**	**206**	**35.5 B**	**24.1 B**
Antimony	µg/L	6	**17.9**	**8.6**	**16.3**	6 U	**11**	**7.3**	**7.9**	6 U	6 U
Arsenic	µg/L	10	**12**	**60.2**	**4.5 B**	5 U	**6.9**	5 U	**3.3 J**	5 U	**3.7 J**
Barium	µg/L	2,000	**13**	**13.7**	**16.3**	**16.6**	**8.1 B**	**9.9 B**	**13.7**	**34.3**	**28.7**
Beryllium	µg/L	4	**0.42 B**	1 U	1 U	**0.45 B**	**0.39 B**	1 U	1 U	1 U	1 U
Cadmium	µg/L	5	**44,500**	**434**	**311**	**0.91 J**	**47.2**	**9,780**	**10,200**	**41.9**	**0.59 J**
Chromium	µg/L	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**0.89 J**	5 U
Cobalt	µg/L	6	**238**	**76.3**	**142**	**13**	**113**	**144**	**114**	**38.5**	**53.1**
Copper	µg/L	1,300	5 U	**2.5 B**	5 U	5 U	5 U	**1.5 J**	**7.8**	**12**	**6**
Iron	µg/L	14,000	**134,000 J**	**159,000 J**	**400,000 J**	**713,000 J**	**443,000**	**283,000**	**202,000**	**37,000**	**226,000**
Manganese	µg/L	430	**16,400**	**26,600**	**28,200**	**33,300**	**19,000**	**17,500**	**18,000**	**2,580**	**9,210**
Nickel	µg/L	390	**287**	**42.2**	**94**	**11.5**	**63.2**	**109**	**92.8**	**12.6**	**40**
Selenium	µg/L	50	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Silver	µg/L	94	**2.4 J**	**4.3 J**	**7.3**	**11.5**	**7.6**	**5.2 B**	**4.1 B**	**0.62 B**	**4.5 J**
Thallium	µg/L	2	10 U	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U
Vanadium	µg/L	86	5 U	5 U	5 U	5 U	**7.5**	**5.9**	**5.6**	**1.5 B**	**4 B**
Zinc	µg/L	6,000	**658,000 J**	**592,000 J**	**784,000 J**	**65,400 J**	**576,000**	**387,000**	**509,000**	**7,000**	**82,800**
Additional Water Quality Parameters											
Alkalinity, Total as CaCO3	µg/L	---	**32**	**98**	**24**	**142**	**19 J-**	**22 J-**	**10**	**40**	**12**
BOD, 5 day	µg/L	---	10 U	10 U	**15.2**	**23.9**	**31.9**	20 U	10 U	**10**	**17.5**
Chemical Oxygen Demand	µg/L	---	**61**	**86.5**	**114**	**170**	**106**	**78**	**86.5**	**38.5 J**	**86.5**
Dissolved Oxygen	µg/L	---	**0.21**	**0.18**	**0.22**	**0.04**	**0.17**	**0.25**	**0.82**	**0.30**	**0.18**
Iron, Ferrous	µg/L	---	**0.14 J-**	**0.13 J-**	**0.17 J-**	**727 J-**	**0.33 J-**	**0.48 J-**	**0.26 J-**	**40.5 J-**	NS
Nitrate as N	µg/L	---	**0.04 J**	**0.033 J**	**0.044 J**	**0.037 J**	**0.044 J**	**0.036 J**	**0.032 J**	0.1 U	0.1 U
Nitrite as N	µg/L	---	**0.0044 J**	**0.0031 J**	**0.0028 J**	**0.0074 J**	0.01 U	0.01 U	**0.0052 J**	0.01 U	**0.0058 J**
Oxidation-Reduction Potential	µg/L	---	**-49.3**	**-59.4**	**-10.3**	**-28.4**	**-107.0**	**-64.1**	**-85.3**	**-71.3**	**-167.7**
pH	µg/L	---	**4.33**	**4.90**	**4.47**	**5.10**	**4.17**	**4.1**	**6.74**	**5.65**	**3.06**
Sulfate	µg/L	---	**2270 B**	**2590 B**	**3,350**	**2580 B**	**3,420**	**2380 B**	**2000 B**	**742 B**	NS
Sulfide	µg/L	---	1 U	**0.4 J**	1 U	1 U	**0.4 J-**	**0.6 J-**	1 U	1 U	1 U
Total Dissolved Solids	µg/L	---	**4,240**	**4,680**	**5,780**	**4,280**	**5,840**	**3,930**	**4,190**	**8,250**	**1,990**
Total Organic Carbon	µg/L	---	**3.3**	**5.8**	**4.2**	**6.6**	**3.7 J-**	**3.3 J-**	**2.9**	**1.2 B**	**2.6 B**

Detections in bold

NS: Not sampled

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

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

J-: The positive result reported for this analyte is a quantitative estimate, but may be biased low.

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

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

APPENDIX C

Construction Worker Soil Screening Levels
60 and 120 Work Day Exposure
Calculation Spreadsheet - Parcel A3

Description	Variable	Value
Days worked per week	DW	5
Exposure duration (yr)	ED	1
Hours worked per day	ET	8
A/constant (unitless) - particulate emission factor	Aconst	12.9351
B/constant (unitless) - particulate emission factor	Bconst	5.7383
C/constant (unitless) - particulate emission factor	Cconst	71.7711
Dispersion correction factor (unitless)	FD	0.185
Days per year with at least .01" precipitation	P	130
Target hazard quotient (unitless)	THQ	1
Body weight (kg)	BW	80
Averaging time - noncancer (yr)	ATnc	1
Soil ingestion rate (mg/d)	IR	330
Skin-soil adherence factor (mg/cm2)	AF	0.3
Skin surface exposed (cm2)	SA	3300
Event frequency (ev/day)	EV	1
Target cancer risk (unitless)	TR	01E-06
Averaging time - cancer (yr)	ATc	70
A/constant (unitless) - volatilization	Aconstv	2.4538
B/constant (unitless) - volatilization	Bconstv	17.566
C/constant (unitless) - volatilization	Cconstv	189.0426
Dry soil bulk density (kg/L)	Pb	1.5
Average source depth (m)	ds	3
Soil particle density (g/cm3)	Ps	2.65
Total soil porosity	Lpore/Lsoil	0.43
Air-filled soil porosity	Lair/Lsoil	0.28

Construction Worker Soil Screening Levels
120 Work Day Exposure
Calculation Spreadsheet - Parcel A3

Area of site (ac)	Ac	31.1
Overall duration of construction (wk/yr)	EW	24
Exposure frequency (day/yr)	EF	**120**
Cars per day	Ca	5
Tons per car	CaT	2
Trucks per day	Tru	5
Tons per truck	TrT	20
Mean vehicle weight (tons)	w	**11**
Derivation of dispersion factor - particulate emission factor (g/m2-s per kg/m3)	Q/Csr	**13.9**
Overall duration of traffic (s)	Tt	**3,456,000**
Surface area (m2)	AR	**125,857**
Length (km)	LR	**355**
Distance traveled (km)	ΣVKT	**426**
Particulate emission factor (m3/kg)	PEFsc	**127,765,097**
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	**7.05**
Total time of construction (s)	Tcv	**3,456,000**

Exposure Unit 1

Exposure Unit 2

Input
Calculation

Chemical	Toxicity Criteria Source	^Ingestion SF $(mg/kg\text{-}day)^{-1}$	^Inhalation Unit Risk $(ug/m^3)^{-1}$	^Subchronic RfD (mg/kg-day)	^Subchronic RfC (mg/m^3)	^GIABS	Dermally Adjusted RfD (mg/kg-day)	^ABS	^RBA	*Dia	*Diw	*Henry's Law Constant (unitless)	*Kd	*Koc	DA	Volatilization Factor - Unlimited Reservoir (m^3/kg)	Carcinogenic Ingestion/ Dermal SL (SLing/der)	Carcinogenic Inhalation SL (SLinh)	Carcinogenic SL (mg/kg)	Non-Carcinogenic Ingestion/ Dermal SL (SLing/der)	Non-Carcinogenic Inhalation SL (SLinh)	Non-Carcinogenic SL (mg/kg)
Arsenic, Inorganic	I/C	1.50E+00	4.30E-03	3.00E-04	1.50E-05	1	3.00E-04	0.03	0.6			-	2.90E+01				31.6	18,979	31.5	203	17,488	201
Benz[a]anthracene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	2.60E-02	6.70E-06	4.91E-04	1.08E+03	1.80E+05	6.71E-10	1.62E+5	371	1,718	305			
Benzo[a]pyrene	I	1.00E+00	6.00E-04	3.00E-04	2.00E-06	1	3.00E-04	0.13	1	4.80E-02	5.60E-06	1.87E-05	3.54E+03	5.90E+05	2.37E-11	8.61E+5	37.1	910	35.7	159	15.6	14.2
Benzo[b]fluoranthene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	4.80E-02	5.60E-06	2.69E-05	3.60E+03	6.00E+05	2.91E-11	7.76E+5	371	8,209	355			
Cadmium	A/I	-	1.80E-03	1.00E-03	1.00E-05	0.025	2.50E-05	0.001	1			-	7.50E+01					45,339	45,339	658	11,659	623
Chromium(VI)	A/N/I	5.00E-01	8.40E-02	5.00E-03	3.00E-04	0.025	1.25E-04	**0.01**	1			-	1.90E+01				46.9	972	44.8	1,676	349,757	1,668
Cobalt	P	-	9.00E-03	3.00E-03	2.00E-05	1	3.00E-03	**0.01**	1			-	4.50E+01					9,068	9,068	2,148	23,317	1,967
Dibenz[a,h]anthracene	I	1.00E+00	6.00E-04	-	-	1		0.13	1	4.50E-02	5.20E-06	5.76E-06	1.14E+04	1.90E+06	4.13E-12	2.06E+6	37.1	136,017	37.1			
Iron	P	-	-	7.00E-01	-	1	7.00E-01	**0.01**	1			-	2.50E+01							501,128		501,128
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	**0.01**	1			-	6.50E+01							10,113	58,293	8,618
Naphthalene	C/I/A	-	3.40E-05	6.00E-01	3.00E-03	1	6.00E-01	0.13	1	6.00E-02	8.40E-06	1.80E-02	9.00E+00	1.50E+03	6.35E-06	1.66E+3		31.2	31.2	318,291	45.5	45.5
PCB Total	I	2.00E+00	5.71E-04	-	-	1		0.14	1	2.40E-02	6.30E-06	1.70E-02	4.68E+02	7.80E+04	4.66E-08	1.94E+4	18.2	21.7	9.89			
Aroclor 1254	A/I	2.00E+00	5.71E-04	3.00E-05	-	1	3.00E-05	0.14	1	2.40E-02	6.10E-06	1.16E-02	7.80E+02	1.30E+05	1.91E-08	3.03E+4	18.2	33.8	NE	15.6		15.6
Trichloroethene	I	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1	5.00E-04		1	6.90E-02	1.00E-05	4.03E-01	3.66E-01	6.10E+01	2.74E-03	8.00E+1	1,122	12.5	12.3	369	1.46	1.45
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	**0.01**	1			-	1.00E+03							3,424	116,586	3,326
Zinc	I	-	-	3.00E-01	-	1	3.00E-01	**0.01**	1			-	6.20E+01							214,769		214,769

*chemical specific parameters found in Chemical Specific Parameters Spreadsheet at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016
^chemical specific parameters found in Unpaved Road Traffic calculator at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
I: chemical specific parameters found in the IRIS at https://www.epa.gov/iris or IRIS 2017 Recent Additions at https://www.epa.gov/iris/iris-recent-additions ; in addition, PAH compounds were adjusted based on the relative potency factor
C: chemical specific parameters found in Cal EPA at https://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-2016-01.pdf
A: chemical specific parameters found in Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs) at https://www.atsdr.cdc.gov/mrls/pdfs/atsdr_mrls.pdf
P: chemical specific parameters found in the Database of EPA PPRTVs at https://hhpprtv.ornl.gov/quickview/pprtv.php
N: chemical specific parameters found in NJDEP

NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only. The carcinogenic risk is evaluated with total PCBs.

Construction Worker Soil Screening Levels
60 Work Day Exposure
Calculation Spreadsheet - Parcel A3

Area of site (ac)	Ac	22.5
Overall duration of construction (wk/yr)	EW	12
Exposure frequency (day/yr)	EF	**60**
Cars per day	Ca	5
Tons per car	CaT	2
Trucks per day	Tru	5
Tons per truck	TrT	20
Mean vehicle weight (tons)	w	**11**
Derivation of dispersion factor - particulate emission factor (g/m2-s per kg/m3)	Q/Csr	**14.2**
Overall duration of traffic (s)	Tt	**1,728,000**
Surface area (m2)	AR	**91,054**
Length (km)	LR	**302**
Distance traveled (km)	ΣVKT	**181**
Particulate emission factor (m3/kg)	PEFsc	**111,114,720**
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	**7.41**
Total time of construction (s)	Tcv	**1,728,000**

Exposure Unit 1

Exposure Unit 2

Input
Calculation

Chemical	Toxicity Criteria Source	^Ingestion SF $(mg/kg\text{-}day)^{-1}$	^Inhalation Unit Risk $(ug/m^3)^{-1}$	^Subchronic RfD (mg/kg-day)	^Subchronic RfC (mg/m^3)	^GIABS	Dermally Adjusted RfD (mg/kg-day)	^ABS	^RBA	*Dia	*Diw	*Henry's Law Constant (unitless)	*Kd	*Koc	DA	Volatilization Factor - Unlimited Reservoir (m^3/kg)	Carcinogenic Ingestion/ Dermal SL (SLing/der)	Carcinogenic Inhalation SL (SLinh)	Carcinogenic SL (mg/kg)	Non-Carcinogenic Ingestion/ Dermal SL (SLing/der)	Non-Carcinogenic Inhalation SL (SLinh)	Non-Carcinogenic SL (mg/kg)
Arsenic, Inorganic	I/C	1.50E+00	4.30E-03	3.00E-04	1.50E-05	1	3.00E-04	0.03	0.6			-	2.90E+01				63.1	33,011	63.0	406	30,418	401
Benz[a]anthracene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	2.60E-02	6.70E-06	4.91E-04	1.08E+03	1.80E+05	6.71E-10	1.20E+5	743	2,552	575			
Benzo[a]pyrene	I	1.00E+00	6.00E-04	3.00E-04	2.00E-06	1	3.00E-04	0.13	1	4.80E-02	5.60E-06	1.87E-05	3.54E+03	5.90E+05	2.37E-11	6.39E+5	74.3	1,353	70.4	318	23.2	21.6
Benzo[b]fluoranthene	I	1.00E-01	6.00E-05	-	-	1		0.13	1	4.80E-02	5.60E-06	2.69E-05	3.60E+03	6.00E+05	2.91E-11	5.76E+5	743	12,203	700			
Cadmium	A/I	-	1.80E-03	1.00E-03	1.00E-05	0.025	2.50E-05	0.001	1			-	7.50E+01					78,861	78,861	1,317	20,278	1,236
Chromium(VI)	A/N/I	5.00E-01	8.40E-02	5.00E-03	3.00E-04	0.025	1.25E-04	**0.01**	1			-	1.90E+01				93.8	1,690	88.9	3,352	608,353	3,333
Cobalt	P	-	9.00E-03	3.00E-03	2.00E-05	1	3.00E-03	**0.01**	1			-	4.50E+01					15,772	15,772	4,295	40,557	3,884
Dibenz[a,h]anthracene	I	1.00E+00	6.00E-04	-	-	1		0.13	1	4.50E-02	5.20E-06	5.76E-06	1.14E+04	1.90E+06	4.13E-12	1.53E+6	74.3	236,582	74.2			
Iron	P	-	-	7.00E-01	-	1	7.00E-01	**0.01**	1			-	2.50E+01							1,002,256		1,002,256
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	**0.01**	1			-	6.50E+01							20,225	101,392	16,862
Naphthalene	C/I/A	-	3.40E-05	6.00E-01	3.00E-03	1	6.00E-01	0.13	1	6.00E-02	8.40E-06	1.80E-02	9.00E+00	1.50E+03	6.35E-06	1.23E+3		46.4	46.4	636,582	67.6	67.5
PCB Total	I	2.00E+00	5.71E-04	-	-	1		0.14	1	2.40E-02	6.30E-06	1.70E-02	4.68E+02	7.80E+04	4.66E-08	1.44E+4	36.3	32.2	17.1			
Aroclor 1254	A/I	2.00E+00	5.71E-04	3.00E-05	-	1	3.00E-05	0.14	1	2.40E-02	6.10E-06	1.16E-02	7.80E+02	1.30E+05	1.91E-08	2.25E+4	36.3	50.3	NE	31.2		31.2
Trichloroethene	I	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1	5.00E-04		1	6.90E-02	1.00E-05	4.03E-01	3.66E-01	6.10E+01	2.74E-03	5.94E+1	2,244	18.5	18.4	737	2.17	2.16
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	**0.01**	1			-	1.00E+03							6,847	202,784	6,623
Zinc	I	-	-	3.00E-01	-	1	3.00E-01	**0.01**	1			-	6.20E+01							429,538		429,538

*chemical specific parameters found in Chemical Specific Parameters Spreadsheet at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016
^chemical specific parameters found in Unpaved Road Traffic calculator at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
I: chemical specific parameters found in the IRIS at https://www.epa.gov/iris or IRIS 2017 Recent Additions at https://www.epa.gov/iris/iris-recent-additions ; in addition, PAH compounds were adjusted based on the relative potency factor
C: chemical specific parameters found in Cal EPA at https://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-2016-01.pdf
A: chemical specific parameters found in Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs) at https://www.atsdr.cdc.gov/mrls/pdfs/atsdr_mrls.pdf
P: chemical specific parameters found in the Database of EPA PPRTVs at https://hhpprtv.ornl.gov/quickview/pprtv.php
N: chemical specific parameters found in NJDEP

NE = Not Evaluated. Aroclor 1254 was included for non-cancer hazard only. The carcinogenic risk is evaluated with total PCBs.

APPENDIX D

HEALTH AND SAFETY PLAN

SPARROWS POINT TERMINAL
SPARROWS POINT, MARYLAND

Prepared by:

EnviroAnalytics Group

Environmental Engineers

January 2015

TABLE OF CONTENTS

1.0 Introduction 5

1.1 Background 5

1.2 Historic Operations 5

2.0 Purpose, Scope and Organization 6

2.1 Scope 6

2.2 Organization of Documents 7

2.3 EAG Health and Safety Personnel 7

3.0 Hazard Analysis 8

3.1 Hazard Analysis 8

3.1.1 Chemical Hazards 8

3.1.2 Physical Hazards 8

3.1.3 Biological Hazards 9

4.0 Health Hazard Information 9

4.1 Chemical Hazards 9

4.2 Physical Hazards 14

4.2.1 Heat Stress 14

4.2.2 Cold Stress 16

4.2.3 Lifting Hazards 16

4.2.4 Slips, Trips and Falls 17

4.2.5 Buried Hazards 17

4.2.6 Electrical Hazards 17

4.2.7 Heavy Equipment Operations 17

4.2.8 Drilling and Excavation Safety 18

4.2.9 Use of Hand Tools and Portable Power Tools 21

4.2.10 Noise 21

4.2.11 Work Zone Traffic Control 21

4.2.12 Work Over Water 21

4.2.13 Vehicle Use 22

4.3 Biological Hazards 22

5.0 Personal Protective Equipment 23
5.1 Level D Protection 23
5.2 Modified Level D Protection 23
5.3 Level C Protection 23
5.4 First Aid, Emergency and Safety Equipment 24
6.0 Personnel Training and Standard Safety Procedures 24
6.1 Onsite Safety, Health and Emergency Response Training 24
6.2 Standard Safety Procedures 25
6.2.1 General Safety Work Practices 25
6.2.2 Hand Safety 25
6.2.3 Respiratory Protection 26
6.2.4 Personal Hygiene Practices 27
6.2.5 Electrical Safety 27
6.2.6 Fire Safety 27
6.2.7 Illumination 27
6.2.8 Sanitation 28
7.0 Exposure Monitoring Plan 28
7.1 Air Monitoring 28
7.1.1 Combustible Gas and Oxygen Deficiency/Excess Monitoring 28
7.1.2 Organic Vapor Concentrations 29
7.2 Physical Conditions Monitoring 30
8.0 Medical Surveillance 30
8.1 Medical Surveillance Program 30
8.2 Physician Review 33
9.0 Site Control Measures and Decontamination 31
9.1 Site Control Measures 31
9.1.1 Work Zone Delineation 31
9.1.2 Communications 32
9.1.3 Site Security 32

9.2 Decontamination Procedures 33
9.2.1 Personal Decontamination 33
9.2.2 Equipment Decontamination 33
9.2.3 Waste Management 34
10.0 Emergency Response and Contingency Procedures 34
10.1 Emergency Phone Numbers 35
10.2 Injury/Illness Treatment 35
10.3 Occupational Health Clinic and Hospital Information 36
10.4 Accident and Emergency Medical Response 38
10.4.1 Chemical Exposure 38
10.4.2 Decontamination During Medical Emergency 38
10.4.3 Small or Incipient Fire 39
10.4.4 Large Fire or Explosion 39
10.4.5 Adverse Weather Conditions 39
10.4.6 First Aid for Heat Stress/Cold Stress 40
10.4.7 Snake Bites 40
10.4.8 Animal Bites 40
10.4.9 Insect Bites and Stings 41
10.4.10 Poisonous Plants 41
10.4.11 Ticks 41

ATTACHMENTS

Attachment A – EAG Acknowledgment Form
Attachment B – MSDSs

1.0 INTRODUCTION

1.1 Background

The Sparrows Point Terminal site has historically been a steel making facility. It is located in Baltimore County, Maryland in the southeast corner of the Baltimore metropolitan area (approximately 9 miles from the downtown area), on the Sparrows Point Peninsula in the Chesapeake Bay watershed. The facility occupies the entire peninsula and is bounded to the west by Bear Creek; to the south by Patapsco River; and to the east by Jones Creek, Old Road Bay and residential areas of the City of Edgemere. The facility is bounded to the north by the Sparrows Point Country Club. The site is approximately 3,100 acres in size.

Pennsylvania Steel built the furnace at Sparrows Point in 1887 and the first iron was cast in 1889. Bethlehem Steel Corporation (BSC) purchased the facility in 1916 and enlarged it by building additional and plating facilities. BSC filed for bankruptcy in 2001. A series of entities has owned the site between then and now: the International Steel Group (ISG), Mittal Steel, ISG Sparrows Point, LLC, Severstal Sparrows Holding LLC, which was renamed to Severstal Sparrows Point, LLC, RG Steel Sparrows Point, LLC, and then a joint venture to Sparrows Point LLC (SP) and HRE Sparrows Point LLC. Most recently, in 2014, the property and assets were sold to Sparrows Point Terminal LLC (SPT). Environmental liability was retained by SP and work is currently being conducted by EnviroAnalytics Group, LLC (EAG) on behalf of SP.

- In addition to the current environmental investigation and remediation being conducted onsite by EAG and their consultants, there are other entities conducting work on the facility. Demolition of the remaining structures is currently ongoing at the site, and those contractors are being managed by SPT.
- The purpose of this document is to provide an overall health and safety plan (HASP) for EAG personnel and EAG directed contractors who are engaging in environmental investigation and remediation activities onsite. EAG directed contractors will also be expected to have their own Health and Safety Program, and they may opt to draft their own site specific HASP, provided it meets the requirements in this HASP.

1.2 Historic Operations

Steel manufacturing involves handling vast amounts of raw material including coke, iron ore, limestone and scrap steel, as well as recovering byproducts and managing waste materials. The operations listed below either were or are currently performed at the Sparrows Point Facility.

- Iron and steel production
- Coal chemical recovery system
- Other byproducts recovery systems
- Wastewater treatment systems
- Solid waste management
- Air pollution control

A number of site-specific environmental and hydrogeologic investigations have been prepared for the Sparrows Point facility. For the purposes of this HASP, information was obtained from the "Special Study Area Release Site Characterization" completed in 2001 by CH2MHill, as well as additional documents submitted since that time. There are five separate Special Study Areas as put forth in the Consent Decree:

- Humphrey Impoundment,
- Tin Mill Canal/Finishing Mills Areas,
- Coke Oven Area,
- Coke Point Landfill, and
- Greys Landfill.

Contaminated soils and groundwater may be present at the site. This plan was prepared based on an assessment of hazards expected to be present and a review of data from the previous site investigations and groundwater sampling events.

During the current investigations and remedial efforts, all related work will be performed in accordance with the requirements of this HASP and Occupational Safety and Health Administration (OSHA) regulations as defined in 29 Code of Federal Regulations (CFR) 1910.120 and 1926.65.

2.0 PURPOSE, SCOPE AND ORGANIZATION

This section describes the purpose, scope and organization of this HASP and the health and safety responsibilities of EAG, their employees, and their subcontractors involved in the field investigation and remediation activities at the Sparrows Point facility.

2.1 Scope

Field investigation and remediation activities for this project may include, but are not limited to:

- Groundwater sampling and monitoring,
- Groundwater and remediation well installation,
- Groundwater and remediation well repairs,
- Groundwater and remediation well closure and abandonment,
- Surface water sampling,
- Sediment sampling,
- Soil boring and subsurface soil sampling,
- Soil excavations for remedial purposes,
- Installation and operation of remediation systems for soil, soil vapor, and groundwater,
- Decommissioning and closure of remediation systems,
- Soil excavations for remedial purposes,
- Insitu soil mixing/soil stabilization,
- Exsitu soil mixing/soil stabilization,
- Dredging operations along Tin Mill Canal,
- Insitu chemical and/or biological injections, and
- Recovery of non-aqueous phase liquids (NAPL)

When EAG personnel are providing oversight of subcontractors, they will attend the safety and health briefings held by the contractor. EAG personnel will follow the requirements of this HASP, as well as any potentially more stringent requirements of the contractor's health and safety plan.

When EAG personnel are conducting tasks on their own, with or without subcontractors, they will follow the requirements of this HASP. EAG contractors, such as drillers, will also be required to follow the requirements of this HASP, as well as any more stringent requirements of the contractor's health and safety plan.

All EAG field personnel, including subcontractors to EAG, will be required to read and understand this HASP and agree to implement its provisions. All site personnel will sign the Acknowledgement Form included in **Attachment A** stating that they have read, understood, and agree to abide by the guidelines and requirements set forth in this plan.

2.2 Organization of Document

This HASP includes health and safety procedures for all generally anticipated project field activities. This plan also meets the OSHA requirements contained in the CFR, specifically 29 CFR 1910.120 and 29 CFR 1926, by including the following items:

- A description of staff organization, qualifications and responsibilities (Section 2.3),
- Hazard analysis (Section 3.0),
- Health hazard information (Section 4.0),
- Personal protective equipment (PPE), including available first aid, emergency, and safety equipment (Section 5.0),
- Employee and subcontractor training and standard safety procedures (section 6.0),
- Exposure monitoring plan (Section 7.0),
- Medical surveillance (Section 8.0),
- Site control measures and decontamination procedures for personnel and equipment (Section 9.0),
- Emergency response and contingency procedures (section 10.0), and
- Material Safety Data Sheets (MSDSs) for chemicals used on-site (**Attachment B**).

2.3 EAG Health and Safety Personnel

Personnel responsible for implementing this HASP include:

EAG Contacts for Sparrows Point Project Work	
VP Remediation, Russ Becker	(314) 686-5611
Senior Project Manager, James Calenda	(314) 620-3056
Senior Project Engineer, Elizabeth Schlaeger	(314) 307-1732
Josh Burke – Field Operations Manager	(314) 686-5623
Project Field Team Members, Jeff Wilson and Bill Trentzsch	(314) 620-3135, (314) 686-5598

3.0 HAZARD ANALYSIS

This section outlines the potential hazards related to the field activities listed in Section 2.1.

3.1 Hazard Analysis

The field activities planned for this project pose potential health and safety hazards for field team members. This section describes the hazards associated with the above-listed field activities. Detailed chemical, physical, and biological hazards information is provided in Section 4.0 (Health Hazard Information).

Hazards to which employees and subcontractors may be exposed to as a result of the above-listed activities include potential chemical exposures, lacerations, excessive noise, thermal stress, lifting of excessive weight or bulk, hand tools and heavy equipment, drilling and slips, trips and falls.

3.1.1 Chemical Hazards

Potential exposures to chemicals in the soil or groundwater include the possibility of dermal exposure (contact and/or absorption), inhalation of chemical contamination that may be encountered during sampling or during equipment decontamination activities, or ingestion of contaminants if good personal hygiene practices are not followed.

Benzene, naphthalene, and various metals are the major contaminants that have been identified in groundwater during previous investigations at the site In addition, light NAPL (LNAPL – benzene, in particular) and dense NAPL (DNAPL – naphthalene, in particular) have also been identified or are heavily suspected in various locations in the Coke Oven Area. Dissolved metals the chemicals of concern primarily located in the area of Tin Mill Canal and the Rod and Wire Mill Area. Treatment chemicals, such as sulfuric acid, are currently being used in remediation systems. All appropriate MSDS sheets will be reviewed that apply to the investigation or remedial tasks being conducted. MSDS sheets are located in **Attachment B**. It should be noted that this is a dynamic document: should any additional chemicals be introduced or discovered, the MSDS sheets will be added to **Attachment B**, as necessary.

3.1.2 Physical Hazards

The potential physical hazards associated with field activities include:

- Excessive lifting
- Slips, trips, and falls
- Working at heights
- Exposure to extreme outside temperatures and weather
- Equipment hazards
- Drilling Hazards
- Noise
- Dust and fumes
- Injury from tools, equipment, rotating parts
- Electrical hazards
- Buried and overhead hazards
- Work over water
- Driving to, from, and around the site (including working in trafficked areas)

Additional hazards may be encountered based on the various task at hand. It will be the responsibility of the site manager, with the help of field staff, to identify and address any additional hazards on a "per task or job" basis. A Job Safety Analyses (JSA) may need to be conducted prior to the start of various tasks. Safety meetings will be conducted with all staff in attendance, before the start of any new task or when any significant personnel or other changes (such as a swift change in weather, for example) occur. Updated information relating to physical hazards will be presented during these meetings in an effort to familiarize the crew with potential hazards, discuss new situations, and determine how the associated risks can be reduced. Further, good housekeeping practices will be enforced to preclude other risks resulting from clutter and inattention to detail. In addition, internal field audits will be randomly conducted to ensure adherence to all procedures are being followed.

3.1.3 Biological Hazards

Biological hazards that may be encountered when conducting field activities include the following:

- Poisonous snakes and spiders
- Ticks and tick-borne diseases
- Stinging insects such as chiggers, bees, wasps, etc.
- Various viruses and diseases spread via animal to human contact such as West Nile virus or rabies
- Various viruses and diseases spread via human to human contact such as colds or the flu
- Dermal contact with poison ivy, oak, and/or sumac
- Bloodborne pathogens when administering first aid

First aid kits will be available on-site. It is crucial to note that any site personnel who has significant allergies should communicate that information to the field team they are working with, along with the location of their auto-injector pen (such as an Epi-Pen) for use in case of going into anaphylactic shock from something that would cause such a reaction (like a bee sting, for example). Personnel who suffer from such allergies are responsible for providing their own auto-injector devices as those are typically prescription based as well as specific to their particular allergy.

4.0 HEALTH HAZARD INFORMATION

This section provides chemical hazard information for those potentially hazardous materials expected to be present at the facility. Potential physical and biological hazards are also discussed in this section.

4.1 Chemical Hazards

Exposure to chemicals through inhalation, ingestion, or skin contact may result in health hazards to field workers. Hazards associated with exposure will be evaluated using OSHA Permissible Exposure Limits (PELs) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). Each of these values are 8-hour, time-weighted averaged (TWAs) above which an employee cannot be exposed. EAG may also use the National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) where applicable. Although the OSHA PELs are the only exposure limits enforceable by law, the most stringent of exposure limits will be used as the EAG-enforced exposure criteria during field activities.

The following is a summary of the potential hazards created by the compounds that may be encountered during field activities. Data from sampling of groundwater wells was reviewed to identify potential contaminants at the site. Contaminants of concern may include benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), phenols, metals and water treatment chemicals. Table 4-1 contains chemical information and exposure limits for various chemicals that may be expected to be present in the investigation and remediation efforts. During the recovery of NAPL, the major contaminants of concern are benzene and naphthalene. It is possible that carbon monoxide may also be encountered from the use of various internal combustion engines (vehicular or otherwise); however, it is anticipated that since any such engine will be used outdoors, it is not expected that concentrations of concern will accumulate. With the use of any such engine, the engine should be positioned such that site personnel are upwind of the engine exhaust.

If any chemicals are brought on-site, MSDS must be made available and added to **Attachment B**. Personnel must be trained in the hazards and use of chemicals.

Table 4-1
Chemical Contaminants of Potential Concern

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Benzene	PEL: 1PPM REL: 0.1 CA TLV: 0.5PPM STEL: 1PPM (NIOSH) Skin: YES	Colorless to light-yellow liquid with aromatic odor. LEL: 1.2% UEL: 7.8% VP: 75mm FI.P: 12°F	INH ABS ING CON	Irritation of eyes, skin, nose, respiratory system, giddiness, headache, nausea, fatigue, anorexia, dermatitis, bone marrow depression
Ethylbenzene	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: 125PPM IDLH: 800PPM Skin: NO	Colorless liquid with an aromatic odor. LEL: 0.85 UEL: 6.7% IP: 8.76EV VP: 7mm FI.P: 55°F	INH ING CON	Irritation of eyes, skin, mucous membranes; headache; dermatitis
1,1 dichloroethane	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: NA IDLH: 3000PPM Skin: NO	Colorless, oily liquid with a chloroform-like odor. LEL: 6.2% UEL: 16% IP: 11.05EV Vp: 64mm FI.P: 56°F	INH ING CON	Irritation of eyes, CNS depression, liver, kidney, lung damage
Phenol	PEL: 5PPM REL: 5PPM, 15.6PPM (C) TLV: 5PPM STEL: NA IDLH 250PPM Skin: YES	Colorless to light pink crystalline solid with a sweet, acrid odor. LEL: 1.8% UEL: 5.9% IP: 8.12EV Vp: 0.08mm FI.P: 175°F	INH ING CON ABS	Irritated eyes, nose, throat, anorexia, weakness, muscular ache, pain, dark urine, cyanosis, liver, kidney damage, skin burns, dermatitis, tremor, convulsions, twitch
Naphthalene	PEL: 10PPM REL: 10PPM TLV: 10PPM STEL: 15PPM IDLH: 250PPM Skin: YES	Colorless to brown solid with an odor of mothballs LEL: 0.9% UEL: 5.9% IP: 8.12EV Vp: 0.08mm FI.P: 174°F	INH ABS ING CON	Irritation of eyes, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritated bladder, profuse sweating, jaundice, hematuria, renal shutdown, dermatitis, optical neuritis, corneal damage
Toluene	PEL: 200PPM, 300PPM (C) REL: 100PPM TLV: 20PPM STEL: 150PPM IDLH: 500PPM Skin: YES	Colorless liquid with a sweet, pungent benzene-like odor. LEL: 1.1% UEL: 7.1% IP: 8.82EV VP: 21MM FI.P: 40°F	INH ABS ING CON	Irritation of eyes, nose, fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, dermatitis, liver, kidney damage
Xylenes	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: 150PPM IDLH: 900PPM Skin: NO	Colorless liquid with an aromatic odor. LEL: 0.9% UEL: 6.7% IP: 8.40EV VP: 5MM FI.P: 88°F	INH ABS ING CON	Irritated eyes, nose, respiratory system, headache, fatigue, dizziness, confusion, malaise, drowsiness, incoherence, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Styrene	PEL: 100PPM, 200PPM (C) REL: 50PPM TLV: 20PPM STEL: 40PPM IDLH: 700PPM Skin: NO	Colorless to yellow, oily liquid with a sweet, floral odor. LEL: 0.9% UEL: 6.8% IP: 8.40eV VP: 5MM FI.P: 88°F	INH ABS ING CON	Irritated eyes, nose, respiratory system, headache, fatigue, dizziness, confusion, malaise, drowsiness, weakness, narcosis, dermatitis
Chlorodiphenyl (54% chlorine) (11097-69-1)	PEL: 0.5mg/m³ REL: 0.001mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 5mg/m³(CA) Skin: YES	Colorless to pale yellow viscous liquid with a mild hydrocarbon odor. LEL: NA UEL: NA IP: UNKNOWN VP: 0.00006MM FI.P: NA	INH ABS ING CON	Irritated eyes, chloracne, liver damage, reproductive effects (carcinogen)
Polynuclear aromatic hydrocarbons (PAHs) (coal tar pitch volatiles) (65996-93-2)	PEL: 0.2mg/m³ REL: 0.1mg/m³ TLV: 0.2 mg/m³ STEL: N/A IDLH: 80mg/m³(CA) Skin: NO	The pitch of coal tar is black or dark brown amorphous residue that remains after the redistillation process. LEL: N/A UEL: N/A IP: VARIES VP: VARIES FI.P: VARIES	INH CON	Direct contact or exposure to vapors may be irritating to the eyes. Direct contact can be highly irritating to the skin and produce dermatitis. Exposure to vapors may cause nausea and vomiting. A potential human carcinogen.
Arsenic (inorganic)	PEL: 0.01mg/m³ REL: NONE TLV: 0.5 mg/m³ STEL: N/A IDLH: 5mg/m³ (CA) Skin: NO	Silver-gray or tin-white brittle odorless solid. Air odor threshold: N/D.	INH ABS CON ING	Symptoms include ulceration of nasal septum, gastrointestinal disturbances, respiratory irritation and peripheral neuropathy. Potential occupational carcinogen.
Barium	PEL: 0.5mg/m³ REL: 0.5mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 50mg/m³ Skin: NO	White, odorless solid. Air odor threshold: N/D.	INH ING CON	Irritated eyes, skin, upper respiratory system, skin burns, gastroenteritis, muscle spasm, slow pulse, cardiac arrhythmia
Cadmium (elemental)	PEL: 0.005mg/m³ REL: CA TLV: 0.01mg/m³ STEL: N/A IDLH: 9mg/m³ (CA) Skin: NO	Silver-white, blue-tinged lustrous, odorless solid. Air odor threshold: N/D.	INH ING	Symptoms include pulmonary edema, cough, tight chest, head pain, chills, muscle aches, vomiting and diarrhea. Potential occupational carcinogen.
Chromium (Metal)	PEL: 1.0mg/m³ REL: 0.5mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 250mg/m³ Skin: NO	Blue-white to steel-gray lustrous, brittle, hard odorless solid. Air odor threshold: N/D.	INH ING CON	Symptoms may include irritated eyes and skin, lung fibrosis.
Chromium (Chromium III inorganic compounds)	PEL: 0.5mg/m³ REL: 0.5mg/m³ TLV: 0.5mg/m³ STEL: N/A IDLH: 25mg/m³ Skin: NO	Varies depending on specific compound.	INH ING CON	Irritation of eyes, sensitivity dermatitis

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Copper	PEL: 1mg/m³ REL: 1mg/m³ TLV: 1mg/m³ STEL: N/A IDLH: 100mg/m³ Skin: NO	Reddish, lustrous, malleable, odorless solid	INH ING CON	Irritation of eyes, nose, pharynx, nasal septum perforations, metallic taste, dermatitis
Lead (Elemental & Inorganic as Pb)	PEL: 0.05mg/m³ REL0.1mg/m³ TLV: 0.05mg/m³ STEL: N/A IDLH: 100mg/m³ Skin: NO	A heavy, ductile soft gray solid. Air odor threshold: N/D.	INH ING CON	Accumulative poison may cause weakness, insomnia, facial pallor, anorexia, malnutrition, constipation, abdominal pain, anemia, gingival lead line, paralysis of wrists and ankles, hypertension and kidney disease.
Nickel	PEL: 1mg/m³ REL: 0.015mg/m³ (Ca) TLV: 0.1mg/m³ STEL: N/A IDLH: 10mg/m³ Skin: NO	Lustrous, silvery, odorless solid. Air odor threshold: N/A VP: 0mm	INH CON ING	Sensitivity dermatitis, allergic asthma, pneumonitis
Vanadium pentoxide dust	PEL: 0.5mg/m³ (C) REL: 0.05mg/m³ (C) TLV: 0.05mg/m³ STEL: N/A IDLH: 35mg/m³ Skin: NO	Yellow-orange powder or dark gray, odorless flakes dispersed in air. VP: 0mm	INH ING CON	Irritated eyes, skin, throat, green tongue, metallic taste, eczema, cough, fine rales, wheezing, bronchitis
Zinc oxide	PEL: 5mg/m³ REL: 5mg/m³ TLV: 2mg/m³ STEL: 10mg/m³ IDLH: 500mg/m³ Skin: NO	White, lustrous solid	INH	Metal fume fever, chills, muscular ache, nausea, fever, dry throat, cough, weakness, metallic taste, headache, blurred vision, low back pain, vomiting, fatigue, malaise
Sulfuric Acid (water treatment chemical)	PEL: 1mg/m³ TLV: 0.2mg/m³ Skin: YES	Oily, colorless to slightly yellow, clear to turbid liquid	IHN ABS ING CON	Can cause irritation or corrosive burns to the upper respiratory system, lung irritation, pulmonary edema, burns to mouth throat and stomach, erode teeth, skin lesions
Antiscale (water treatment chemical)	PEL: 1mg/m³ TLV: 0.2mg/m³ Skin: YES	Liquid, colorless, clear	IHN ABS ING CON	May cause severe skin burns and eye damage, can cause cancer, fatal if inhaled, may damage organs through prolonged exposure
Antifoam (water treatment chemical)	N/E	Liquid emulsion, white, opaque	IHN ABS ING CON	May be harmful to skin, if inhaled and if swallowed
Gases				
Carbon Monoxide	PEL: 50PPM REL: 35PPM TLV: 25PPM STEL: 200PPM (C) IDLH: 1200PPM Skin: NO	Colorless, odorless gas LEL: 12.5% UEL: 74% IP: 14.01eV VP: >35atm FI.P: N/A	INH	Headache, rapid breathing, nausea, tiredness, dizziness, confusion

NOTES:

OSHA PEL	Occupational Safety and Health administration Final Rule Limits, Permissible Exposure Limit for an eight=hour, time-weighted average
ACGIH TLV	American Conference of Governmental Industrial Hygienists, Threshold Limit Value for eight-hour, time-weighted average
STEL	Short-term Exposure Limit for a 15-minute, time-weighted average
NIOSH IDLH	National Institute for Occupational Safety and Health, Immediately Dangerous to Life or Health concentration
PPM	Part of vapor or gas per millions parts of air by volume at 25°Celsius and 760mm Hg mg/m³ (milligram of substance per cubic meter of air)
CA	NIOSH has identified numerous chemicals that it recommends to be treated as potential or confirmed human carcinogens.
(C)	The (ceiling) concentration that should not be exceed during any part of the working exposure.
Skin	Refers to the potential contribution to the overall exposure by the cutaneous (absorption) route, including mucous membranes and eye, either by airborne or more particularly by direct contact with the substance.
UEL	Upper Explosive Limit – the highest concentration of a material in air that produces an explosion in fire or ignites when it contacts an ignition source.
LEL	Lower Explosive Limit – the lowest concentration of the material in air that can be detonated by spark, shock, fire, etc.
INH	Inhalation
ABS	Skin absorption
ING	Ingestion
CON	Skin and/or eye contact

4.2 Physical Hazards

Field employees and subcontractors may be exposed to a number of physical hazards during this project. Physical hazards that may be encountered include the following:

- Heat and cold stress
- Lifting hazards
- Slips, trips and falls
- Working around heavy equipment
- Drilling hazards
- Noise
- Use of hand and power tools
- Buried hazards
- Electrical hazards
- Underground and overhead utilities
- Working over water
- Travel to and from site

4.2.1 Heat Stress

Local weather conditions may produce an environment that will require restricted work schedules in order to protect employees from heat stress. The Project Manager or the Field Lead Team Member will observe workers for any potential symptoms of heat stress. Adaptation of work schedules and training on recognition of heat stress conditions should help prevent heat-related illnesses from occurring. Heat stress controls will be stated at 70°F for personnel in protective clothing and at 90°F for personnel in regular work clothing. Heat stress prevention controls include:

- Allow workers to become acclimatized to heat (three to six days)
- Provide rest breaks in a shaded or air-conditioned break area
- Provide sun screen to prevent sun burn
- Provide drinking water and electrolyte-replenishing fluids
- Keep ice readily available to rapidly cool field team members

The following Heat Stress Index should be used as a guide to evaluate heat stress situations. If the Heat Stress exceeds 105 degrees Fahrenheit, contact the project manager prior to conducting work for detailed guidance.

Heat Stress Index

Temp. °F	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
105	98	104	110	120	132				
102	97	101	108	117	125				
100	95	99	105	110	120	132			
98	93	97	101	106	110	125			
96	91	95	98	104	108	120	128		
94	89	93	95	100	105	111	122		
92	87	90	92	96	100	106	114	122	
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
84	78	81	83	85	86	89	91	95	99
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

NOTES: Add 10° F when protective clothing is being used; Add 10° F when in direct sunlight

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HSI Temp	Category	Injury Threat
Above 130° F	Extreme Danger	No work unless emergency exists. Contact Cardno ATC RSC and Corporate Risk Management Department prior to proceeding. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
105° to 130° F	Danger	Contact RSC prior to proceeding. Requires strict adherence to ACGIH Heat Stress Guidelines, including use of on-site WBGT equipment. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
90° to 105° F	Extreme Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
80° to 90° F	Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
Below 80° F	Normal Range	Typical conditions for time of year. Little or no danger under normal circumstances. As always, anticipate problems and work safely.

4.2.2 Cold Stress

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. The objective is to prevent the deep body temperature from falling below 96.8° F and to prevent cold injury to body extremities. Two factors influence the development of a cold injury the ambient temperature, and wind velocity. Reduced body temperature will very likely result in reduced mental alertness, reduction in rational decision making, and/or loss of consciousness with the threat of death.

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Use appropriate cold weather clothing when temperatures are at or below 40° F as exposed skin surfaces must be protected. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against glare and ultraviolet light should be worn in snowy and icy conditions.

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can also be used to shield the work area from the cooling effects of wind.

If extreme cold-related weather conditions occur, EAG field personnel and subcontractors will take the following precautions:

- Wear adequate insulated clothing when the air temperature drops below 40°F
- Reduce work periods in extreme conditions to allow adequate rest periods in a warm area
- Change clothes when work clothes become wet
- Avoid caffeine (which has diuretic and circulatory effects)

4.2.3 Lifting Hazards

Field personnel may be exposed to injury caused by lifting heavy objects and various pieces large or unwieldy pieces of equipment. All field team members will be trained in the proper methods for lifting heavy and/or large equipment and are cautioned against lifting objects that are too heavy or too big for one person. Proper lifting techniques include the following:

- Keep feet approximately shoulder width apart
- Bend at the knees
- Tighten abdominal muscles
- Lift with the legs
- Keep the load close to the body
- Keep the back upright
- Use the buddy system for larger or heavy pieces of equipment

All drums will be staged using an approved drum dolly or other appropriate equipment. Proper care will be taken in the use of this equipment. Healthy employees with no medical restrictions may lift and carry a maximum of 50 pounds using proper lifting and carrying techniques. This recommended weight limit may be reduced depending on physical and workplace factors.

4.2.4 Slips, Trips and Falls

The most common hazards that will be encountered during field activities will be slips, trips and falls. Field team members are trained to use common sense to avoid these hazards such as using work boots/safety shoes with nonskid soles. When working on slippery surfaces, tasks will be planned to decrease the risk of slipping via avoiding the slippery areas, if possible, or utilizing engineering controls. Engineering controls may involve the placement of supplemental material such as boards, gravel, or ice melt should be utilized to mitigate slippery conditions. Other engineering controls may involve the use of footgear traction control devices. Employees and subcontractors will avoid slippery surfaces, use engineering controls as appropriate, not hurry, and maintain good housekeeping.

4.2.5 Buried Hazards

Whenever the ground is penetrated, the potential for contacting buried hazards exists. During the planning/mobilization phase, prior to drilling or other excavation activities, EAG personnel and/or their contractors will establish the location of underground utility lines (gas, electrical, telephone, fiber optic cable, etc.) and/or substructures or other potential buried hazardous items. This may be conducted by review of historic utility and substructure maps, private utility locates, ground penetrating radar, or other technologies. If there is any evidence of utilities or subsurface objects/structures, drilling or excavation activities may be offset. If activities cannot be offset, measures will be taken to remove, disconnect, and/or protect the utilities and/or subsurface structures and/or objects. Every reasonable effort will be made to clear the area of intrusive work prior to fieldwork being started.

4.2.6 Electrical Hazards

It may be possible that overhead power lines will be in proximate locations during drilling or excavation activities. At least a 20 foot clearance must be maintained from overhead power lines. No equipment such as drill rigs or dump trucks can be moved while masts or buckets are in the upright position. Field personnel and subcontractors performing electrical work are required to be appropriately trained to work on the electrical systems in question prior to start of work. Authorization from project management personnel is required prior to any electrical work or work near overhead power lines. . When using extension cords, all field workers will ensure that they are in good working condition, are correctly rated for use, and do not contain abrasions such that bare wires could be exposed to the environment. Extension cords will not be used in wet areas without plugging the extension cord into a ground fault circuit interrupter (GFCI). GFCIs will detect a short circuit and cut power.

4.2.7 Heavy Equipment Operations

Heavy equipment must be operated in a safe manner and be properly maintained such that operators and ground personnel are protected.

Requirements for Operators

- Only qualified, trained, and authorized operators are allowed to operate equipment
- Seat belts will be used at all times in all equipment and trucks
- Operators will stop work whenever ground personnel or other equipment enter their work area; work will resume only when the area has been cleared
- No personnel may ride on equipment other than the Authorized Operator
- No personnel may be carried or lifted in the buckets or working "arms" of the equipment
- Spotters will be used when ground personnel are in the vicinity of heavy equipment work areas and/or when an operator is backing equipment near other structures or congested area

Requirements for Ground Personnel

- All ground personnel must wear orange protective vests in work areas with any operating heavy equipment
- Ground personnel will stay outside of the swing zone or work area of any operating equipment
- Ground personnel may only enter the swing or work area of any operating equipment when:
  -They have attracted the operators attention and made eye contact
  -The operator has idled the equipment down and grounded all extensions
  -The operator gives the ground personnel permission to approach
- Ground personnel shall never walk or position themselves between any fixed object and running equipment or between two running pieces of equipment

Equipment

- Maintain operations manuals at the site for each piece of equipment that is present and in use
- Ensure operators are familiar with the manual for the equipment and operate the equipment within the parameters of the manual
- Ensure all equipment is provided with roll-over protection systems
- Verify that seatbelts are present and functional in all equipment
- Prohibit the use of equipment that has cab glass which is broken or missing
- Ensure that backup alarms are functional on all trucks and equipment
- Require all extensions such as buckets, blades, forks, etc. to be grounded when not in use
- Require brakes to be set and wheels chocked (when applicable) when not in use

Daily inspections of equipment are required using a Daily Heavy Equipment Safety Checklist. Equipment deemed to be unsafe as a result of daily inspection will not be used until required repairs or maintenance occurs. During maintenance/repair, ensure that motors are turned off, all extensions are grounded or securely blocked, controls are in a neutral position, and the brakes are set.

4.2.8 Drilling and Excavation Safety

Prior to any intrusive work, as previously mentioned, the location of underground utilities, such as sewer, telephone, gas, water and electric lines must be determined and plainly staked. Necessary arrangements must be made with the utility company or owner for the protection, removal or relocation of the underground utilities. In such circumstances, excavation will be done in a manner that

does not endanger the field personnel engaged in the work or the underground utility. Utilities left in place will be protected by barricading, shoring, suspension or other measures, as necessary.

The use of unsafe or defective equipment is not permitted. Equipment must be inspected regularly. If found to be defective, equipment must be immediately removed from use and either repaired or replaced prior to resuming work with that equipment. Field personnel will be familiar with the location of first-aid kits and fire extinguishers. Telephone numbers for emergency assistance must be prominently posted and kept current.

Good housekeeping conditions will be observed in and around the work areas. Suitable storage places will be provided for all materials and supplies. Pipe, drill rods, etc. must be securely stacked on solid, level sills. Work surfaces, platforms, stairways, walkways, scaffolding, and access ways will be kept free of obstructions. All debris will be collected and stored in piles or containers for removal and disposal.

The area of the site to undergo intrusive activity must be walked over with the drillers and/or heavy equipment operators to identify all work locations, as well as making sure all marked utilities are seen by those doing the intrusive work.

Drilling Specific Concerns:

In areas where utilities have been identified or may be suspected, pre-drilling clearance such hand-augering, hand excavation (with shovels or post-hole diggers), or air-knifing to a depth of at least 5' below ground surface (BGS) may be required. The Project Manager will provide guidance in those instances on what has been determined as an acceptable means of clearing drilling locations. It should be noted that if the soil lithology changes to gravel within those 5 feet, that may be an indication of a utility trench and extreme caution should be taken OR the drilling location should be offset 5 horizontal feet from the original location. Should 3 consecutive attempts be made without success to offset a particular drilling location, the field personnel should stop and contact the Project Manager for further instruction.

Special precaution must be taken when using a drill rig on a site within the vicinity of electrical power lines and other overhead utilities. Electricity can shock, burn and cause death. When overhead electrical power lines exist at or near a drilling site, all wires will be considered dangerous.

A check will be made for sagging power lines before a site is entered. Power lines will not be lifted to gain entrance. The appropriate utility company will be contacted and a request will be made that it lift or raise cut off power to the lines.

The area around the drill rig will be inspected before the drill rig mast (derrick) is raised at a site in the vicinity of power lines. The minimum distance from any point on the drill rig to the nearest power line will be determined when the mast is raised or is being raised. The mast will not be raised and the drill rig will not be operated if this distance is less than 20 feet, because hoist lines and overhead power lines can be moved toward each other by the wind.

Before the mast is raised, personnel will be cleared from the immediate area, with the exception of the operator and a helper, when necessary. A check will be made to ensure safe clearance from energized power lines or equipment (minimum 20-foot clearance). Unsecured equipment must be removed from the mast and cables, mud lines and catline ropes must be adequately secured to the mast before raising. After it is raised, the mast must be secured to the rig in an upright position with steel pins.

Excavation Specific Concerns:

For excavation work, entry into an excavated area or trench will only be allowed when:

- Shoring, sloping, and spoil pile placement is in conformance with 29 CFR 1926 Subpart P, and
- Personal protection and monitoring, as detailed in this HASP, has been implemented.

All excavation contractors are required to provide an OSHA trained and certified Competent Person. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by the Competent Person for evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the Competent Person prior to the start of work and as needed throughout each shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. All inspections made by the Competent Person should be recorded in the field log book. No personnel shall perform work in a trench or excavation that contains accumulated water (any accumulated water will need to be either pumped out until the trench/excavation is dry, or the accumulated water is allowed to disperse naturally). Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when excavations are made entirely in stable rock or the excavation is less than 5 feet in depth and examination by the Competent Person provides no indication of a potential cave-in. Protective systems consist of sloping or benching, use of trench boxes or other shielding mechanisms, or the use of a shoring system in accordance with the regulations.

When mobile equipment is operated adjacent to an excavation and the operators/drivers do not have a clear and direct view of the edge of the excavation, a warning system such as barricades, hand or mechanical signals, or spotters are required.

Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard to personnel in the excavation. All temporary spoil piles shall be kept at least 2 feet away from the edge of the excavation. Spoil piles should be placed to channel rainwater or other run-off water away from the excavation.

All excavations deeper than 4 feet deep and which have the potential to have a hazardous atmosphere or oxygen deficient atmospheres (less than 19.5% oxygen) must be tested to ensure safe working conditions, prior to entry.

4.2.9 Use of Hand Tools and Portable Power Tools

Hand tools will be kept in good repair and used only for their designed purposes. Proper protective eyewear will be worn when using hand tools and portable power tools. Unguarded sharp-edged or

pointed tools will not be carried in field personnel's pockets. The use of tools with mushroomed heads, split or defective handles, worn parts, or other defects will not be permitted. Inspect all tools prior to start-up or use to identify any defects. Tools that have become unsafe will be reconditioned before reissue or they will be discarded and replaced. Throwing or dropping of tools from one level to another will not be permitted; rather, containers and hand lines will be used for transporting tools from one level to another if working at heights.

Non-sparking tools will be used in atmospheres where sources of ignition may cause fire or explosion. Electric-powered shop and hand tools will be of the double-insulated, shockproof type, or they will be effectively grounded. Power tools will be operated only by designated personnel who are familiar and trained with their use. When not in use, tools will not be left on scaffolds, ladders or overhead working surfaces.

4.2.10 Noise

Exposure to high levels of noise may occur when working near drill rigs or other heavy equipment. Also, depending upon where the work is being performed, local equipment (e.g., airports, factory machines, etc.) may produce high levels of noise. A good indication of the need for hearing protection is when verbal communication is difficult at a distance of 2-3 feet. Personnel will be provided with ear plugs and/or earmuffs when exposed to noise levels in excess of the 8-hour Permissible Exposure Limit (PEL) of 90 decibels.

4.2.11 Work Zone Traffic Control

Personnel will exercise caution when working near areas of vehicular traffic. Work zones will be identified by the use of delineators (traffic cones, flags, vehicles, DOT approved devices, temporary or permanent fencing, and/or safety barrier tape). Personnel will wear reflective vests when working in these areas. Depending on frequency, proximity, and nature of traffic, a flag person may also be utilized.

4.2.12 Work Over Water

If personnel will be working near, above or immediately adjacent to or within 6 feet of water that is 3 feet or more deep or where water presents a drowning hazard (e.g., fast-moving stream, water body with a soft bottom), employees are required to a U.S. Coast Guard (USCG) approved personal flotation device (PFD). All PFDs must have reflective tape on them to facilitate visibility. Employees must inspect PFDs daily before use for defects. Do no use defective PFDs.

4.2.13 Vehicle Use

Personnel must use caution when driving to, from, and across the site, paying special attention to other site traffic, as well as weather and road conditions. Heavy equipment should be transported during non-rush hour traffic.

4.3 Biological Hazards

Site activities on this Site may expose workers to other hazards such as poisonous plants, insects, animals, and indigenous pathogens. Protective clothing and respiratory protection equipment, and being capable of identifying poisonous plants, animals, and insects, can greatly reduce the chances of exposure. Thoroughly washing any exposed body parts, clothing, and equipment will also protect against infections. Avoiding contact with biological hazards is the best way to prevent potential adverse health effects. Recognition of potential hazards is essential. When avoidance is impractical or impossible, PPE, personal hygiene, good general health and awareness must be used to prevent adverse effects. If working in wooded/grassy areas, use appropriate insect repellants (containing DEET and/or Permethrin) and apply them per the manufacturers' directions. The following is a list of biological hazards that may be encountered while performing field activities at the project site and surrounding areas:

BIOLOGICAL HAZARD and LOCATION	CONTROL MEASURES
Snakes typically are found in underbrush and tall grassy areas.	If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound or apply a tourniquet. Carry the victim or have him/her walk slowly if the victim must be moved. Try to identify the snake: note color, size, patterns and markings.
Poison ivy, poison oak and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas.	Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.
Exposure to **bloodborne pathogens** may occur when rendering first aid or CPR, or when coming into contact with medical or other potentially infectious material or when coming into contact with landfill waste or waste streams containing such infectious material.	Training is required before a task involving potential exposure is performed. Exposure controls and personal protective equipment (PPE) area required. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.
Bees, spiders and other stinging insects may be encountered almost anywhere and may present a serious hazard particularly to people who are allergic.	Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past and inform the Project Manager and/or the buddy. If a stinger is present, remove it carefully with tweezers. Watch for allergic reaction; seek medical attention if a reaction develops.
Ticks typically are in wooded areas, bushes, tall grass and brush. Ticks are black, black and red or brown and can be up to one-quarter inch in size.	Avoid tick areas. Wear tightly woven, light-colored clothing with pants tucked into boots or socks. Spray outside of clothing with insect repellent containing permethrin. Check yourself for ticks often. If bitten, carefully remove tick with tweezers. Report the bit to the Project Manager. Look for symptoms of Lyme

	disease that include a rash that looks like a bulls eye and chills, fever, headache, fatigue, stiff neck or bone pain. If symptoms appear, seek medical attention.

5.0 PERSONAL PROTECTIVE EQUIPMENT

PPE ensembles are used to protect employees and subcontractors from potential contamination hazards while conducting project field activities. Level D is expected to be used for most activities at the site. The following subsections describe the PPE requirements for the field activities.

5.1 Level D Protection

When the atmosphere contains no known hazards and work functions preclude splashes, immersions or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals, Level D protection may be used. Level D does not provide respiratory protection and only provides minimal dermal protection. The Level D ensemble consists of the following:

- Work clothes that may consist of a short or long-sleeved cotton shirt and cotton pants, cotton overalls, or disposal overalls such as Tyvek™
- Steel-toe/steel-shank work boots
- Safety glasses with side shields
- Hearing protection, as necessary
- Hand protection, as appropriate
- Hard hat when working around overhead equipment such as a drilling rig
- Reflective vests when working around heavy equipment or near roadways
- Body harness and life vests when working on or within 6 feet of bulkheads, at heights, or in 3 feet or more of standing water (such as in Tin Mill Canal)

5.2 Modified Level D Protection

This is the level of protection that may be needed for material handling, sampling operations, and operation of remediation equipment when splash hazards are present. Modified Level D protection consists of the following:

- Disposable overalls such as polyethylene-coated Tyvek™
- Latex, vinyl, or nitrite inner gloves when handling liquids/fluids
- Nitrile outer gloves (taped to outer suit)
- Chemical-protective over-boots (taped to outer suit)
- Steel-toe/steel-shank, high-ankle work boots
- Hard hat with face shield
- Safety glasses with side shields or goggles
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- Hearing protection, as necessary

5.3 Level C Protection

Level C protection will be used when site action levels are exceeded and respiratory protection is required. The Level C ensemble consists of Modified Level D with the following modifications:

- Half or full-face air-purifying respirator (APR) equipped with appropriate cartridges/filters
- Chemical resistant clothing such as poly-coated Tyvek™
- Inner and outer nitrile gloves
- Chemical-resistant safety boots or boot covers to go over safety boots

Upgrading or downgrading the level of protection used by EAG employees and subcontractors is a decision made by EAG based on the air monitoring protocols presented in Section 7.0 for respiratory protection, the potential for inhalation exposure to toxic chemicals, and the need for dermal protection during the activity.

5.4 First Aid, Emergency and Safety Equipment

The following first aid, emergency and safety equipment will be maintained onsite at the work area:

- A portable eye wash
- Appropriate ABC-type fire extinguishers (minimum of 10 pounds; remediation systems to house individual 20 pound extinguishers) carried in every vehicle used during field operations
- Industrial first-aid kit (one 16-unit that complies with American National Standards Institute (ANSI) Z308A for every 25 persons or less)
- Bloodborne pathogen precaution kit with CPR mouth shield
- Instant cold packs
- Soap or waterless hand cleaner and towels
- American Red Cross First Aid and CPR Instruction Manuals

6.0 PERSONNEL TRAINING AND STANDARD SAFETY PROCEDURES

Employees must have received, at the time of project assignment, a minimum of 40 hours of initial OSHA health and safety training for hazardous waste site operations. Personnel who have not met the requirements for the initial training will not be allowed in the Exclusion Zone (EZ) or Contamination Reduction Zone (CRZ) of any active work area. A copy of each subcontractor site worker's 40-hour training certificate must be sent to the Project Manager for review prior to the start of the site work.

The 8-hour refresher training course must be taken at a minimum of once per year. At the time of the job assignment, all site workers must have received 8 hours of refresher training within the past year. This course is required of all field personnel to maintain their qualifications for hazardous waste site work. A copy of each subcontractor site worker's most recent 8-hour refresher training certificate must be sent to the Project Manager for review prior to the start of the site work.

A site-specific safety orientation will be conducted by EAG for all EAG employees and subcontractors engaged in fieldwork.

6.1 Onsite Safety, Health and Emergency Response Training

The OSHA 1910.120 standard requires that site safety and health training be provided by a trained, experienced supervisor. "Trained" is defined to mean an individual that has satisfactorily completed the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course and 8-hour site supervisor training. Training will be offered at the time of the initial task assignment and/or whenever new chemicals are introduced into the workplace. Training will include all applicable regulatory requirements, location of the program, inventory and MSDSs, chemicals used and their hazards (chemical, physical, and health), how to detect the presence or release of chemicals, safe work practices and methods employees can take to protect themselves from hazards, how to read MSDSs and site or project specific information on hazard warnings and labels in use at that location. All training will be documented and training certificates will be kept in the employee's permanent training file. All applicable training will also require annual refreshers.

EAG qualified personnel must also provide safety meetings.

6.2 Standard Safety Procedures

This section describes the standard safety procedures that EAG requires all onsite personnel to follow during site activities.

6.2.1 General Safety Work Practices

All onsite employees and subcontractors will observe the following general safety work practices:

- Health and safety tailgate briefings will occur to introduce new activities, any new safety issues, and emergency egress routes for work areas; any significant change (added personnel, change in scope, or change in field conditions) will trigger a second (or more) tailgate meeting to address whatever change occurred
- No food, drink, or tobacco products will be allowed in the Exclusion and Contamination Reduction Zones
- Loose clothing, hair, and/or jewelry will not be permitted around moving or rotating equipment
- The "buddy system" will be implemented as necessary whereby a pair of co-workers watches out for each other while in proximity of potential physical work hazards
- Good housekeeping of all work areas will be maintained on an ongoing basis

6.2.2 Hand Safety

This standard is intended to protect employees from activities that may expose them to injury. This standard provides information on recognizing those conditions that require personal protective equipment (PPE) or specific work practices to reduce the risk of hand injury.

Appropriate gloves must be worn when persons work with materials or equipment that presents the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc.

<u>Guidelines for Working With and Around Equipment (Hand Tools, Portable Powered Equipment)</u>:

- Employees should be trained in the use of all tools.
- Keep hand and power tools in good repair and use them only for the task for which they were designed.

- Inspect tools before use and remove damaged or defective tools from service.
- Operate tools in accordance with manufacturer's instructions.
- Do not remove or bypass a guarding device for any reason.
- Keep surfaces and handles clean and free of excess oil to prevent slipping.
- Wear proper PPE, including gloves, as necessary.
- Do not carry sharp tools in pockets.
- Clean tools and return to the toolbox or storage area upon completion of a job.
- Before applying pressure, ensure that wrenches have a good bite.
- Brace yourself by placing your body in the proper position so you will not fall if the tool slips.
- Make sure hands and fingers have sufficient clearance in the event the tool slips.
- Always pull on a wrench, never push.
- When working with tools overhead, place tools in a holding receptacle when not in use.
- Do not throw tools from place to place or from person to person, or drop tools from heights.
- Inspect all tools prior to start-up or use to identify any defects.
- Powered hand tools should not be capable of being locked in the ON position.
- Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.
- Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.
- Do not use cheater pipes.
- Make provisions to prevent machines from restarting through proper lockout/tagout.

<u>Guidelines for using Cutting Tools:</u>

- Always use the specific tool for the task. Tubing cutters, snips, self- retracting knives, concealed blade cutters, and related tools are task specific and minimize the risk of hand injury. For more information about cutting tools, see Supplemental Information A.
- Fixed open-blade knives (FOBK) are prohibited from use. Examples of fixed open-blade knives include pocket knives, multitools, hunting knives, and standard utility knives.
- When utilizing cutting tools, personnel will observe the following precautions to the fullest extent possible:
- Use the correct tool and correct size tool for the job.
- Cut in a direction away from yourself and not toward other workers in the area.
- Maintain the noncutting hand and arm toward the body and out of the direction of the cutting tool if it were to slip out of the material being cut.
- Ensure that the tool is sharp and clean; dirty and dull tools typically cause poor cuts and more hazard than a sharp, clean cutting tool.
- Store these tools correctly with covers in place or blades retracted, as provided by the manufacturer.
- On tasks where cutting may be very frequent or last all day (e.g., liner samples), consider Kevlar® gloves in the PPE evaluation for the project.
- Do not remove guards on paper cutters.

6.2.3 Respiratory Protection

Based on air monitoring, an upgrade to Level C protection may be indicated. Half or full-face APRs will be utilized for protection against organic vapors and particulates. All employees required to wear respirators will be need to be medically cleared, in writing to do so by a qualified Occupational Physician.

All respirator users must be trained before they are assigned a respirator, annually thereafter, whenever a new hazard or job is introduces and whenever employees fail to demonstrate proper use or knowledge. Training will include, at a minimum:

- Why the respirator is necessary and what conditions can make the respirator ineffective.
- What limitation and capabilities of the respirators area.
- How to inspect, put on and remove and check the seals of the respirator.
- What respirator maintenance and storage procedures are.
- How to recognize medicals signs and symptoms that may limit or prevent effective use of the respirator.
- The engineering and administrative controls being used and the need for respirators.
- The hazards and consequences of improper respirator use.
- How to recognize and handle emergency situations.

Training will be documented and training certificated will be kept in the employee's permanent training file.

6.2.4 Personal Hygiene Practices

The field team must pay strict attention to sanitation and personal hygiene requirements to avoid personal contamination. The following instructions will be discussed and must be followed:

- During field activities, never put anything in the mouth, including fingers
- All employees must wash their hands, forearms, face, and neck before eating drinking, smoking or using the restroom
- Smoking is prohibited except in designated areas outside the work zone
- At the end of the day, all employees will shower upon returning home or to their hotel

6.2.5 Electrical Safety

All extension cords used onsite must be heavy-duty variety and must be properly grounded. All temporary circuitry must incorporate the use of GFCI devices. Refer to electrical safety in Section 4.2.6, Electrical Hazards.

6.2.6 Fire Safety

All flammable liquids will be used only for their intended purpose and stored and handled only in approved containers. Portable containers must be the approved red safety containers equipped with flame arresters and self-closing lids. All transfers of flammable liquids must be made with the containers grounded or bonded. Also, gasoline containers will be clearly labeled and storage areas (if

applicable) will be posted with "No Smoking" signs. Fire extinguishers will be stalled in all areas that contain flammable liquids.

6.2.7 Illumination

All work is planned for daylight hours. No special requirements are anticipated. However, should any work take place outdoors after daylight hours, suitable lighting will be required. In addition, suitable lighting is to be provided in each remediation system building or enclosure.

6.2.8 Sanitation

Potable water and toilet facilities will be provided in compliance with the OSHA 1926.51 standard. Any container used to distribute drinking water shall be clearly marked and not used for any other purpose. Single drinking cups will be supplied, both a sanitary container for the unused cups and a receptacle for disposed of the used cups will also be provided. Port-a-johns will be provided since there are no sanitary sewers on the job site.

7.0 EXPOSURE MONITORING PLAN

This section describes air and personnel monitoring protocols, sampling methods, and instrumentation to be used, as well as the methods and frequency of sampling instrument calibration and action levels for potential work site hazards. When engaged in air monitoring, EAG personnel and subcontractors must use the forms to record air monitoring data and air monitoring instrument calibration records. All monitoring records/forms are to be maintained in the project file by the EAG Project Manager.

7.1 Air Monitoring

The surveillance program is established to detect changes in the ambient air at the work site and to ensure the continuing safety of the work zones and adequacy of the level of worker protection. During field activities, the designated field team member will monitor the work site for combustible gas concentrations and organic vapors. Calibration of all monitoring equipment will be performed in accordance with the manufacturers' procedures by trained EAG employees and subcontractors. The Project Manager, Project Field Team Leader or representative will be notified immediately of any contaminant levels that could trigger an upgrade in PPE or cause a suspension of site activities.

- One or more of the following direct-reading instruments may be used to aid in this determination. Photoionization Detectors (PID) and Flame Ionization Detectors (FID) will measure non-specific organic gases and vapors. Combustible Gas Indicators (CGI) will detect explosive atmospheres. Oxygen (O2) meters will detect fluctuations in oxygen concentrations. These instruments should be calibrated or bump tested daily and whenever the readings may be erratic. All readings should be recorded in the field log books.

Air monitoring results obtained from the breathing zone during field activities will be recorded in field log books. All such records will also include the location, date/time, weather conditions, person monitored, background concentration, and identification of specific contaminant whenever possible. Air monitoring information will be utilized to evaluate personnel exposure and assess the appropriateness of PPE for Site conditions.

7.1.1 Combustible Gas and Oxygen Deficiency/Excess Monitoring

Explosive gas concentrations are not expected to exceed 10% of the lower explosive level (LEL). Should the need be indicated for monitoring, action guidance for the CGI/O2 meter responses is contained in **Table 7-1**.

Table 7-1

CGI/Oxygen Meter Action Levels	
Meter Response	**Action**
CGI response 0%-10% LEL	Continue normal operations
CGI initial response >10% and <20% LEL	Eliminate all sources of ignition from the work area; temporarily retreat from work area for 15-30 minutes and then monitor area again
CGI response after 15-30 minute retreat >10% and <20% LEL	Retreat from work area; notify Project Manager
CGI response >20%	Discontinue operations; retreat from work area
Oxygen level <19.5%	Retreat from work area; notify Project Manager
Oxygen level >23.5%	Retreat from work area; notify Project Manager

7.1.2 Organic Vapor Concentrations

Real-time monitoring for organic vapor concentrations in the breathing zone and down hole will be conducted during field operations (installation of groundwater monitoring and groundwater sampling by EAG and EAG subcontractor personnel) with a PID equipped with a 10.2- or 11.7-electron volt (eV) probe. The PID will be taken into the field and operated during site activities where contaminated soil and/or groundwater may be present. Air monitoring will be conducted during well installation and when a well is opened for groundwater measurements. Measurements will be made at the well head and personnel breathing zones where activities are being performed. The instrument will be calibrated using ultra-high purity air and isobutylene vapor of known concentration before and after use each day. Air calibration measurements will be documented in writing and kept in the project file. Action guidance for PID responses is contained in **Table 7-2**.

Table 7-2

Action Levels for General Site Work	
Meter Response in Breathing Zone (minimum of 3 minutes)	**Action Required**
<5ppm above background	Use Level D PPE
>5ppm above background	Level C PPE, including half or full-face APR with organic vapor cartridges/P100 filters
>50ppm above background	Stop work
Action Levels for Handling NAPL	
Meter Response in Breathing Zone (minimum of 3 minutes)	**Action Required**
<1ppm above background	Use Modified Level D PPE
>1ppm to <10ppm	Level C PPE, including half or full-face APR with organic vapor cartridges
>10ppm above background	Immediately withdraw; monitoring will continue until action levels will allow safe re-entry

If air concentrations of organic vapors are greater than 5 ppm above background in the breathing zone for a 3-minute period, personnel will stop work, retreat from site, and allow time (at least 15 minutes) for vapors to dissipate. If monitoring indicates that concentrations still exceed 5 ppm, workers will upgrade to Level C PPE. If monitoring indicates that concentrations exceed 50 ppm, work will be stopped until site conditions can be re-evaluated.

These action levels are based on the assumption that the major component of free product being recovered will be benzene or naphthalene.

Work involving NAPL recovery from monitoring wells will be conducted in Level C PPE. This level may be downgraded based on air monitoring data and actual field conditions. Downgrading of PPE must be approved by the PM and HSE staff. If ventilation is conducted, additional air monitoring will be performed to the resumption of work to determine the level of PPE required.

7.2 Physical Conditions Monitoring

Site workers will be monitored by the Project Manager for signs of weather-related symptoms from exposure to excessive heat or cold.

Whenever the air temperature exceeds 70°F for personnel wearing chemical protective clothing or 90°F for personnel wearing regular work clothes, the Project Manager will assess conditions that may cause heat stress in site workers.

8.0 MEDICAL SURVEILLANCE

This section discusses the medical surveillance program, how the results are reviewed by a physician and how participation is documented.

8.1 Medical Surveillance Program

All personnel who will be performing any task where potential exposure to hazardous material exists will undergo medical surveillance as outlined in OSHA 29 CFR 1910.120(f). All personnel performing tasks in the Exclusion Zone or Contamination Reduction Zone will be required to have passed the EAG medical surveillance examination (or equivalent), performed by a licensed Occupational Physician. The Project Manager will verify that all EAG and subcontractor personnel meet applicable OSHA medical surveillance requirements.

Applicable field employees will undergo an annual comprehensive medical examination, including a comprehensive health history, blood chemistry with complete blood count and differential, urinalysis, medical history, required chest x-rays, audiogram, pulmonary function testing, testing for heavy metals (as needed), and a physician's interpretation of each employee's medical surveillance examination, including the ability of the employee to wear a respirator. A comprehensive medical examination will be performed if an employee develops signs or symptoms indicating possible overexposure to hazardous substances and/or heat or cold stress.

8.2 Physician Review

All medical surveillance and examination results are reviewed by a licensed physician who is certified in Occupational Medicine by the American Board of Preventive Medicine. EAG employee participation in the medical surveillance program is a part of their permanent medical record maintained in the employee's home office. A copy of the current medical clearance signed by the occupational health physician for all EAG employees must be maintained at the home office.

9.0 SITE CONTROL MEASURES AND DECONTAMINATION

To provide for the protection of public health and safety and minimize the possibility of transferring hazardous substances from the site, contamination control procedures are required. These procedures consist of site control measures (which entail the delineation of work zones, communications, and site security) and decontamination procedures (which are necessary for both personnel and equipment). Contaminants that may be uncovered during sampling operations must not be transferred outside the work zone unless properly containerized, and must be removed from clothing, personnel, and equipment prior to relocation from that zone. This section discusses site control measures and decontamination procedures to be used during the collection of samples, the installation of soil borings and/or groundwater monitoring/remediation wells, excavations, and other intrusive work where contact with impacted soils and groundwater could occur by EAG and/or EAG subcontractor personnel.

9.1 Site Control Measures

Site control can be achieved by effectively delineating the work zone, providing appropriate communication, and establishing site security.

9.1.1 Work Zone Delineation

To minimize the transfer of hazardous substances from the site and to ensure proper protection of employees and subcontractors, work zones will be established by the Field Project Team Leader. Applicable site work and the associated requirement for work zones will be determined by the Project Manager. The work area will be divided into an Exclusion Zone (EZ), a Contamination Reduction Zone (CRZ), and a Support Zone (SZ). A typical work zone delineation setup is shown as **Figure 9-1**, below.

Exclusion Zone (EZ)

Contamination does or could exist in this zone. Only properly authorized and trained individuals (refer to Section 6.0) wearing appropriate PPE will be allowed to enter and work in this zone. All people entering the EZ must wear, at a minimum, Level D protection. An entry and exit point for personnel and equipment will be established at the periphery of the EZ (between the EZ and the CRZ) to regulate the flow of personnel and equipment.

Contamination Reduction Zone (CRZ)

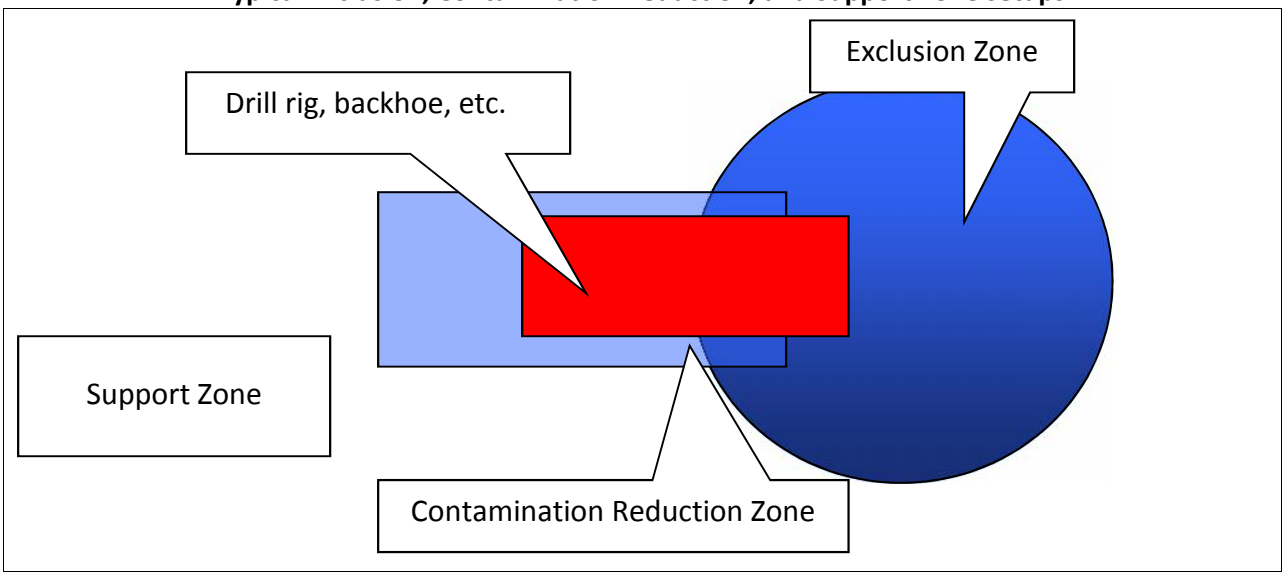
Between the EZ and the SZ will be the CRZ, which will provide a transition between the potentially contaminated EZ and the clean SZ. The CRZ (located upwind of the EZ, if possible) will be a corridor leading from the EZ and will serve as a buffer to further reduce the probability of the SZ becoming contaminated. Exit from the EZ will only be allowed through this CRZ. The CRZ will provide additional assurance that the physical transfer of contaminating substances on people, equipment, and/or in the air will be limited through a combination of decontamination and zone restrictions. Within this zone, employees and subcontractors may perform personal decontamination (e.g., face and hand washing), and certain PPE and small equipment decontamination. Buckets or wash basins for boot

washing and equipment decontamination will be stationed on a sheet of plastic (a minimum of 8 feet by 8 feet), the boundaries of which will constitute the CRZ.

Support Zone (SZ)

The Support Zone will be considered a non-contaminated area. The location of support facilities in the SZ will be upwind of the EZ (where possible) and readily accessible to the nearest road. The field office/support facilities, equipment vehicles, a first aid station and a visitors/personnel entry and exit log for the work site will be located in this zone. Potentially contaminated personal clothing, equipment and samples are not permitted in this zone unless properly containerized.

Figure 9-1
Typical Exclusion, Contamination Reduction, and Support Zone setups



9.1.2 Communications

A loud and clear form of communication should be made available for Site personnel entering the work zones. Site communication may be in the form of hand signals, voice, or other communication devices. All forms of communication should be understood by all workers on the Site prior to starting work. Offsite communications may be conducted with mobile phones or walkie-talkies only if the atmosphere has been deemed non-explosive, and the person using the mobile device is in the SZ while placing the call, or inside the cab of a stationary vehicle.

9.1.3 Site Security

The Sparrows Point facility is not open to the public, and there is a strictly monitored main entrance with a security guard on duty at all times who only allows authorized personnel onto the Site. This limited access to the facility should eliminate the need for many requirements for specific site security except those needed to maintain work zone integrity, such as visible barriers around open excavations or EZs and CRZs. No site visitors will be allowed to travel unescorted by EAG or subcontractor personnel around the facility.

Once site visitors arrive at their intended work zone, they must check in with the Field Team Lead. If visitors are authorized to enter the CRZ and/or the EZ, they must have completed OSHA 1910.120 medical surveillance and training requirements (refer to Section 8.0 and Section 6.0). Visitors must wear

appropriate PPE before they will be allowed to enter the CRZ and/or the EZ. They must also be taken through this HASP during a brief tail-gate meeting and sign the Acknowledgement page in the back prior to engaging in any activities inside the CRZ or the EZ. All site visitors must follow the same site control measures and decontamination procedures as EAG personnel and subcontractors. The Project Manager must also be informed of each visitor's name, purpose for their visit, time of entry (and exit), location of tasks they wish to perform, whether they completed their intended task(s), and any other relevant information pertaining to their visit.

9.2 Decontamination Procedures

Decontamination of employees, subcontractors, and equipment leaving the EZ will be performed to minimize human exposure to hazardous substances and to minimize the spread of contamination to surrounding areas. The purpose of the CRZ is to provide a location to perform limited personnel decontamination and certain PPE and small equipment decontamination.

9.2.1 Personnel Decontamination

Persons leaving the EZ must pass through the CRZ and follow decontamination procedures before entering the SZ. Hand tools and other sampling equipment used in the EZ and reusable PPE (boots, safety glasses, etc.) will be appropriately cleaned prior to removal from the site each day. The step-by-step sequence for personnel decontamination is as follows:

- Remove boot covers (if used) at the boot washing station and place them in the disposal container provided
- Wash outer gloves and chemical resistant boots (if used) at the boot washing station
- Remove wrist tape (if used) and outer gloves and place them in the disposal container provided
- Remove ankle tape (if used) and disposable coveralls (if used) and place them in the disposal container provided
- Remove respirators (if used) and place each in designated locations in the CRZ
- Remove inner gloves and discard in the disposal container provided
- Wash hands and face and proceed to the SZ

Respirators must be fully decontaminated after each use by the personnel who previously wore them. All project employees and subcontractors are required to take a thorough soap and water shower in their home or motel room at the end of each workday. If monitoring or a general exposure assessment indicates that an employee has become contaminated, the employee or subcontractor will notify the EAG Project Manager and the Field Team Lead as soon as the contaminated state has been discovered.

9.2.2 Equipment Decontamination

All equipment leaving the EZ must be decontaminated either within the CRZ or at the central decontamination area. Small equipment, such as hand tools, will be thoroughly decontaminated within the CRZ before being placed in the SZ. The field tools may be scrubbed visually clean using a detergent solution (Alconox/Liquinox) with water and a stiff, long-bristled scrub brush. Following the solution scrubbing, the tools may be rinsed with distilled water or isopropyl alcohol. Any vehicle working in an EZ will be decontaminated before leaving the site. The vehicle will be cleaned by sweeping excess soil and debris off the wheels. A high-pressure sprayer will then be used to wash the wheels, if necessary.

Each piece of equipment will be inspected after cleaning for any soil remaining on the tires or elsewhere. All vehicles will be cleaned to the satisfaction of the Field Team Lead or a designated assistant prior to entering the SZ or leaving the site. Employees or subcontractors performing decontamination shall wear the appropriate level of PPE (refer to Section 5.0).

9.2.3 Waste Management

The Project Manager and the Field Team Leads will be responsible for overseeing the containerization and disposal of any field derived wastes. Contaminated or suspected contaminated field derived wastes shall be disposed of in accordance with all local, state, and/or federal regulations. Field derived wastes include decontamination rinse waters and other related decontamination generated wastes.

Soils and groundwater expected to be encountered during any sampling or intrusive work not to be contaminated, based on existing data, may be discharged to the ground surface in the immediate vicinity of the monitoring well. However, any known or suspected to be contaminated soil (in small quantities) or groundwater will be containerized for future removal, likely in 55-gallon drums or other approved storage vessels. Depending on the suspected contaminants, the recovered groundwater may be sent through one of the onsite groundwater treatment units. However, the treatment unit must be designed to address the contaminants of concern in the groundwater being treated. Otherwise, the liquid must be staged onsite for eventual offsite disposal at an approved facility.

Impacted soil, if in drums, will be staged in an area designated by the Project Manager or Field Team Lead for eventual disposal. For large excavations, where excavated soil is stockpiled, it may be necessary to place soils on plastic and cover with plastic to prevent any potential leachable runoff. The Project Manager and/or Field Team Lead will provide the proper guidance necessary for handling bulk soil piles.

Any NAPL recovered via remediation systems or manual recovery efforts will be properly containerized and either disposed of offsite as a recyclable material, if possible, or as a hazardous waste. The receiving facility must be an approved facility.

10.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

The objective of emergency response and contingency procedures is to ensure that effective actions are implemented in a timely manner to minimize or control the effects of adverse events (e.g., potential chemical exposures, personal injuries, fires/explosions, and spills/releases). The following subsections describe the basic emergency responses required should an emergency take place during field investigation or remedial effort activities.

10.1 Emergency Phone Numbers

Emergency telephone numbers are listed in **Table 10-1**.

Table 10-1
Emergency Telephone Numbers and Agencies

Agency	Telephone Number
Security (Sparrows Point facility)	(410) 388-7761
Ambulance	911
Fire	911
Occupational Health Clinic	(410) 633-3600
Hospital	(410) 550-0100 (general) (410) 550-0350 (emergency)
National Response Center	(800) 424-8802
Poison Control Center - Maryland	(800) 222-1222
EAG Main Contact	
VP Remediation, Russ Becker	(314) 686-5611
Project Manager, James Calenda	(314) 620-3056

10.2 Injury/Illness Treatment

In the event of illness or injury, the following steps will be taken:

- Evaluate the extent of injuries or seriousness of illness.
- When employees require urgent medical attention, call for emergency assistance. First aid should be administered while awaiting an ambulance or paramedics. All emergency medical treatment, other than first aid, will be administered by the local paramedics. **Table 10-1** lists site emergency telephone numbers. In all cases, critical injuries must be immediately referred for professional medical attention.
- For a non-critical injury/illness, first aid will be administered by onsite personnel. Anyone sustaining a non-critical injury/illness who continues to work will be monitored by the Field Team Lead for any signs of worsening condition, if it is deemed that the person can return to work by the Team Lead and Project Manager. Injured personnel who later suffer any worsening change in status are to immediately notify the Team Lead or the Project Manager.

10.3 Occupational Health Clinic and Hospital Information

Occupational Health Clinic

The Concentra Medical Center, located at 1833 Portal Street, Baltimore, MD, is the closest occupational health clinic, just over 6 miles away. A map to the clinic in included as **Figure 10-1**. The clinic should be used for non-emergency injuries and illnesses.

Directions:
From Sparrow's Point Road, turn left onto Wharf Road;
Turn left onto MD-158 W/Bethlehem Blvd. (0.4 mile);
Turn right onto MD-157 N/Peninsula Expy. (2.7 miles);
Turn slight left onto Merritt Ave. (0.1 mile);
Merritt Ave. becomes Sollers Point Rd. (0.3 mile);
Turn left to stay on Sollers Point Rd (0.6 mile);
Turn left onto Williams Ave. (0.2 mile);
Turn right onto Dundalk Ave. (<0.1 miles);
Turn left onto Chandlery St. (0.1 mile);
Turn left onto Portal St.

Figure 10-1: Health Clinic (Non-Emergency) Map

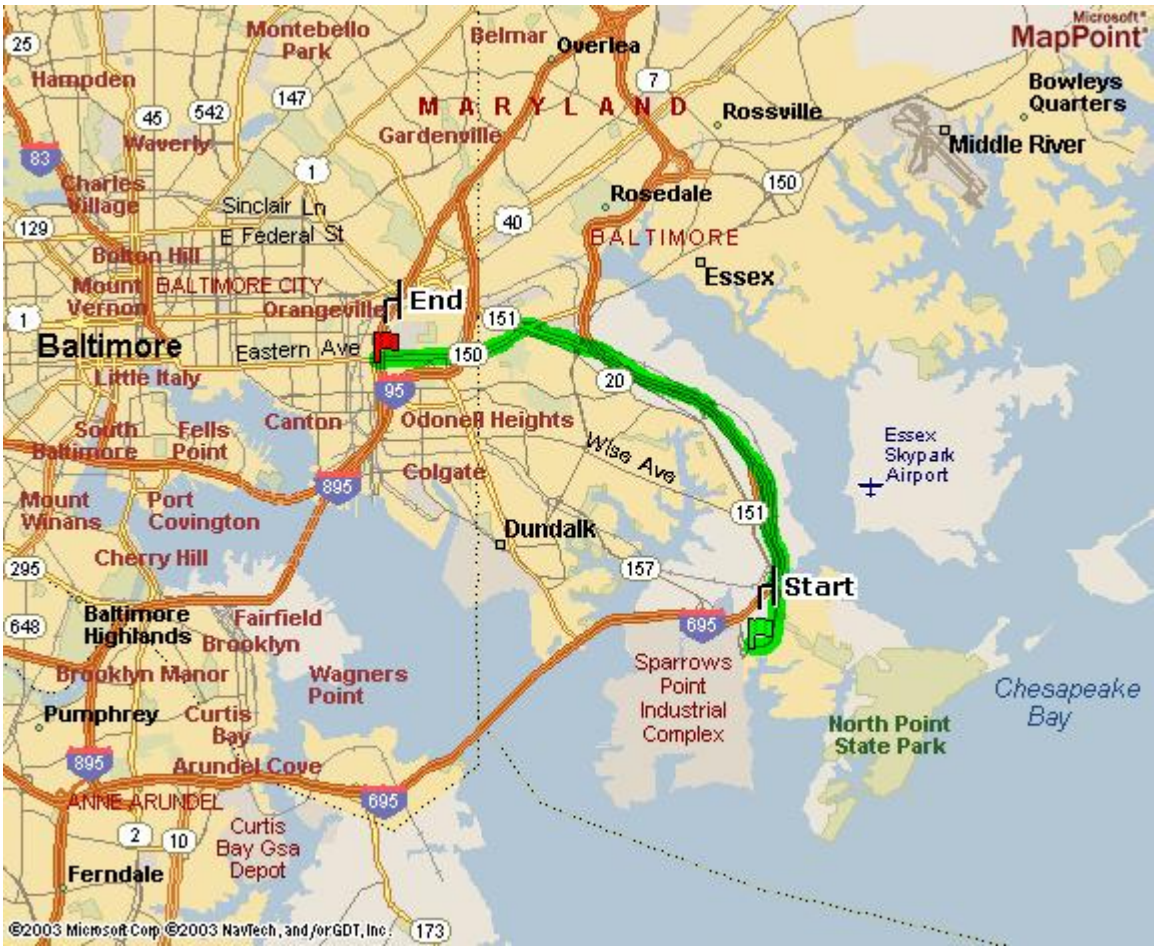
Hospital

The Johns Hopkins Bayview Hospital is the closest emergency facility, just over 9 miles away. The hospital is located at 4940 Eastern Avenue in Baltimore, MD. **Figure 10-2** is a map to this hospital. Maps are also included in **Attachment E**.

Directions:

From the Sparrows Point Industrial Complex, go north on Route 151 for approximately one mile.
Take ramp (right) onto I-695 towards I-695/Essex.
At exit 40, take ramp (right) onto Route 151/North Point Boulevard North/MD 150;
Take ramp (right) onto Route 150 (Eastern Avenue).
Continue on Eastern Avenue to hospital on right.

Figure 10-2: Hospital Map



Prior to the start of field activities, the Project Field Team Leader will call to verify the telephone numbers and directions for the clinic and hospital, and then distribute location maps and the emergency telephone list to workers and vehicles.

10.4 Accident and Emergency Medical Response

All field team members will be aware of the location of a first aid kit kept onsite. All vehicles used to transport injured persons to an offsite medical facility will be provided with directions and a map to the medical facility.

If treatment beyond first aid is required, emergency response personnel will be contacted for assistance and transport. Before beginning site activities, the Project Field Team Leader will ensure that each field team member knows where the nearest emergency medical facilities are and how to get there. The closest hospital will be used in cases of life-threatening emergencies at the direction of the Project Field Team Leader. The telephone numbers of the local emergency services will be available in the SZ, and the Project Field Team Leader will brief the field team on the procedures for calling for help in an emergency.

Site personnel will inform the Project Manager of any medications, allergies, or other medical information that may be applicable for their medical treatment. The Project Manager will supply this information to emergency response personnel, and will accompany the victim to the hospital, if possible.

10.4.1 Chemical Exposure

In case of accidental overexposure to a hazardous material (groundwater, soil, and/or off-gas materials), guidelines shown in **Table 10-2** will be used.

Table 10-2
Chemical Exposure Guidelines

Type of Overexposure	First Aid Guidelines
Skin Contact	Skin: Wash/rinse the affected area thoroughly with copious amounts of soap and water.
	Eyes: Eyes should be rinsed for at least 15 minutes following chemical contamination.
	Contact emergency response personnel if required, or transport victim to the hospital.
Inhalation	Move the victim to fresh air.
	Contact emergency response personnel if required, or transport victim to the hospital.
Ingestion	Contact Poison Control Center.
	Contact emergency response personnel, or transport victim to the hospital.

10.4.2 Decontamination During a Medical Emergency

For minor medical problems or injuries, regular decontamination procedures will be followed. If emergency, life-saving first aid and/or medical treatment are required, regular decontamination procedures may need to be abbreviated or omitted:

- Do not attempt to wash or rinse an unresponsive victim unless the victim has been contaminated with an extremely toxic or corrosive chemical that may cause injury or loss of life to emergency response personnel.
- Outer garments can be removed if it does not cause a delay, interfere with treatment, or aggravate the problem.

- PPE can be cut away and respiratory protective equipment must always be removed.
- If contaminated clothing cannot be safely removed, then the victim should be wrapped in a blanket or plastic sheeting to prevent contamination to the inside of the ambulance and/or emergency response personnel.

The Project Manager or Field Team Lead will advise the medical staff as to the type of contamination possibly involved.

10.4.3 Small or Incipient Fire

A small fire is defined as a fire that can be extinguished with an available 20 pound type ABC fire extinguisher. An incipient fire is a fire that is small because it has just started. In the event of a small or incipient fire, the following minimum actions will be taken:

- Evacuate nearby personnel from the area, if possible, to an upwind location or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible.
- Attempt to extinguish fire using portable fire extinguisher or by smothering.
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products, or if fire cannot be put out.
- After the fire has been extinguished, or emergency response personnel have been contacted, notify the following project personnel:

  The Project Manager

10.4.4 Large Fire or Explosion

An explosion, large fire or a small fire which cannot be extinguished is beyond the first line capabilities of EAG personnel. Professional emergency response personnel would be needed to provide emergency assistance for these types of incidents. In the event of a large fire, explosion or a small fire that cannot be extinguished, the following minimum actions will be taken:

- Evacuate all personnel from the site, if possible, to an upwind location, or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible
- Perform a quick role call to account for all site personnel
- Contact the fire department
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products
- After emergency response personnel have been contacted, notify the following project personnel:

  The Project Manager

10.4.5 Adverse Weather Conditions

In the event of adverse weather conditions, the Project Manager will determine if work can continue without sacrificing the health and safety of site personnel. Threatening weather conditions will be monitored by the Project Manager and possibly the Team Lead via radio, television, internet, and/ or calls to the National Weather Service. Some of the conditions to be considered include:

- Potential for heat or cold stress
- Limited visibility

- Electrical storms
- Treacherous weather-related working conditions (i.e., heavy rainfall, icy conditions causing slippery footing hazards, etc.).

10.4.6 First Aid for Heat Stress/Cold Stress

First aid treatment for **heat cramps** includes shade, rest and fluid replacement. If available, the individual should drink electrolyte replacement fluids (e.g., Gatorade, Squincher or 10-K). The individual should recover within half an hour.

First aid treatment for **heat exhaustion** includes cooling the victim, elevating the feet and fluid replacement. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Heat stroke is a medical emergency, requiring the immediate cooling of the victim and transport to the hospital for medical treatment immediately.

First aid treatment for **frost nip** and **frostbite** includes covering the affected area with warmth and retreating to a warm area. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Frozen tissue is a medical emergency and the victim must receive medical attention immediately. Contact emergency response personnel immediately or transport the victim to the hospital.

First aid treatment of **mild hypothermia** includes using heat to raise the individual's body temperature. Heat may be applied to the victim in the form of heat packs, hot water bottles and blankets. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Severe hypothermia is a medical emergency and the victim must be transported to the hospital immediately. First aid treatment for severe hypothermia includes handling the victim very gently; rough handling may set off of an irregular heartbeat. ***DO NOT*** attempt to re-warm the severely hypothermic victim; re-warming may cause the development of an irregular heartbeat.

10.4.7 Snake Bites

If bitten, lower the extremity below the heart to reduce the poison's dissemination through the body. Remain calm, try to keep the heart rate reduced and seek medical attention immediately. Do not cut the wound or attempt to suck out the venom. Note any physical features (e.g., shape of head and color or pattern on body) of the snake.

10.4.8 Animal Bites

All bites should be treated as contaminated soft tissue injuries. Bites should be washed immediately with large amounts of soap and water. If soap is not available, flush the wound with water. The severity and onset of any infection is dependent upon the number of organisms (viruses or bacteria) introduced into the wound. Washing saliva out of the wound immediately will reduce the number of bacteria or viruses that can enter the tissue. Medical attention must be sought if rabies is suspected or the individual has not had a recent tetanus booster.

10.4.9 Insect Bites and Stings

Emergency care for insect bites and stings depends on the individual's reaction. To treat a sting that results in a minor reaction, remove the stinger by gently scraping it off the skin. Do not try to grasp the sac or stinger, because this forces the remaining venom into the skin. Once the stinger has been removed, clean the wound and surrounding area. Apply cold packs to slow the absorption of the venom and reduce pain and swelling. The treatment for a severe reaction to insect stings includes the following:

- Confirm with the victim whether they are highly allergic to the insect that stung them
    - If victim has gone into anaphylactic shock, retrieve their epi pen or other auto-injector and administer per the directions as hastily as possible
- Assuming the victim remains conscious, ask them to refrain from moving around, and to lie down
- Immobilize the injured area immediately
- If an extremity is involved, remove any rings or watch
- Keep the affected part low, below the level of the heart
- Apply cold compresses to the affected area
- If possible, try to identify the type of insect that inflicted the sting
- Transport the victim to a medical facility immediately, continuing supportive measures en route.

All employees and subcontractors must report severe reactions to insect stings prior to the beginning of work to both the Project Manager and Field Team Lead.

10.4.10 Poisonous Plants

Decontamination: Wash the skin immediately after contact with the plant. Proper washing may not be practical in the middle of the woods, but a product such as Technu or a small wash-up kit with prepackaged, alcohol-based cleansing tissues can be effective. Employees and subcontractors should not forget to wash contaminated clothing and clean up contaminated equipment prior to re-use.

Treatment: Options are as follows:

- Home treatment: Calamine lotion and an oatmeal bath (one cup to a tub full of water) can help relieve itching. To prevent secondary skin infection, scratching is not helpful and the fingernails should be cut to avoid damage to the skin. Over-the-counter hydrocortisone cream can decrease inflammation and itching; however, the label should be read and the cream used according to directions.
- When to see the doctor: Severe cases may require further treatment. A physician should be seen if the rash appears infected, is on the face or other sensitive body areas, or is too extensive to be easily treated at home.

10.4.11 Ticks

To remove an attached tick:

- Use fine-tipped tweezers or a "tick tool" to grasp the tick at the surface of the skin
- If tweezers are not available, use a tissue to protect the fingers (exposure to the tick's body fluid may lead to transmission of disease)
- With a steady motion, pull the tick straight out

Disinfect the bite site and the tweezers. Wash your hands thoroughly with soap and water. Save the tick if you can by placing it in a Ziploc bag in the freezer; this may help with diagnosis in the future.

If flu-like symptoms such as fatigue, headache, neck-stiffness or jaw discomfort begin following a tick bite, seek medical attention.

APPENDICES

EnviroAnalytics Group

Environmental Engineers

ATTACHMENT A

COMPLIANCE AGREEMENT

EAG HEALTH AND SAFETY PLAN

ACKNOWLEDGEMENT FORM

I, _____, have read (or had read to me), EAG's health and safety plan.
(Print Name)

I understand my responsibilities as they are defined in this plan and will abide by these rules and procedures, as well as any regulations or otherwise governing safety. When in doubt concerning safe job performance, I will speak to my immediate supervisor and/or Project Manager.

I understand EAG reserves the right to change or amend the HASP at any time.

I understand any violation to the plan policies or procedures will be cause for disciplinary action up to and including termination.

_____ _____

Employee Signature Date

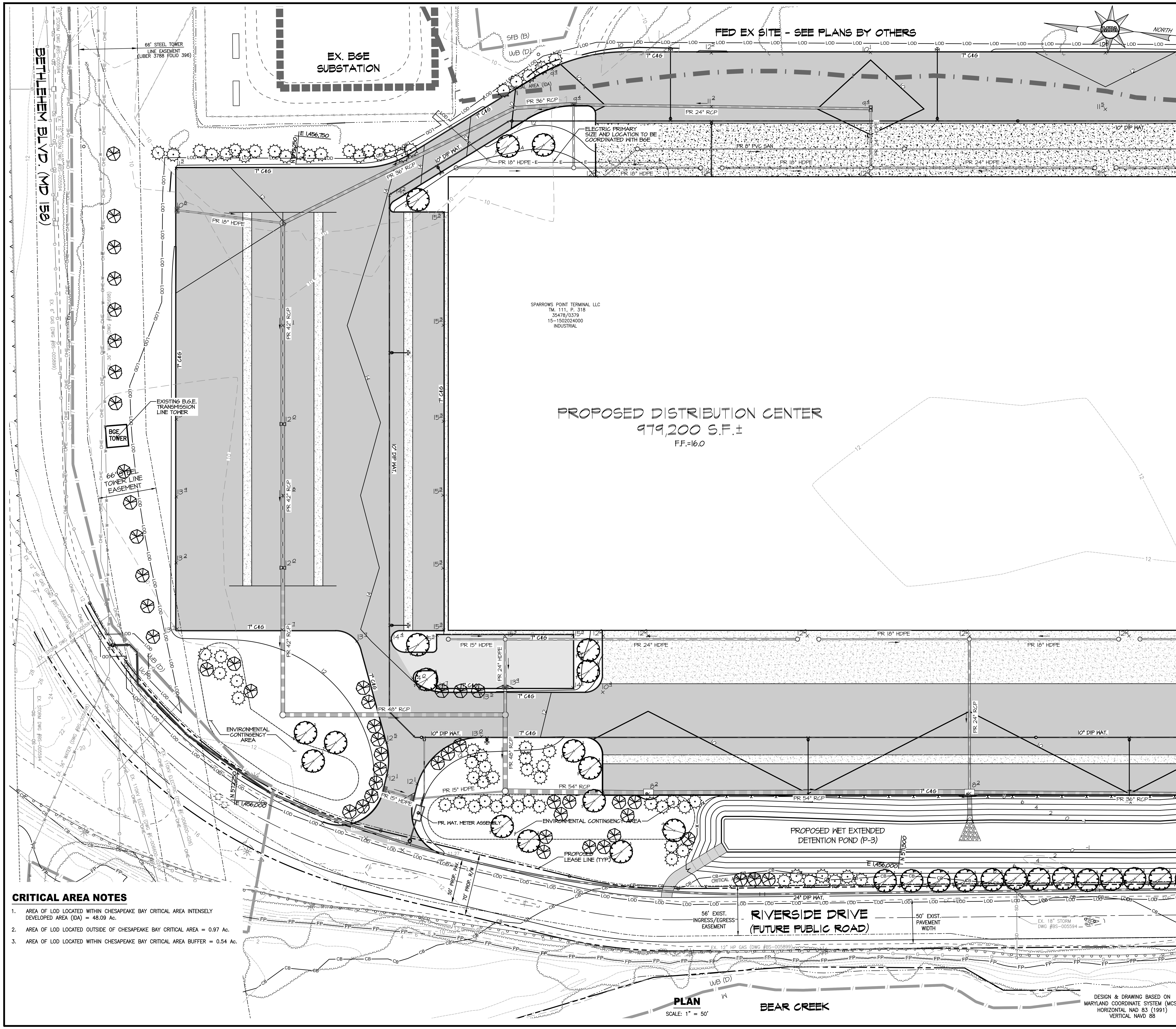
_____ _____

EAG Supervisor/Project Manager Signature Date

ATTACHMENT B

Material Safety Data Sheets (MSDSs)

APPENDIX E

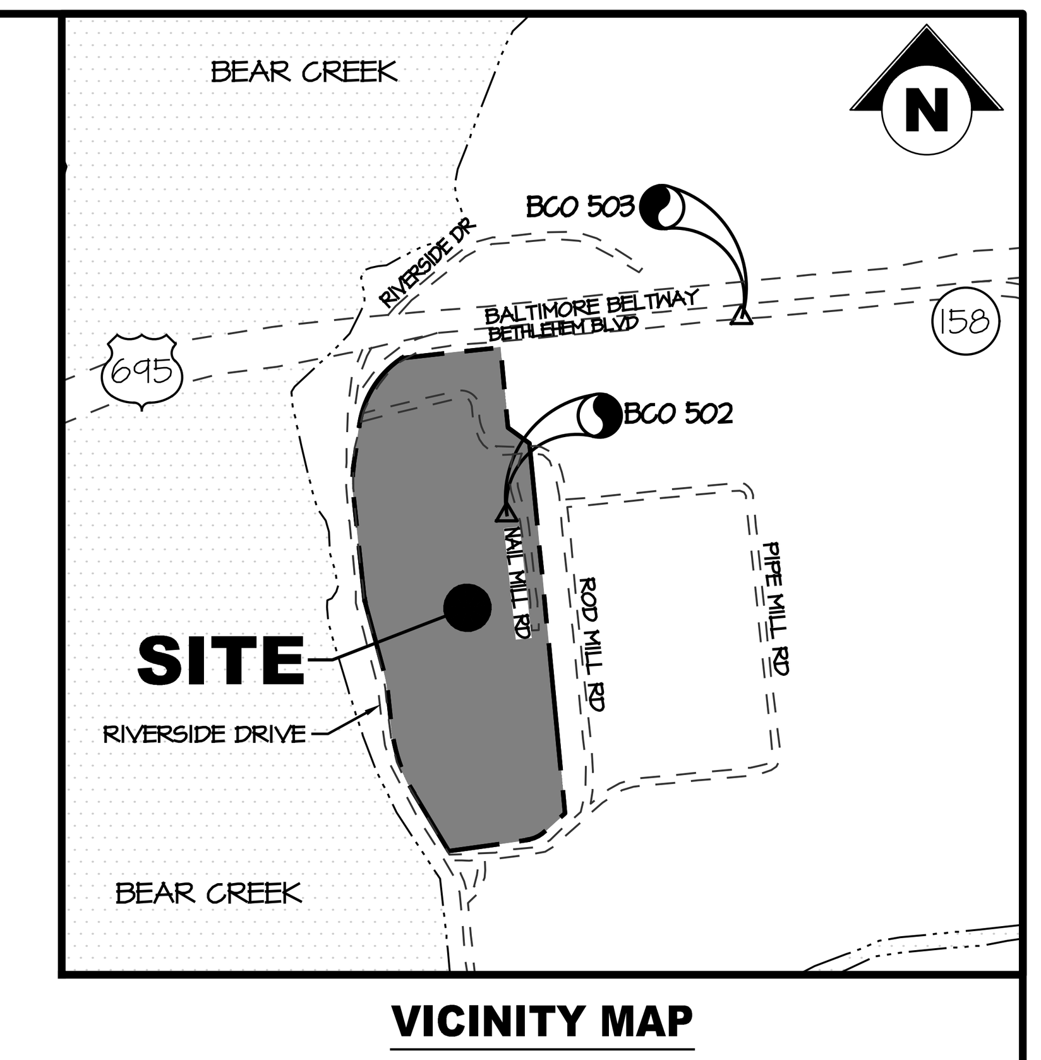


PLAN
SCALE: 1" = 50'

DESIGN & DRAWING BASED ON
MARYLAND COORDINATE SYSTEM (MCS):
HORIZONTAL NAD 83 (1991)
VERTICAL NAVD 88

CRITICAL AREA NOTES

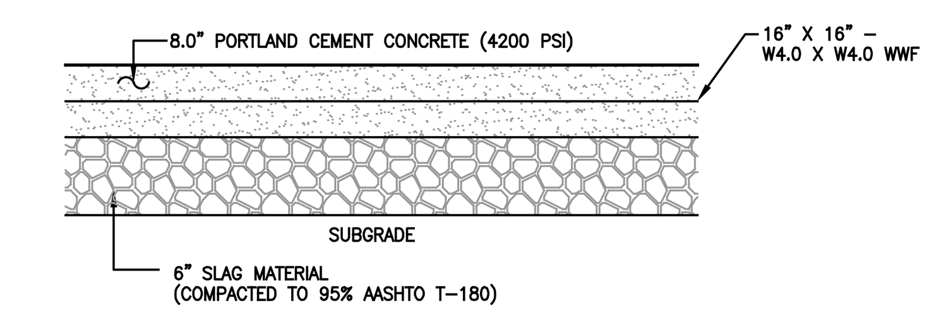
1. AREA OF LOD LOCATED WITHIN CHESAPEAKE BAY CRITICAL AREA INTENSELY DEVELOPED AREA (IDA) = 48.09 Ac.
2. AREA OF LOD LOCATED OUTSIDE OF CHESAPEAKE BAY CRITICAL AREA = 0.97 Ac.
3. AREA OF LOD LOCATED WITHIN CHESAPEAKE BAY CRITICAL AREA BUFFER = 0.54 Ac.



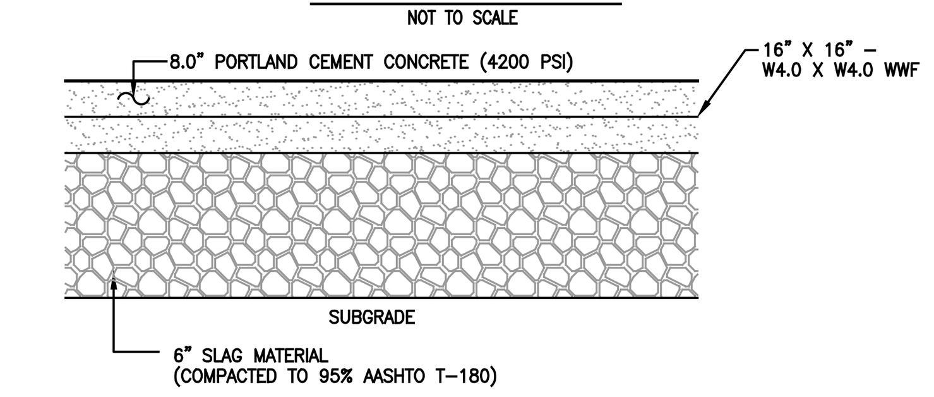
VICINITY MAP
SCALE: 1" = 1000'

BENCHMARKS

BCO 502 - PIN & CAP ELEV. 11.73 WEST SIDE NAIL MILL ROAD	N 571,617.57 E 1,456,749.20
BCO 503 - PIN & CAP ELEV. 14.83 SOUTH SIDE 695	N 572,645.36 E 1,457,970.96



E□TERIOR RIGI□ PA□EMENT SECTION
□OR TRUC□ □OC□
NOT TO SCALE



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□OR □OLLY PA□
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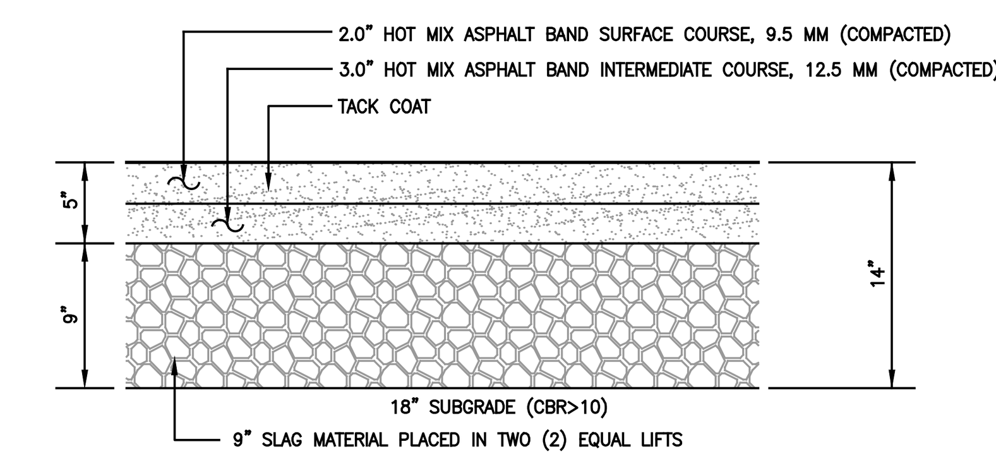

HEA□Y □UTY
PA□EMENT SECTION
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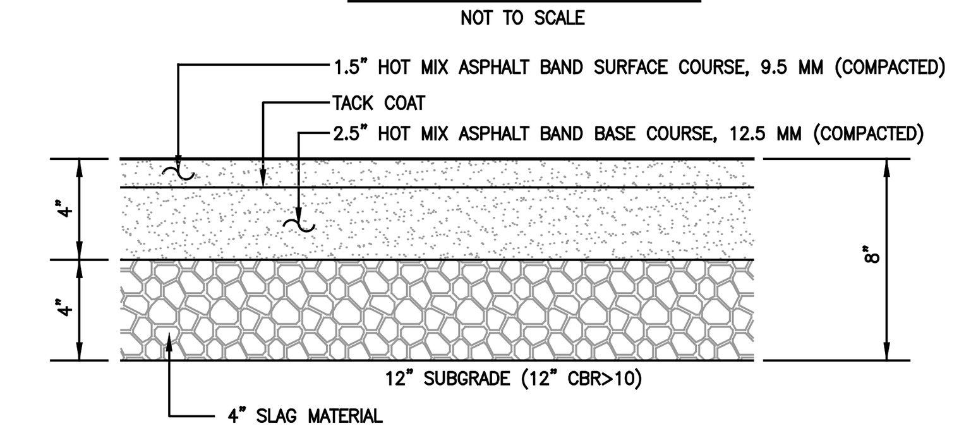


CAR PAR□ING
PA□EMENT SECTION
NOT TO SCALE

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS & LANDSCAPE ARCHITECTS
1220-C EAST JOPPA RD., SUITE 505
TOWSON, MD 21286
PHONE (410) 821-1690
FAX (410) 821-1748

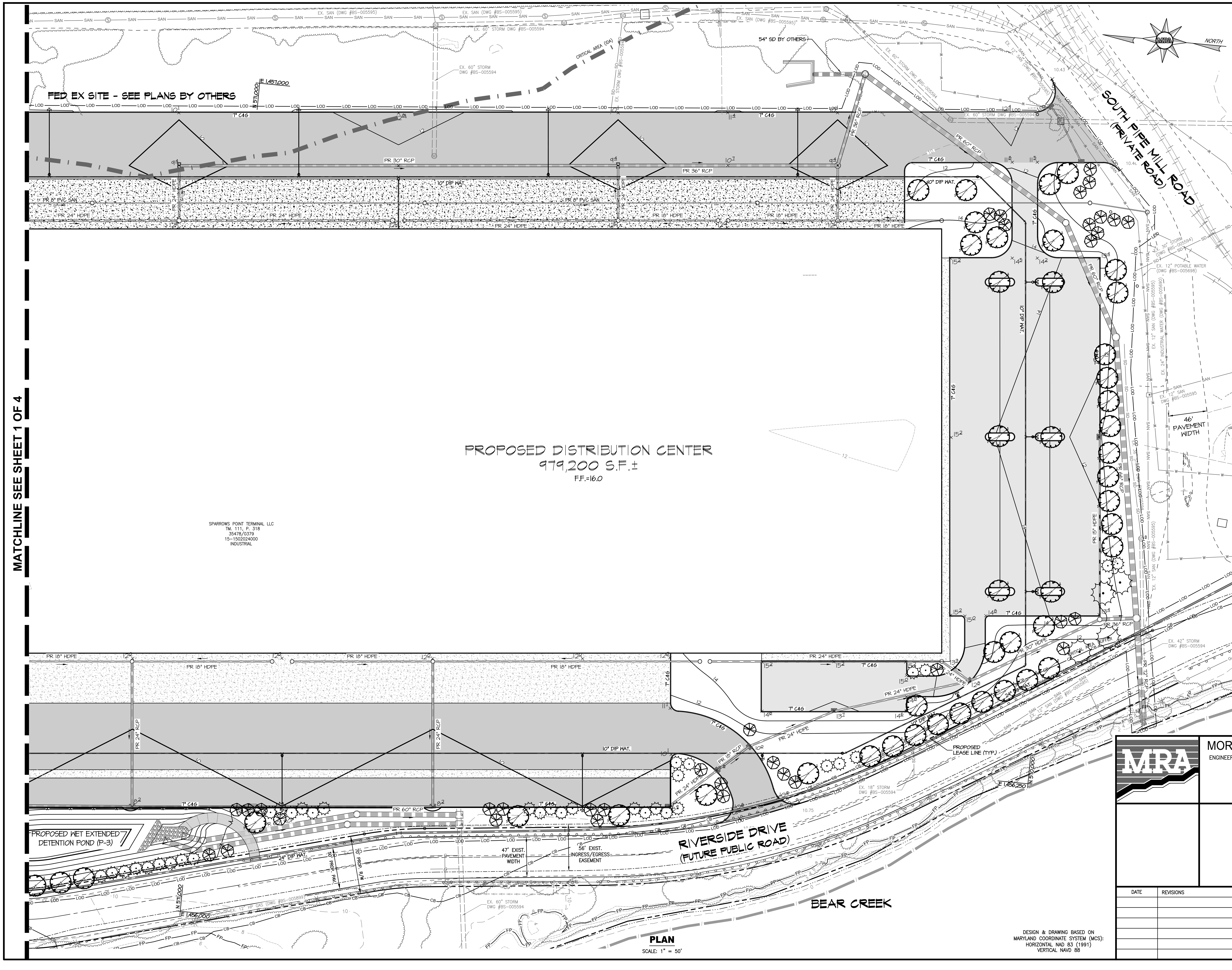
TRADEPOINT ATLANTIC SITE A-3

979,200 SF DISTRIBUTION CENTER

6001 RIVERSIDE DRIVE
15TH ELECTION DISTRICT
7TH COUNCILMANIC DISTRICT
BALTIMORE COUNTY, MARYLAND

DATE	REVISIONS

JOB NO.:	19287
SCALE:	1" = 50'
DATE:	11/17/2016
DRAWN BY:	CEM
DESIGN BY:	CEM
REVIEW BY:	AGD
SHEET:	1 OF 4



PLAN

SCALE: 1" = 50'

DESIGN & DRAWING BASED ON
MARYLAND COORDINATE SYSTEM (MCS):
HORIZONTAL NAD 83 (1991)
VERTICAL NAVD 88

LEGEND

PROPOSED

- PROPERTY LINE
- LOT LINE
- RIGHT OF WAY
- CL OF ROAD/STATIONS
- EDGE OF PAVING
- CURB
- BUILDING SETBACK
- EASEMENT
- 1' CONTOUR
- 2' CONTOUR
- 10' CONTOUR
- STORM DRAIN
- WATER
- SANITARY SEWER
- CLEARING LIMIT
- LIMIT OF DISTURBANCE

EXISTING

- PROPERTY LINE
- ADJOINING PROPERTY
- RIGHT OF WAY
- CL OF ROAD
- EDGE OF PAVING
- CURB
- 2' CONTOURS
- 10' CONTOURS
- WETLANDS
- 25' WETLANDS BUFFER
- WATERS OF THE U.S.
- STREAM BUFFER
- STREAM
- STORM DRAIN
- WATER
- SANITARY SEWER
- WOODS
- FENCE
- CRITICAL AREA BUFFER
- 100 YR FLOODPLAIN
- CONCRETE
- TRUCK PAVEMENT
- CAR PAVEMENT

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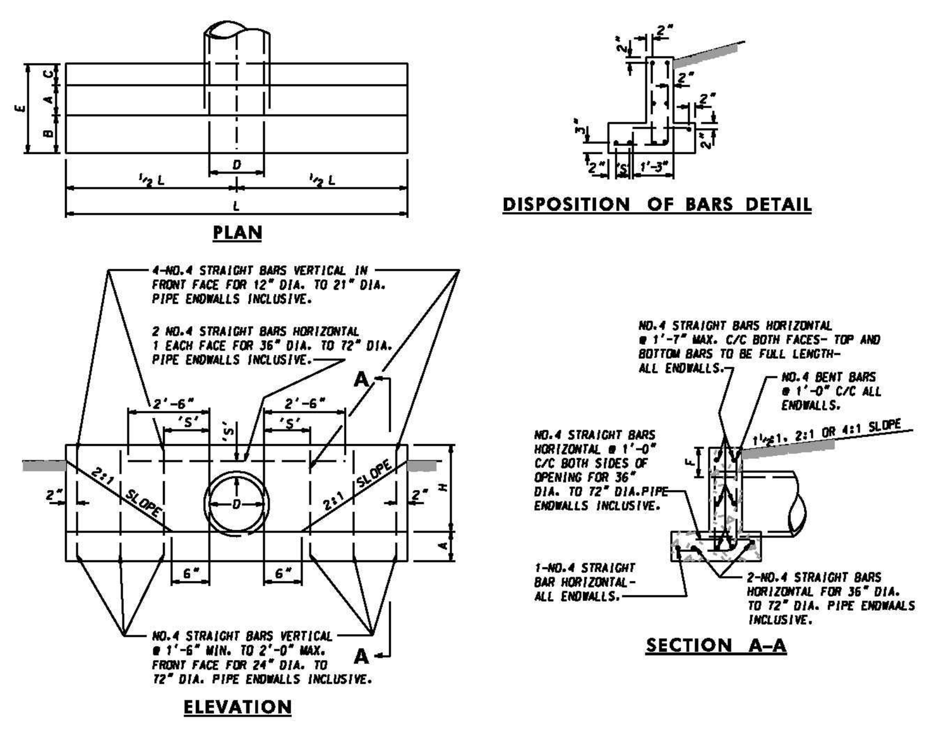
		REVIEW BY:	AGD
		SHEET:	2 OF 4



QUANTITIES FOR ESTIMATING PURPOSES ONLY

OPENING D INCHES	OPENING AREA SQ.FT.	A	B	C	E	F	H	L	CONC. C.Y.	STEEL LBS.
12	0.79	9"	6"	6"	1'-9"	9"	1'-9"	6'-6"	0.61	41
15	1.23	9"	6"	6"	1'-9"	9"	2'-0"	7'-9"	0.77	47
18	1.77	9"	6"	6"	1'-9"	9"	2'-3"	9'-0"	0.95	54
21	2.40	9"	6"	6"	1'-9"	9"	2'-6"	10'-3"	1.14	70
24	3.14	9"	14"	6"	2'-5"	9"	2'-9"	11'-6"	1.56	80
27	3.98	9"	14"	6"	2'-5"	9"	3'-0"	12'-10"	1.82	88
30	4.91	9"	14"	6"	2'-5"	12"	3'-6"	14'-2"	2.22	98
33	5.94	9"	14"	6"	2'-5"	12"	3'-9"	15'-5"	2.48	105
36	7.07	12"	16"	10"	3'-2"	12"	4'-0"	16'-8"	4.16	182
42	9.62	12"	16"	10"	3'-2"	12"	4'-6"	19'-2"	5.07	206
48	12.57	12"	16"	10"	3'-2"	12"	5'-0"	21'-8"	6.09	244
54	15.90	12"	20"	12"	3'-8"	12"	5'-6"	24'-2"	7.62	275
60	19.64	12"	20"	12"	3'-8"	12"	6'-0"	26'-8"	8.82	304
72	28.27	12"	20"	12"	3'-8"	12"	7'-0"	31'-8"	11.46	377

'S' DISTANCES

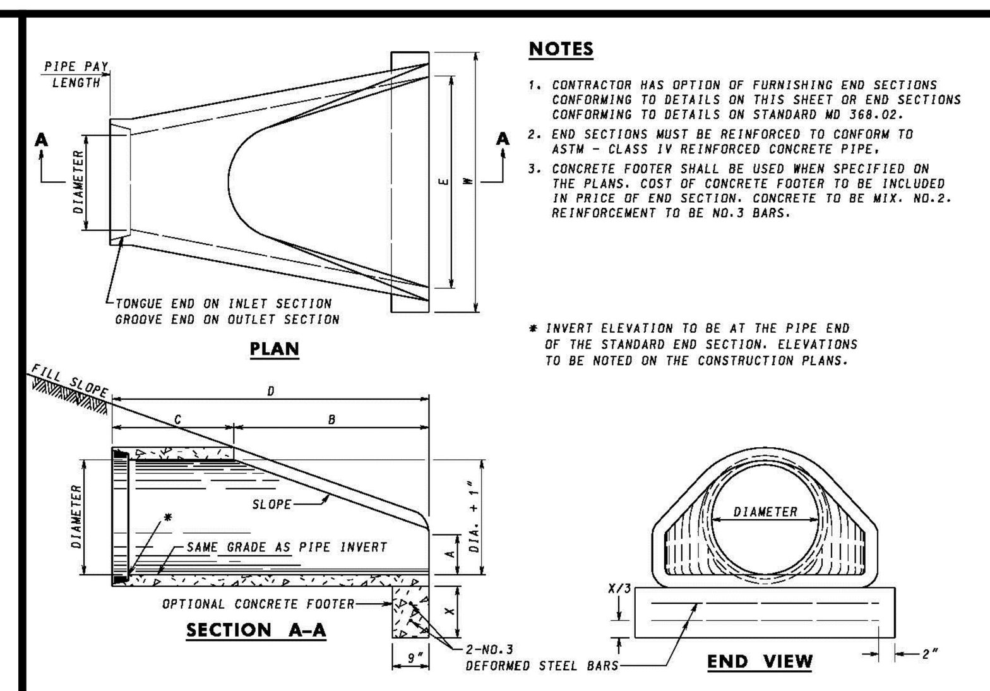
4" FOR 12" DIA. TO 21" DIA. PIPES INCLUSIVE.
6" FOR 24" DIA. TO 36" DIA. PIPES INCUSIVE.
8" FOR 42" DIA. TO 72" DIA. PIPES INCLUSIVE.

GENERAL NOTES

SPECIFICATIONS: LATEST S.H.A.
CONCRETE SHALL BE MIX NO.2
REINFORCING: DEFORMED STEEL BARS-NO.4
CHAMFER: ALL EXPOSED EDGES 1"x1" OR AS DIRECTED

SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 8-28-86; REVISED 10-1-01 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 12-12-86

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
STANDARD TYPE C ENDWALL METAL OR CONCRETE ROUND PIPE
STANDARD NO. MD 354.01



NOTES

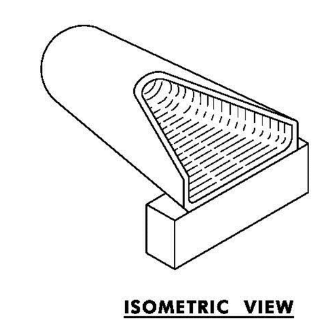
1. CONTRACTOR HAS OPTION OF FURNISHING END SECTIONS CONFORMING TO DETAILS ON THIS SHEET OR END SECTIONS CONFORMING TO DETAILS ON STANDARD MD 368.02.
2. END SECTIONS MUST BE REINFORCED TO CONFORM TO ASTM – CLASS IV REINFORCED CONCRETE PIPE.
3. CONCRETE FOOTER SHALL BE USED WHEN SPECIFIED ON THE PLANS. COST OF CONCRETE FOOTER TO BE INCLUDED IN PRICE OF END SECTION. CONCRETE TO BE MIX. NO.2. REINFORCEMENT TO BE NO.3 BARS.

* INVERT ELEVATION TO BE AT THE PIPE END OF THE STANDARD END SECTION. ELEVATIONS TO BE NOTED ON THE CONSTRUCTION PLANS.

QUANTITIES FOR ESTIMATING PURPOSES ONLY

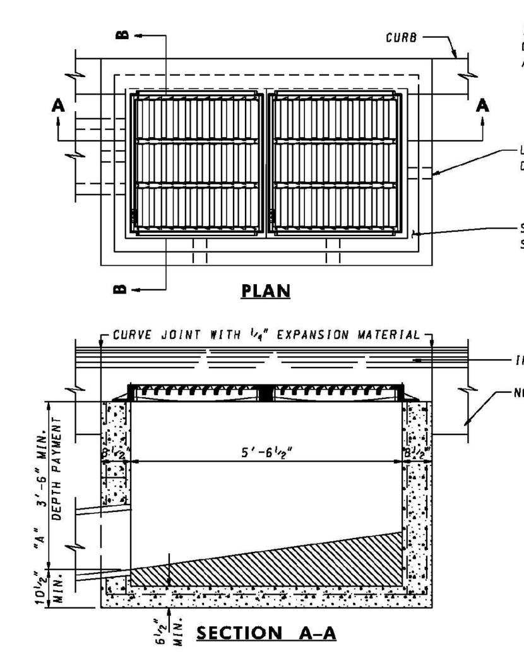
DIA.	SLOPE	A	B	C	D	E	W	X	CONC. C.Y.	STEEL LBS.
		CONCRETE END SECTION					CONCRETE FOOTER		QUANTITIES	
12"	3:1	4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	3'-0"	12"	0.08	2.01
15"	3:1	6½"	2'-4"	3'-10"	6'-2"	2'-6"	3'-6"	12"	0.10	2.38
18"	3:1	10¼"	2'-2"	4'-0"	6'-2"	3'-0"	4'-0"	12"	0.11	2.76
21"	3:1	9"	3'-0"	3'-1½"	6'-1½"	3'-6"	4'-6"	12"	0.13	3.13
24"	3:1	11"	3'-7"	2'-8"	6'-3"	4'-0"	5'-0"	15"	0.17	3.51
27"	3:1	10½"	4'-1½"	2'-0"	6'-1½"	4'-6"	5'-6"	15"	0.19	3.89
30"	3:1	1'-1"	4'-5"	1'-10"	6'-3"	5'-0"	6'-0"	15"	0.21	4.26
33"	3:1	1'-2"	4'-7"	2'-2"	6'-9"	5'-6"	6'-6"	15"	0.23	4.64
36"	3:1	1'-3½"	5'-3"	3'-1"	8'-4"	6'-0"	7'-3"	15"	0.25	5.20

SEE NOTE 3 ABOVE FOR CONCRETE FOOTER



SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 8-28-86; REVISED 3-15-06; REVISED 7-1-09 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 12-12-86; REVISED 4-05-06; REVISED 7-27-09

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
STANDARD CONCRETE END SECTION ROUND CONCRETE PIPE
STANDARD NO. MD 368.01



INVERT MAY BE PLAIN CONCRETE OR 4" BRICK LAID ON EDGE. INVERT TO SLOPE DOWN TOWARD OUTLET AT THE RATE OF 2" PER FOOT, OR AS DIRECTED.

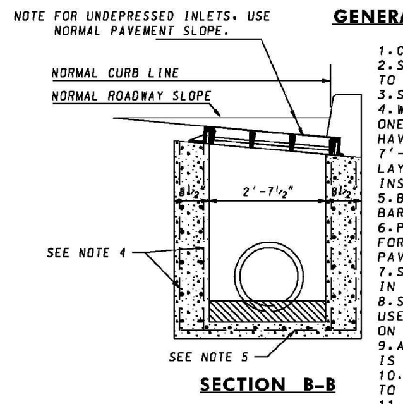
LEAVE 4"x4" OPENING FOR SUBGRADE DRAINAGE, IF DIRECTED.

STANDARD CLASS 'S' CAST IRON FRAME & GRATES. SEE STANDARD MD 379.05.

NOTE "BRICK FOR MASONRY", TO COMPLY WITH THE LATEST S.H.A. SPECIFICATIONS.

SUPPORT BEAM IS NOT TO BE USED

NOTE FOR UNDEPRESSED INLETS, USE NORMAL PAVEMENT SLOPE.

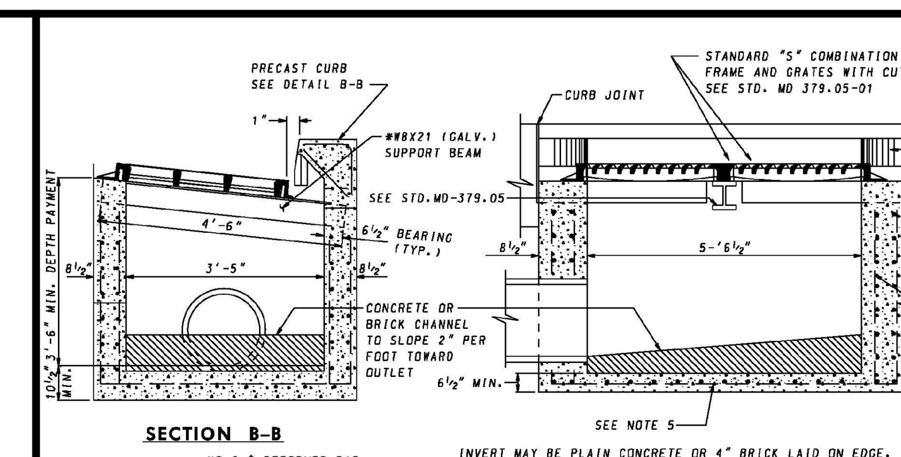


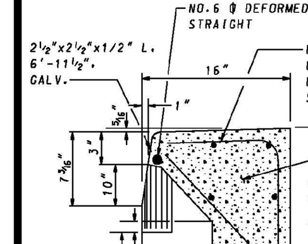
GENERAL NOTES

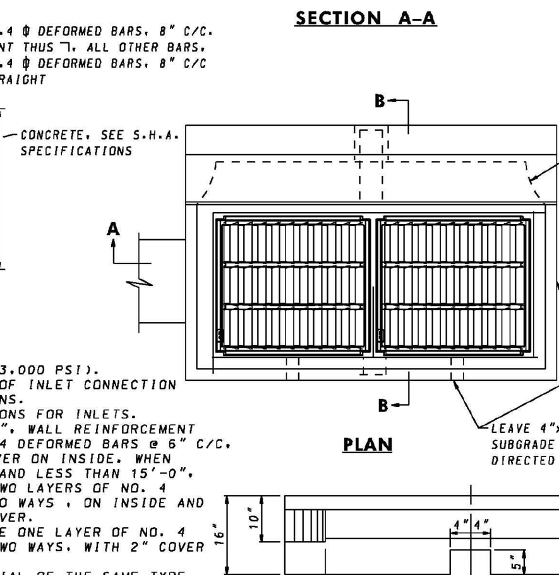
1. CONCRETE TO BE MIX NO. 2 (3,000 PSI).
2. SIZE, TYPE, AND DIRECTION OF INLET CONNECTION WILL VARY TO SUIT CONDITIONS.
3. SEE SHA LATEST SPECIFICATIONS FOR INLETS.
4. WHEN "A" IS LESS THAN 7'-0", WALL REINFORCEMENT SHALL BE ONE LAYER OF NO. 4 DEFORMED BARS @ 6" C/C, TWO WAYS, AND HAVE 3½" COVER ON INSIDE. WHEN "A" IS GREATER THAN 7'-0" AND LESS THAN 15'-0", WALL REINFORCEMENT TO BE TWO LAYERS OF NO. 4 DEFORMED BARS @ 6" C/C, TWO WAYS, ON INSIDE AND OUTSIDE OF WALL WITH 2" COVER.
5. BASE REINFORCEMENT SHALL BE ONE LAYER OF NO. 4 DEFORMED BARS @ 6" C/C, TWO WAYS, WITH 2" COVER FROM TOP OF BASE.
6. PLACE ¼" EXPANSION MATERIAL OF THE SAME TYPE APPROVED FOR PAYMENT IN BETWEEN THE FRAME AND ABUTTING RIGID PAVEMENT AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
7. SLOPE FACE OF CURB TO MEET INSIDE EDGE OF FRAME AS SHOWN IN SECTION B-B.
8. STANDARD CLASS "S" INLET (DOUBLE GRATE TANDEM) MAY BE USED WITH ONE END ADJACENT TO CURB. FRAME WILL BE LAID ON NORMAL SLOPE OF ROADWAY UNLESS NOTED OTHERWISE.
9. ALL WALL, FRAME, AND GRATE DIMENSIONS SAME AS WHEN SIDE IS ADJACENT TO CURB AS SHOWN ON LEFT.
10. INLET MAY BE USED IN LOW SPOTS, WHICH ARE NOT ADJACENT TO CURB.
11. FROM THE CURB LINE, INLET HAS BEEN DESIGNED FOR HS-25 LOADING, ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND FOR A MAXIMUM DEPTH OF 15'-0".

SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 10-30-69; REVISED 8-3-10; REVISED 10-7-14 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 11-10-69; REVISED 7-27-09; REVISED 9-29-14

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
STANDARD TYPE S INLET DOUBLE GRATE TANDEM
STANDARD NO. MD 379.03





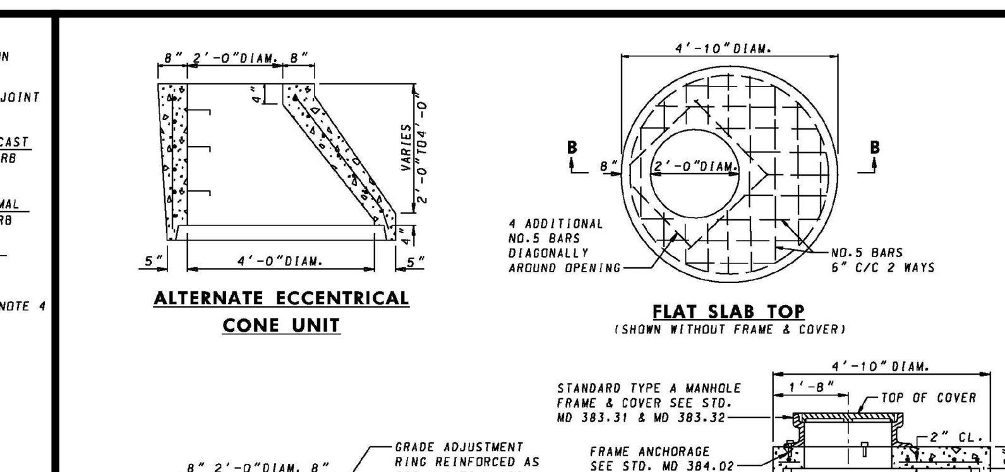


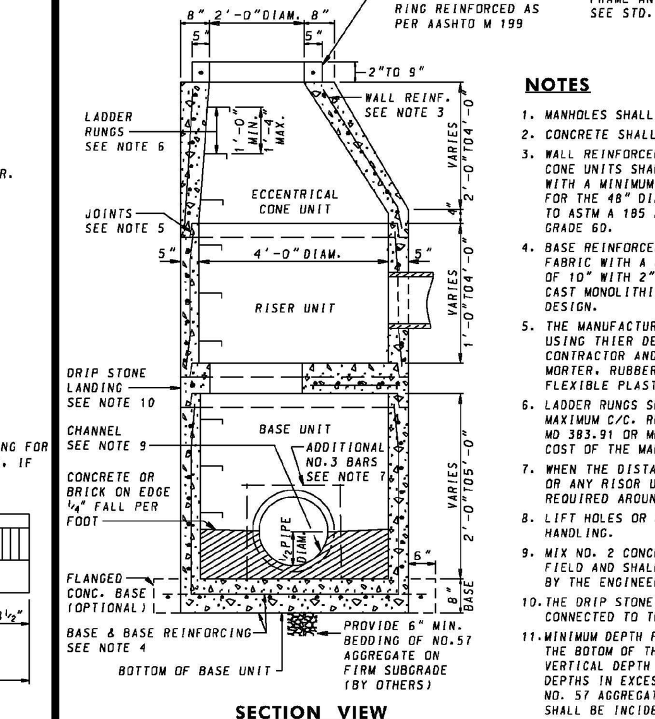
GENERAL NOTES

1. CONCRETE TO BE MIX NO. 2 (3,000 PSI).
2. SIZE, TYPE, AND DIRECTION OF INLET CONNECTION WILL VARY TO SUIT CONDITIONS.
3. SEE SHA LATEST SPECIFICATIONS FOR INLETS.
4. WHEN "A" IS LESS THAN 7'-0", WALL REINFORCEMENT SHALL BE ONE LAYER OF NO. 4 DEFORMED BARS @ 6" C/C, TWO WAYS, AND HAVE 3½" COVER ON INSIDE. WHEN "A" IS GREATER THAN 7'-0" AND LESS THAN 15'-0", WALL REINFORCEMENT TO BE TWO LAYERS OF NO. 4 DEFORMED BARS @ 6" C/C, TWO WAYS, ON INSIDE AND OUTSIDE OF WALL WITH 2" COVER.
5. BASE REINFORCEMENT SHALL BE ONE LAYER OF NO. 4 DEFORMED BARS @ 6" C/C, TWO WAYS, WITH 2" COVER FROM TOP OF BASE.
6. PLACE 1/4" EXPANSION MATERIAL OF THE SAME TYPE APPROVED FOR PAYMENT IN BETWEEN THE FRAME AND ABUTTING RIGID PAVEMENT AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
7. BRICK FOR MASONRY TO COMPLY WITH THE SHA SPECIFICATION.
8. FOR UNDEPRESSED INLETS USE NORMAL PAVEMENT SLOPE.
9. FOR METHOD OF ANCHORING BEAM, SEE STD. MD 380.01 IF INLET IS CONSTRUCTED OF BRICK. (FOR INLET REPAIR ONLY).
10. FROM THE CURB LINE, INLET HAS BEEN DESIGNED FOR HS-25 LOADING, ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND FOR A MAXIMUM DEPTH OF 15'-0".

SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 10-30-69; REVISED 8-3-10; REVISED 10-7-14 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 11-10-69; REVISED 7-26-10; REVISED 9-29-14

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
STANDARD TYPE S COMBINATION INLET DOUBLE GRATE TANDEM
STANDARD NO. MD 379.04



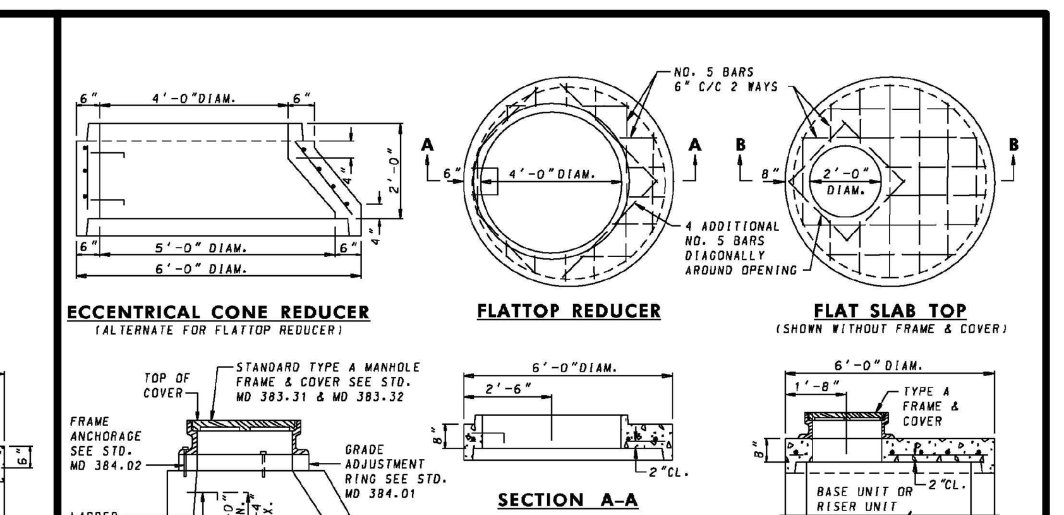


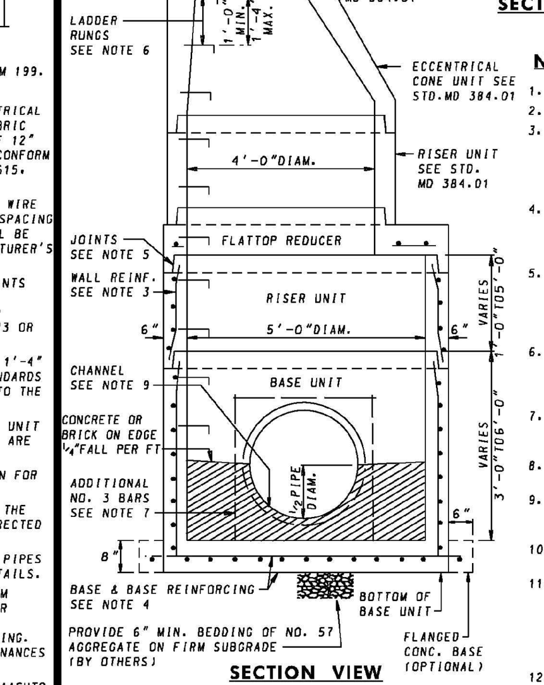
NOTES

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.
2. CONCRETE SHALL BE MIX NO. 6 (4500 PSI).
3. WALL REINFORCEMENT FOR BASE UNITS, RISER UNITS AND ECCENTRICAL CONE UNITS SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MINIMUM AREA OF 0.12 IN²/FT AND MAXIMUM SPACING OF 12" FOR THE 48" DIAMETER MANHOLES. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 AND A 52. REINFORCEMENT SHALL MEET ASTM A 615, GRADE 60.
4. BASE REINFORCEMENT SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MINIMUM AREA OF 0.20 IN²/FT AND A MAXIMUM SPACING OF 10" WITH 2" COVER FROM THE TOP OF BASE. THE BASE SHALL BE CAST MONOLITHIC WITH THE UNIT OR JOINTED PER THE MANUFACTURER'S DESIGN.
5. THE MANUFACTURER SHALL FORM MALE AND FEMALE ENDS OF JOINTS USING THIER DESIGN. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATERTIGHT USING (WHERE APPLICABLE) MORTER, RUBBER O-RING GASKETS MEETING ASTM C 361 & C 443 OR FLEXIBLE PLASTIC GASKETS MEETING AASHTO M 198 TYPE B.
6. LADDER RUNGS SHALL BE INSTALLED IN VERTICAL ALIGNMENT AT 1'-4" MAXIMUM C/C. RUNG TYPES SHALL BE IN ACCORDANCE WITH STANDARDS MD 383.91 OR MD 383.92 LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
7. WHEN THE DISTANCE BETWEEN MULTIPLE OPENINGS IN THE BASE UNIT OR ANY RISOR UNIT IS LESS THAN 6" ADDITIONAL NO. 3 BARS ARE REQUIRED AROUND OPENINGS.
8. LIFT HOLES OR LIFT EYES SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
9. MIX NO. 2 CONCRETE OR BRICK CHANNEL SHALL BE PROVIDED IN THE FIELD AND SHALL SLOPE 2" PER FOOT TOWARD OUTLET OR AS DIRECTED BY THE ENGINEER.
10. THE DRIP STONE LANDING SHALL BE USED ONLY WHEN THERE ARE PIPES CONNECTED TO THE RISER UNITS. SEE STD. MD 384.13 FOR DETAILS.
11. MINIMUM DEPTH PAYMENT PER EACH SHALL BE 9'-0" MEASURED FROM THE BOTOM OF THE BASE UNIT TO THE TOP OF THE MANHOLE COVER VERTICAL DEPTH PAYMENT PER LINEAR FOOT SHALL INCLUDE ALL DEPTHS IN EXCESS OF 9'-0". THE COST OF THE DRIP STONE LANDING, NO. 57 AGGREGATE GROUT, SEALANT, AND ALL NECESSARY APPURTENANCES SHALL BE INCIDENTAL TO THE PRICE BID.
12. MANHOLE HAS BEEN DESIGNED FOR HS-25 LOADING, ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 2-22-91; REVISED 10-7-14; REVISED – | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 1-2-91; REVISED 9-29-14

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
48" DIAMETER PRECAST MANHOLE FOR 12" TO 24" PIPES
STANDARD NO. MD 384.01



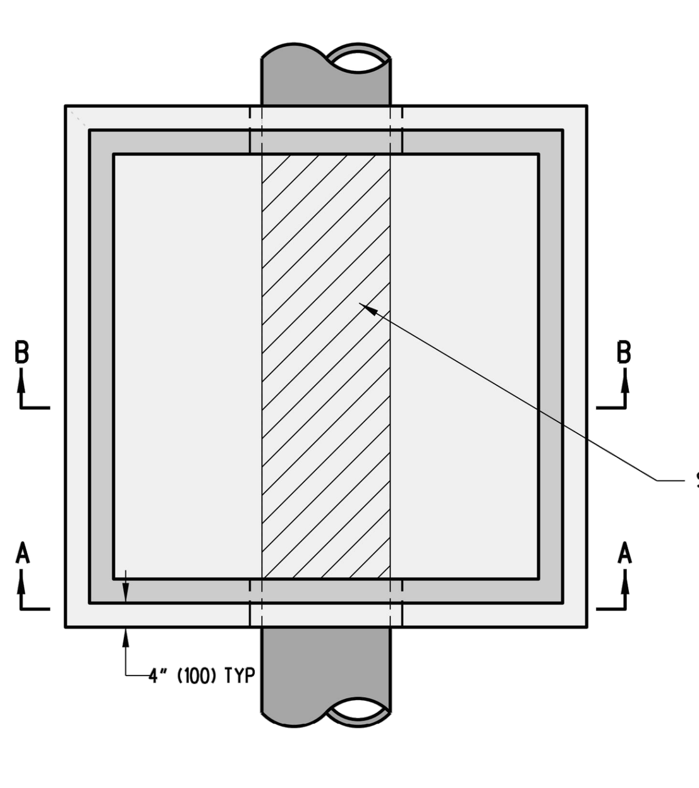


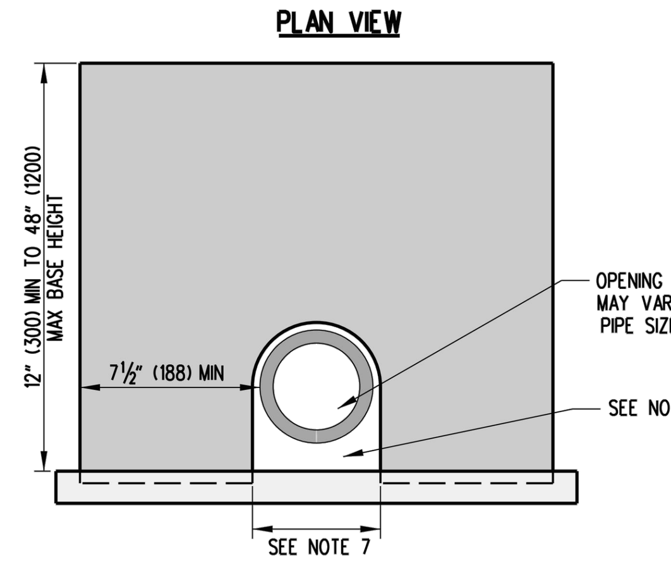
NOTES

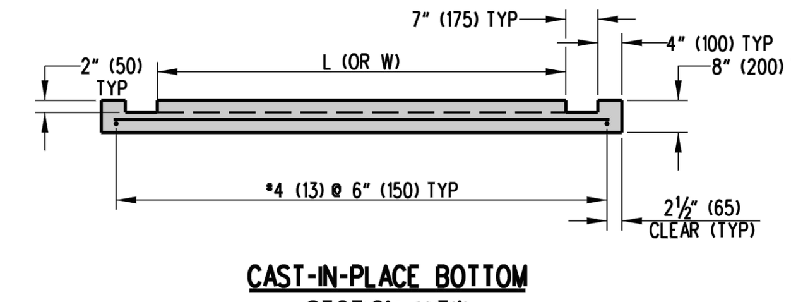
1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.
2. CONCRETE SHALL BE MIX NO.6 (4500PSI).
3. WALL REINFORCEMENT FOR BASE UNITS, RISER UNITS AND ECCENTRICAL CONE UNITS SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MINIMUM AREA OF 0.15 IN²/FT AND MAXIMUM SPACING OF 9" FOR THE 60" DIAMETER MANHOLES. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 AND A 52. REINFORCEMENT SHALL MEET ASTM A 615, GRADE 60.
4. BASE REINFORCEMENT SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MINIMUM AREA OF 0.27 IN²/FT AND A MAXIMUM SPACING OF 8" WITH 2" COVER FROM THE TOP OF BASE. THE BASE SHALL BE CAST MONOLITHIC WITH THE UNIT OR JOINTED PER THE MANUFACTURER'S DESIGN.
5. THE MANUFACTURER SHALL FORM MALE AND FEMALE ENDS OF JOINTS USING THEIR OWN DESIGN. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATERTIGHT USING (WHERE APPLICABLE) MORTAR, RUBBER O-RING GASKETS MEETING ASTM C 361 AND C 443 OR FLEXIBLE PLASTIC GASKETS MEETING AASHTO M 198 TYPE B.
6. LADDER RUNGS SHALL BE INSTALLED IN VERTICAL ALIGNMENT AT 1'-4" MAXIMUM C/C. RUNG TYPES SHALL BE IN ACCORDANCE WITH STANDARDS MD 383.91 OR 383.92. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
7. WHEN THE DISTANCE BETWEEN MUTIPLE OPENINGS IN THE BASE UNIT OR ANY RISER UNIT IS LESS THAN 6" ADDITIONAL NO.3 BARS ARE REQUIRED AROUND OPENINGS.
8. LIFT HOLES OR LIFT EYES SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
9. MIX NO.2 CONCRETE OR BRICK CHANNEL SHALL BE PROVIDED IN THE FIELD AND SHALL SLOPE 2" PER FOOT TOWARD OUTLET OR AS DIRECTED BY THE ENGINEER.
10. THE DRIP STONE LANDING SHALL BE USED ONLY WHEN THERE ARE PIPES CONNECTED TO THE RISER UNITS. SEE STD. MD 384.13 FOR DETAILS.
11. MINIMUM DEPTH PAYMENT PER EACH SHALL BE 9'-0" MEASURED FROM THE BOTTOM OF THE BASE UNIT TO THE TOP OF THE MANHOLE COVER. VERTICAL DEPTH PAYMENT PER LINEAR FOOT SHALL INCLUDE ALL DEPTHS IN EXCESS OF 9'-0". THE COST OF THE DRIP STONE LANDING, NO.57 AGGREGATE, GROUT, SEALANT, AND ALL NECESSARY APPURTENANCES SHALL BE INCIDENTAL TO THE PRICE BID.
12. MANHOLE HAS BEEN DESIGNED FOR HS-25 LOADING, ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

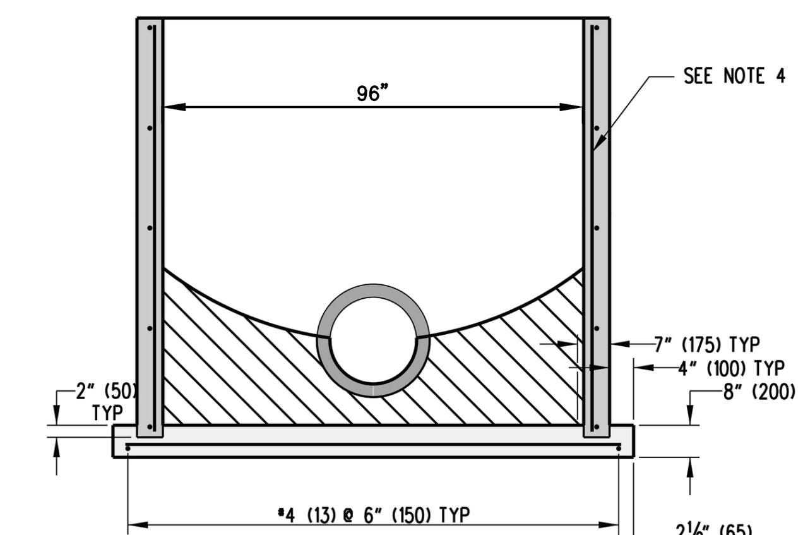
SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 2-22-91; REVISED 10-7-14 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 1-2-91; REVISED 9-29-14

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
60" DIAMETER PRECAST MANHOLE FOR 27" TO 36" PIPES
STANDARD NO. MD 384.03









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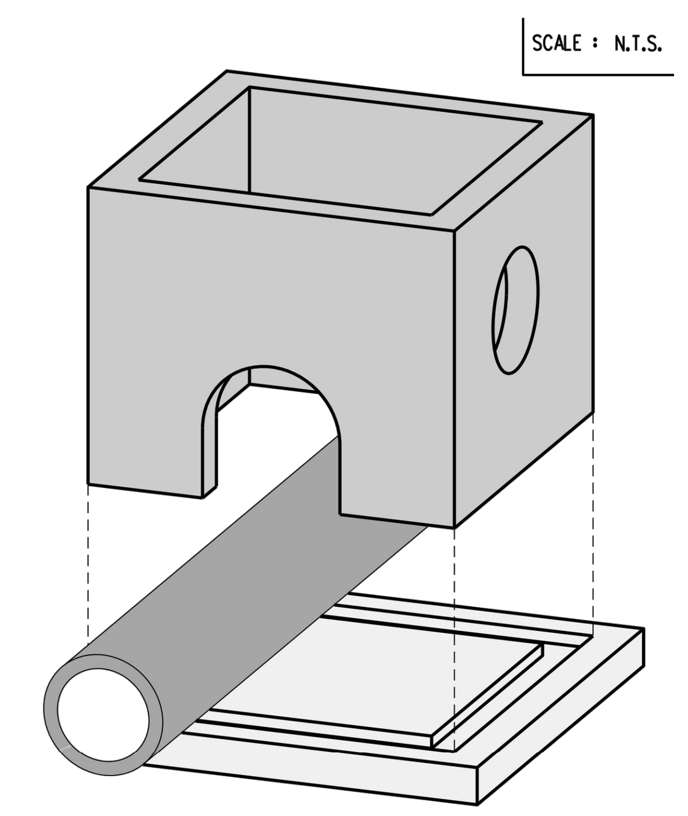
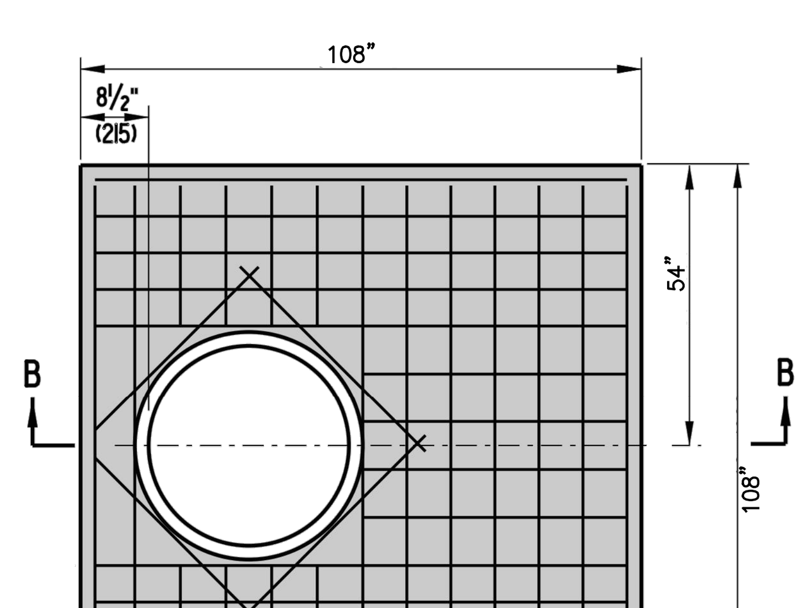
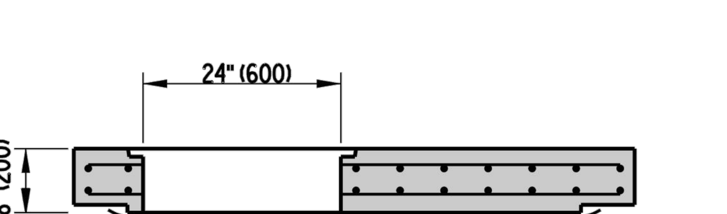


NOTES:

1). ALL REINFORCEMENT SHALL HAVE A MINIMUM COVER OF 1½" (38) UNLESS NOTED OTHERWISE.
2). PIPE SHALL BE SUPPORTED ON BOTH ENDS DURING THE CONSTRUCTION OF THE BASE.
3). VERTICAL WALL REINFORCEMENT SHALL COMPLY WITH A.S.T.M. A615, 0.12 IN/FT IN EACH DIRECTION, VERTICALLY AND HORIZONTALLY.
4). DOGHOUSE OPENING SHALL BE FILLED WITH HIGH STRENGTH, NON-SHRINK GROUT MIXED WITH COARSE AGGREGATE IN A 1:1 RATION BY WEIGHT.
5). THE TOP OF THE DOGHOUSE OPENING SHALL, IN NO CIRCUMSTANCES, BE LESS THAN 4" (100) FROM THE TOP OF THE BOX.
6). DOGHOUSE OPENING WIDTH SHALL BE BETWEEN 3" (75) AND 4" (100) LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE AND SHALL NOT ENCROACH ON THE ADJACENT WALL.
7). EXISTING PIPE IS TO EITHER BE COMPLETELY REMOVED BY SAWCUTTING AS CLOSE TO THE INSIDE BOX WALL AS POSSIBLE, OR BY REMOVING THE TOP PORTION OF THE PIPE AND USING THE REMAINING PIPE SECTION AS THE BOTTOM OF THE FLOW CHANNEL, AS SHOWN IN SECTION B-B.





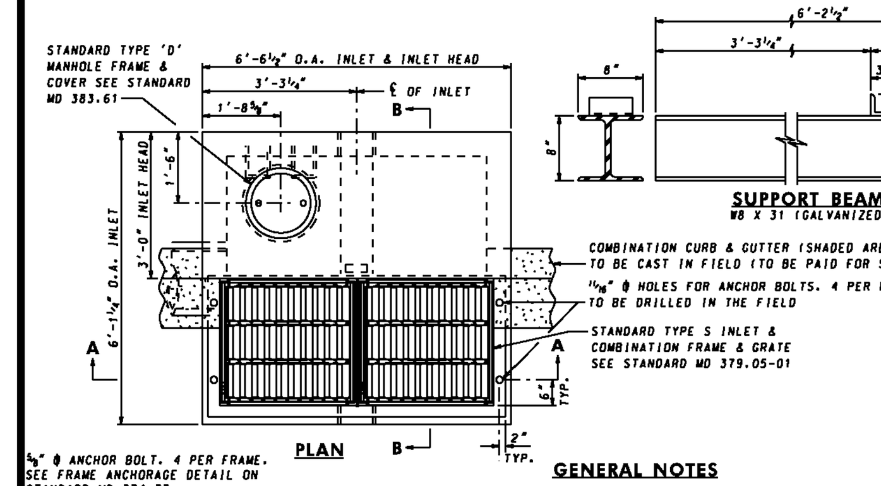
BOX MANHOLE COVER SLAB DETAILS

NOTES:
1. COVER SLABS SHALL BE PRE-CAST.
2. ALL BARS SHALL BE #5 (#16) SPACED AT 6" (150) ± UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1½" (38).

*- DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

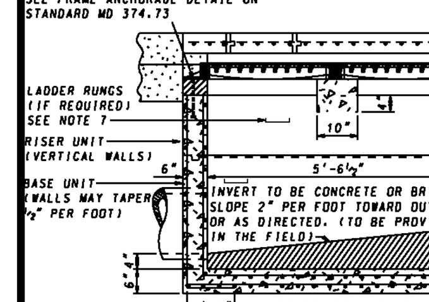
96" DOGHOUSE MANHOLE DETAIL

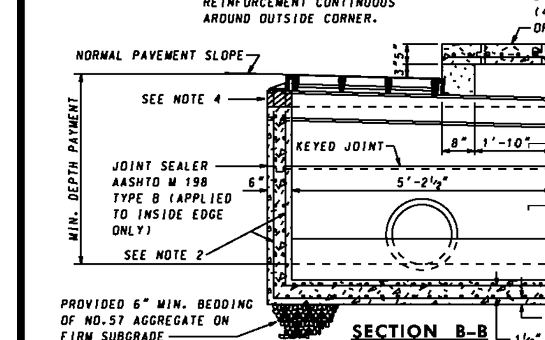
NOT TO SCALE



GENERAL NOTES

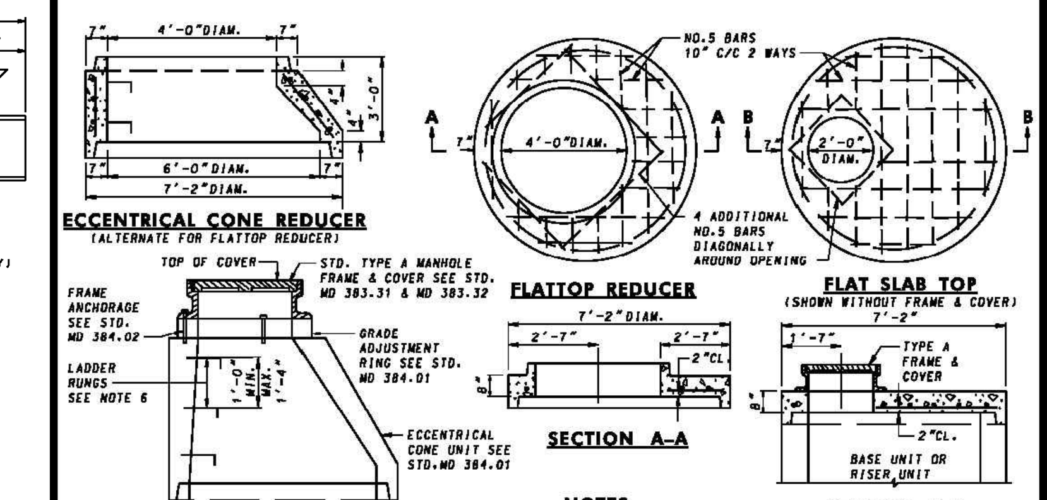
1. CONCRETE TO BE MIX NO.6 (4500 PSI).
2. REINFORCEMENT-2 LAYERS OF 4x4-W4.0x W4.0 WELDED WIRE FABRIC.
3. THREADED PLASTIC INSERTS TO BE PROVIDED FOR HANDLING.
4. GRADE AND SLOPE ADJUSTMENTS TO BE COMPLETED IN THE FIELD USING CONCRETE MIX NO.6.
5. PIPE OPENINGS TO BE PROVIDED AS REQUIRED. FOR SIZE, LOCATION AND INVERT ELEVATIONS REFER TO CONSTRUCTION PLANS.
6. PLACEMENT OF SUBGRADE DRAINAGE WILL BE AS DIRECTED BY THE ENGINEER OR AS NOTED ON THE CONSTRUCTION PLANS.
7. LADDER RUNGS SHALL BE IN ACCORDANCE WITH STANDARD MD 383.91 AND MD 383.92 OR AS DIRECTED BY THE ENGINEER.
8. MINIMUM DEPTH PAYMENT PER "EACH" INLET INCLUDES DEPTHS UP TO 3'-6". VERTICAL DEPTH PAYMENT PER LINEAR FOOT FOR DEPTHS IN EXCESS OF 3'-6".

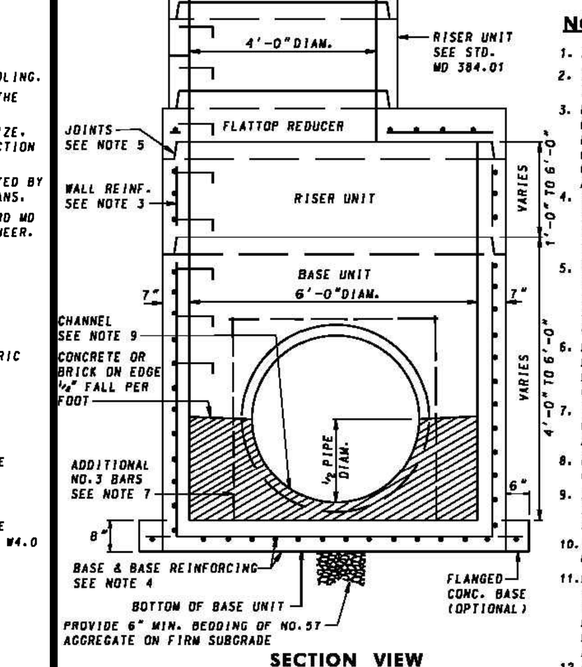




SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 4-15-87; REVISED 10-1-01; REVISED 7-1-09; REVISED 08-03-10 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 6-23-87; REVISED 7-27-09; REVISED 07-26-10

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
PRECAST STANDARD TYPE HS COMBINATION INLET
STANDARD NO. MD 374.72



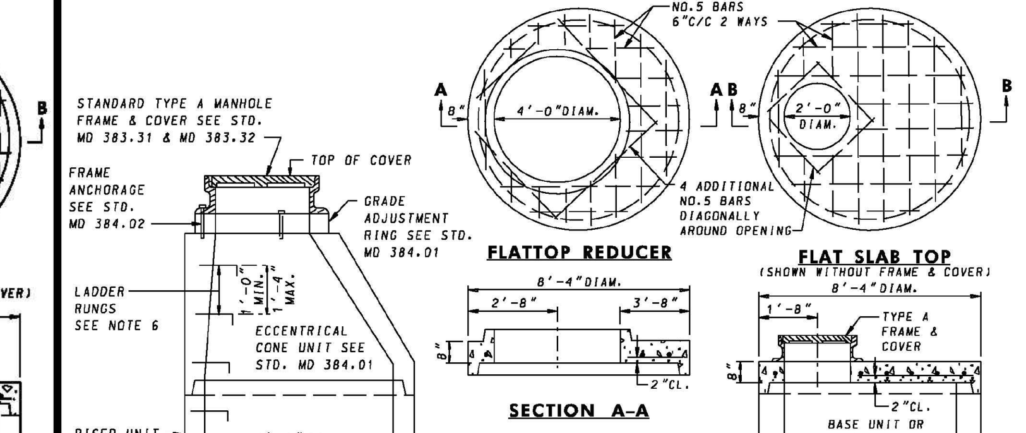


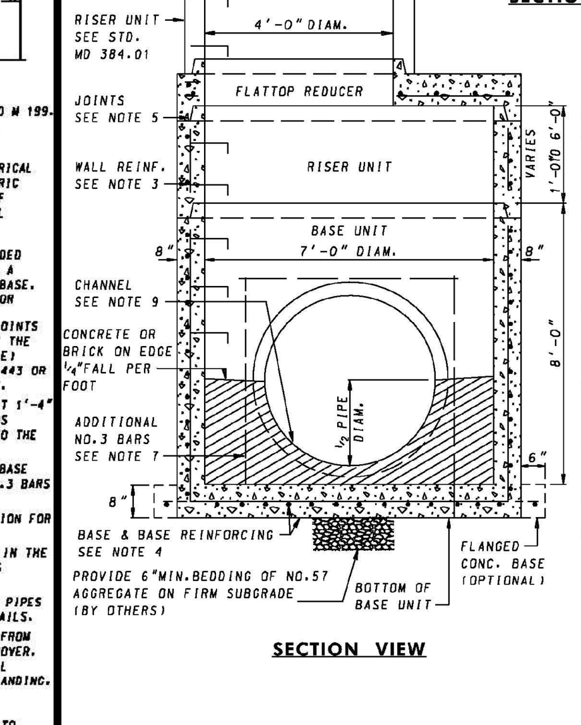
NOTES

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.
2. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4500PSI.
3. WALL REINFORCEMENT FOR BASE UNITS, RISER UNITS AND ECCENTRICAL CONE UNITS SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MINIMUM AREA OF 0.18 IN.²/FT AND MAXIMUM SPACING OF 6" FOR THE 72" DIAMETER MANHOLES. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 AND A 52. REINFORCEMENT SHALL MEET ASTM A 615 OR ASTM A 706, GRADE 60.
4. BASE REINFORCEMENT SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MINIMUM AREA OF 0.27 IN. /FT. AND A MAXIMUM SPACING OF 4" WITH 2" COVERED FRO THE TOP OF BASE. THE BASE SHALL BE CAST MONOLITHIC WITH THE BASE UNIT OR JOINTED PER MANUFACTURER'S DESIGN.
5. THE MANUFACTURER SHALL FORM MALE AND FEMALE ENDS OF JOINTS USING THEIR OWN DESIGN. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATERTIGHT USING (WHERE APPLICABLE) MORTAR, RUBBER O-RING GASKETS MEETING ASTM C 361 & C 443 OR FLEXIBLE PLASTIC GASKETS MEETING AASHTO M 198, TYPE B.
6. LADDER RUNGS SHALL BE INSTALLED IN VERTICAL ALIGNMENT AT 1'-4" MAXIMUM C/C. TYPES SHALL BE IN ACCORDANCE WITH STANDARDS MD 383.91 OR 383.92. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
7. WHEN THE DISTANCE BETWEEN THE MULTIPLE OPENINGS IN THE BASE UNIT OR IN ANY RISER UNIT IS LESS THAN 6" ADDITIONAL NO.3 BARS ARE REQUIRED AROUND OPENINGS.
8. LIFT HOLES OR LIFT EYES SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
9. MIX NO.2 CONCRETE OR BRICK CHANNEL SHALL BE PROVIDED IN THE FIELD AND SHALL SLOPE 2" PER FOOT TOWARD OUTLET OR AS DIRECTED BY THE ENGINEER.
10. THE DRIP STONE LANDING SHALL BE USED ONLY WHEN THERE ARE PIPES CONNECTED TO THE RISER UNITS. SEE STD. MD 384.13 FOR DETAILS.
11. MINIMUM DEPTH PAYMENT PER EACH SHALL BE 9'-0" MEASURED FROM THE BOTTOM OF THE BASE UNIT TO THE TOP OF THE MANHOLE COVER. VERTICAL DEPTH PAYMENT PER LINEAR FOOT SHALL INCLUDE ALL DEPTHS IN EXCESS OF 9'-0". THE COST OF THE DRIP STONE LANDING, NO.57 AGGREGATE, GROUT, SEALANT, AND ALL NECESSARY APPURTENANCES SHALL BE INCIDENTAL TO THE PRICE BID.
12. MANHOLE HAS BEEN DESIGNED FOR HS-25 LOADING, ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 2-22-91; REVISED 4-12-16 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 1-2-91; REVISED 3-4-16

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
72" DIAMETER PRECAST MANHOLE FOR 42" & 48" PIPES
STANDARD NO. MD 384.05



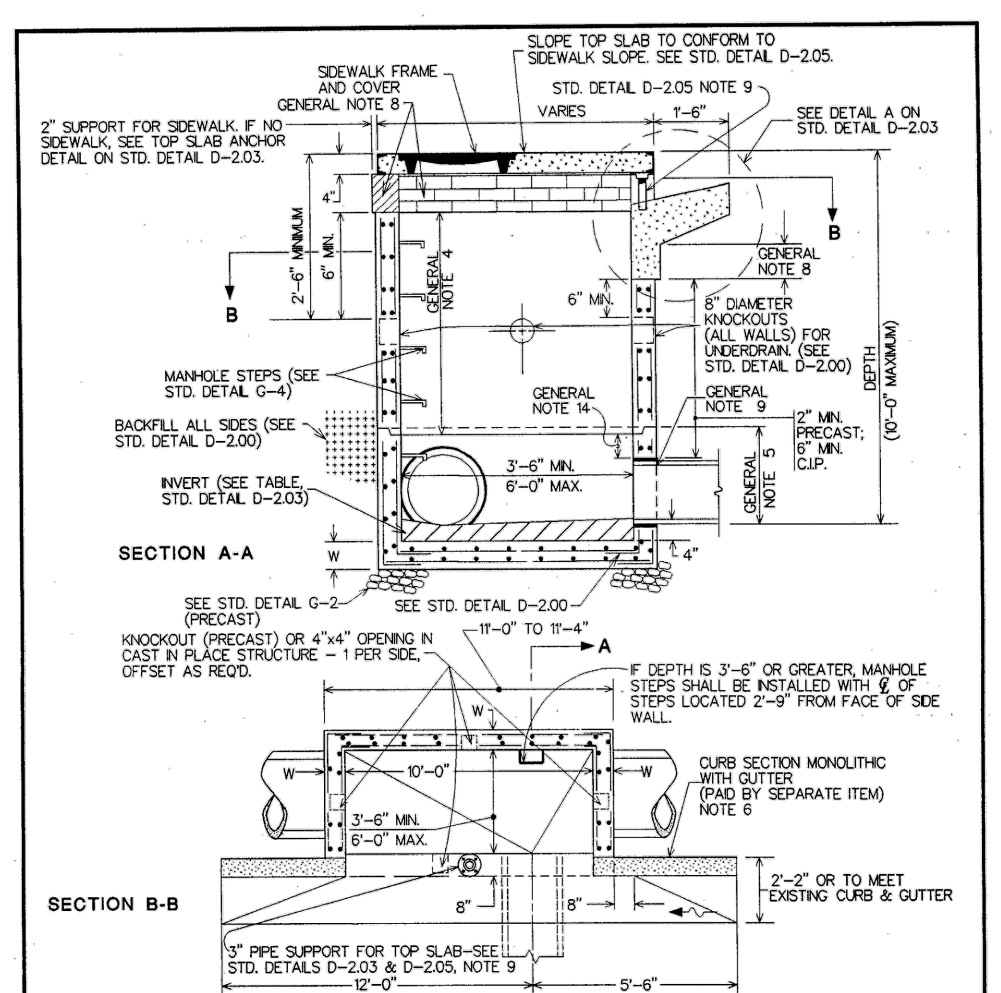


NOTES

1. MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.
2. CONCRETE SHALL BE MIX NO.6 (4500 PSI).
3. WALL REINFORCEMENT FOR BASE UNITS, RISER UNITS AND ECCENTRICAL CONE UNITS SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MINIMUM AREA OF 0.21 IN²/FT AND MAXIMUM SPACING OF 5" FOR THE 84" DIAMETER MANHOLES. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 AND A 52. REINFORCEMENT SHALL MEET ASTM A 615, GRADE 60.
4. BASE REINFORCEMENT SHALL BE REINFORCEMENT BARS OR WELDED WIRE WIRE FABRIC WITH A MINIMUM AREA OF 0.48 IN²/FT AND A MAXIMUM SPACING OF 4" WITH 2" COVER FROM THE TOP OF BASE. THE BASE SHALL BE CAST MONOLITHIC WITH THE UNIT OR JOINTED PER THE MANUFACTURER'S DESIGN.
5. THE MANUFACTURER SHALL FORM MALE AND FEMALE ENDS OF JOINTS USING THEIR OWN DESIGN. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATERTIGHT USING (WHERE APPLICABLE) MORTAR, RUBBER O-RING GASKETS MEETING ASTM C 361 AND C 443 OR FLEXIBLE PLASTIC GASKETS MEETING AASHTO M 198 TYPE B.
6. LADDER RUNGS SHALL BE INSTALLED IN VERTICAL ALIGNMENT AT 1'-4" MAXIMUM C/C. RUNG TYPES SHALL BE IN ACCORDANCE WITH STANDARDS MD 383.91 OR 383.92. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
7. WHEN THE DISTANCE BETWEEN MULTIPLE PIPE OPENING IN THE BASE UNIT OR ANY RISER UNIT IS LESS THAN 6" ADDITIONAL NO.3 BARS ARE REQUIRED AROUND OPENINGS.
8. LIFT HOLES OR LIFT EYES SHALL BE APPRIVED IN EACH SECTION FOR HANDLING.
9. MIX NO.2 CONCRETE OR BRICK CHANNEL SHALL BE PROVIDED IN THE FIELD AND SHALL SLOPE 2" PER FOOT TOWARD OUTLET OR AS DIRECTED BY THE ENGINEER.
10. THE DRIP STONE LANDING SHALL BE USED ONLY WHEN THERE ARE PIPES CONNECTED TO THE RISER UNITS. SEE STD. 384.13 FOR DETAILS.
11. MINIMUM DEPTH PAYMENT PER EACH SHALL BE 10'-1" MEASURED FROM THE BOTTOM OF THE BASE UNIT TO THE TOP OF THE MANHOLE COVER. VERTICAL DEPTH PAYMENT PER LINEAR FOOT SHALL INCLUDE ALL DEPTHS IN EXCESS OF 10'-1". THE COST OF THE DRIP STONE LANDING, NO.57 AGGREGATE, GROUT, SEALANT, AND ALL NECESSARY APPURTENANCES SHALL BE INCIDENTAL TO THE PRICE BID.
12. MANHOLE HAS BEEN DESIGNED FOR HS-25 LOADING, ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

SPECIFICATION 305 | CATEGORY CODE ITEMS | APPROVED — DIRECTOR – OFFICE OF HIGHWAY DEVELOPMENT
APPROVAL • SHA REVISIONS: APPROVAL 2-22-91; REVISED 10-7-14 | APPROVAL • FEDERAL HIGHWAY ADMINISTRATION: APPROVAL 1-2-91; REVISED 9-29-14

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
84" DIAMETER PRECAST MANHOLE FOR 54" &60" PIPES
STANDARD NO. MD 384.07



NOTES

1. SEE DETAIL D–2.00 FOR GENERAL NOTES.
2. SEE DETAIL D–2.05 FOR PRECAST TOP SLAB.
3. DRAWING SHOWS PRECAST INLET. CAST–IN–PLACE INLET PER TABLE, STD. DETAIL D–2.03.
4. PREVIOUSLY STD. DETAIL D–2.03.
5. INLETS SHALL NOT BE USED IN LOCATIONS WHERE THE TOP SLAB MAY REASONABLY BE EXPECTED TO EXPERIENCE TRAFFIC LOADS.
6. DEVELOPMENT PROJECTS: CURB SECTION PAID FOR BY THE HIGHWAY CONTRACT.

DEPARTMENT OF PUBLIC WORKS
STORM DRAINAGE DETAILS
TYPE B-2 INLET
ISSUED: OCTOBER 1977 · REVISED: AUGUST, 1997 · REVISED: JANUARY 2002
PLATE D-2.02B

DESIGN & DRAWING BASED ON
MARYLAND COORDINATE SYSTEM (MCS):
HORIZONTAL NAD 83 (1991)
VERTICAL NAVD 88

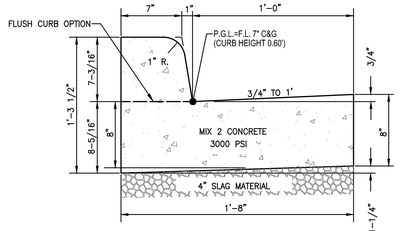
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS & LANDSCAPE ARCHITECTS
1220-C EAST JOPPA RD., SUITE 505
TOWSON, MD 21286
PHONE (410) 821-1690
FAX (410) 821-1748

TRADEPOINT ATLANTIC SITE A-3

979,200 SF DISTRIBUTION CENTER

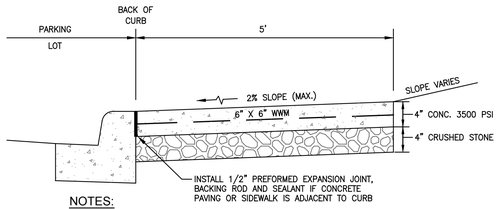
6001 RIVERSIDE DRIVE
15TH ELECTION DISTRICT
7TH COUNCILMANIC DISTRICT
BALTIMORE COUNTY, MARYLAND

DATE	REVISIONS		
		JOB NO.:	19287
		SCALE:	AS SHOWN
		DATE:	11/17/2016
		DRAWN BY:	CEM
		DESIGN BY:	CEM
		REVIEW BY:	AGD
		SHEET:	3 OF 4



7" COMBINATION CURB & GUTTER

NOT TO SCALE

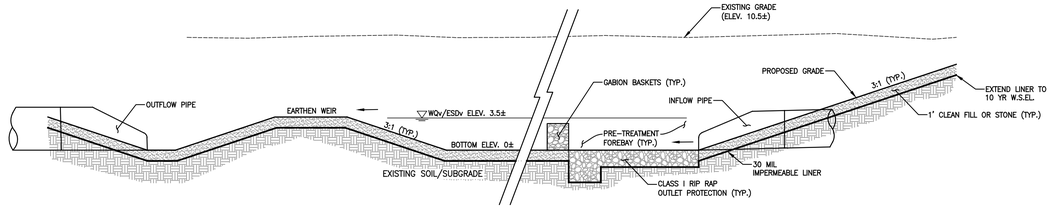


NOTES:

1. SIDEWALK TO BE SCRIBED IN 5' SQUARES.
2. EXPANSION JOINTS ACROSS THE SIDEWALK NOT MORE THAN 10' APART.
3. 1/2" PREFORMED BITUMINOUS EXPANSION JOINT MATERIAL IN EXPANSION JOINTS TO BE 1/4" BELOW SURFACE OF SIDEWALK
4. CONCRETE TO BE MIX 2. (3500 PSI)
5. WHEN SIDEWALK ABUTS PARKING LOT, WALK SHALL BE 1/4" ABOVE PAVING WITH 1/2" PREFORMED BITUMINOUS EXPANSION JOINT BETWEEN THEM AND RESTING ON A COMPACTED CRUSHED STONE BASE.
6. SIDEWALK TO BE 4" CONCRETE WITH 6"X6" WIRE MESH REINF., SLOPE AWAY FROM BUILDING.

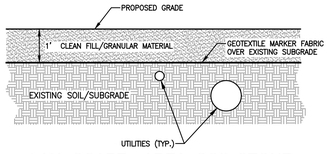
SIDEWALK DETAIL

NOT TO SCALE



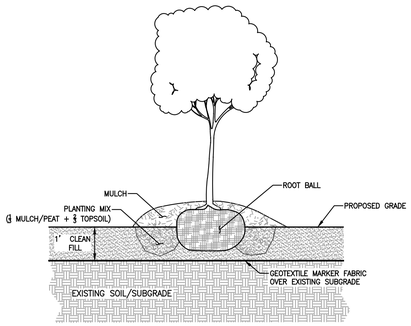
EXTENDED DETENTION POND TYPICAL SECTION

NOT TO SCALE



LANDSCAPE AREA SOIL/STONE TYPICAL SECTION

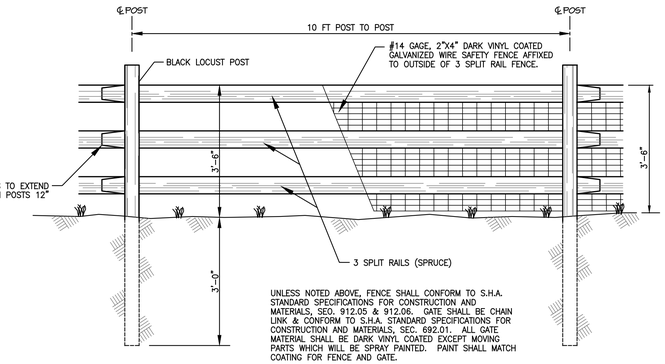
NOT TO SCALE



LANDSCAPE AREA PLANTING TYPICAL SECTION

NOT TO SCALE

NOTE: SHALLOW ROOTED PLANTS SHALL BE SPECIFIED FOR THIS APPLICATION

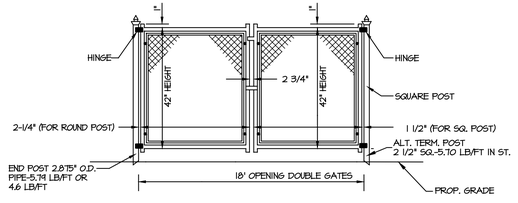


UNLESS NOTED ABOVE, FENCE SHALL CONFORM TO S.H.A. STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SEC. 912.05 & 912.06. GATE SHALL BE CHAIN LINK & CONFORM TO S.H.A. STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SEC. 692.01. ALL GATE MATERIAL SHALL BE DARK VINYL COATED EXCEPT MOVING PARTS WHICH WILL BE SPRAY PAINTED. PAINT SHALL MATCH COATING FOR FENCE AND GATE.

42" SPLIT RAIL FENCE W/SAFETY WIRE BACKING

(PONDS #1A & 1B)

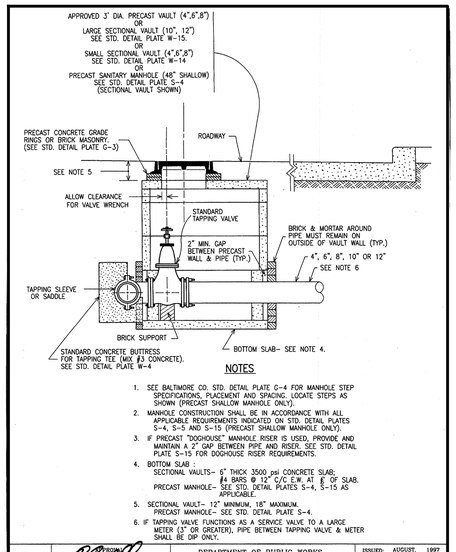
NOT TO SCALE



18' WIDE 42" HIGH DOUBLE GATE DETAIL

(PONDS #1A & 1B)

NOT TO SCALE



NOTES

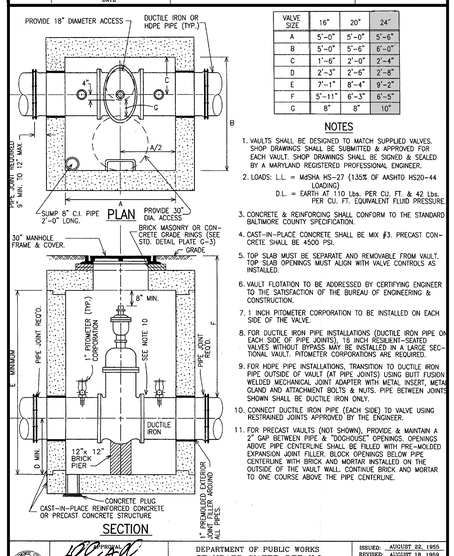
1. SEE BALTIMORE CO. STD. DETAIL PLATE G-4 FOR MANHOLE STEP SPECIFICATIONS, PLACEMENT AND SPACING. LOCATE STEPS AS SHOWN (PRECAST SHALLOW MANHOLE ONLY).
2. MANHOLE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE REQUIREMENTS INDICATED ON STD. DETAIL PLATES S-4, S-5 AND S-15 (PRECAST SHALLOW MANHOLE ONLY).
3. IF PRECAST "DOGHOUSE" MANHOLE RISER IS USED, PROVIDE AND MAINTAIN A 2" GAP BETWEEN PIPE AND RISER. SEE STD. DETAIL PLATE S-15 FOR DOGHOUSE RISER REQUIREMENTS.
4. BOTTOM SLAB :
   SECTIONAL VAULTS- 6" THICK 3500 psi CONCRETE SLAB; #4 BARS @ 12" C/C E.W. AT ℄ OF SLAB.
   PRECAST MANHOLE- SEE STD. DETAIL PLATES S-4, S-15 AS APPLICABLE.
5. SECTIONAL VAULT- 12" MINIMUM, 18" MAXIMUM.
   PRECAST MANHOLE- SEE STD. DETAIL PLATE S-4.
6. IF TAPPING VALVE FUNCTIONS AS A SERVICE VALVE TO A LARGE METER (3" OR GREATER), PIPE BETWEEN TAPPING VALVE & METER SHALL BE DIP ONLY.

DEPARTMENT OF PUBLIC WORKS
STANDARD WATER DETAILS

TAPPING SLEEVE & VALVE

ISSUED: AUGUST, 1997
REVISED: MARCH, 2002
REVISED: MARCH, 2006

PLATE W-9



VALVE SIZE	16"	20"	24"
A	5'-0"	5'-0"	5'-6"
B	5'-0"	5'-6"	6'-0"
C	1'-6"	2'-0"	2'-4"
D	2'-3"	2'-6"	2'-8"
E	7'-1"	8'-4"	9'-2"
F	5'-11"	6'-3"	6'-5"
G	8"	8"	10"

NOTES

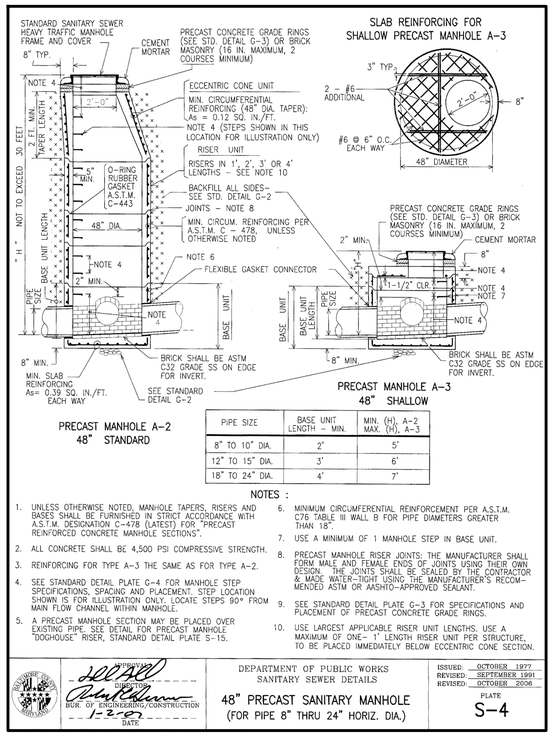
1. VAULTS SHALL BE DESIGNED TO MATCH SUPPLIED VALVES. SHOP DRAWINGS SHALL BE SUBMITTED & APPROVED FOR EACH VAULT. SHOP DRAWINGS SHALL BE SIGNED & SEALED BY A MARYLAND REGISTERED PROFESSIONAL ENGINEER.
2. LOADS: LL = AASHTA HS-27 (135K OF AASHTO HS20-44 LOADING)
   D.L. = EARTH AT 110 Lbs. PER CU. FT. & 42 Lbs. PER CU. FT. EQUIVALENT FLUID PRESSURE.
3. CONCRETE & REINFORCING SHALL CONFORM TO THE STANDARD BALTIMORE COUNTY SPECIFICATION.
4. CAST-IN-PLACE CONCRETE SHALL BE MIX #3. PRECAST CONCRETE SHALL BE 4500 PSI.
5. TOP SLAB MUST BE SEPARATE AND REMOVABLE FROM VAULT. TOP SLAB OPENINGS MUST ALIGN WITH VALVE CONTROLS AS INSTALLED.
6. VAULT FLOTATION TO BE ADDRESSED BY CERTIFYING ENGINEER TO THE SATISFACTION OF THE BUREAU OF ENGINEERING & CONSTRUCTION.
7. 1 INCH PITOMETER CORPORATION TO BE INSTALLED ON EACH SIDE OF THE VALVE.
8. FOR DUCTILE IRON PIPE INSTALLATIONS (DUCTILE IRON PIPE ON EACH SIDE OF PIPE JOINTS), 16 INCH RESILIENT-SEATED VALVES WITHOUT BYPASS MAY BE INSTALLED IN A LARGE SECTIONAL VAULT. PITOMETER CORPORATIONS ARE REQUIRED.
9. FOR HDPE PIPE INSTALLATIONS, TRANSITION TO DUCTILE IRON PIPE OUTSIDE OF VAULT (AT PIPE JOINTS) USING BUTT FUSION WELDED MECHANICAL JOINT ADAPTER WITH METAL INSERT, METAL GLAND AND ATTACHMENT BOLTS & NUTS. PIPE BETWEEN JOINTS SHOWN SHALL BE DUCTILE IRON ONLY.
10. CONNECT DUCTILE IRON PIPE (EACH SIDE) TO VALVE USING RESTRAINED JOINTS APPROVED BY THE ENGINEER.
11. FOR PRECAST VAULTS (NOT SHOWN), PROVIDE & MAINTAIN A 2" GAP BETWEEN PIPE & "DOGHOUSE" OPENINGS. OPENINGS ABOVE PIPE CENTERLINE SHALL BE FILLED WITH PRE-MOLDED EXPANSION JOINT FILLER. BLOCK OPENINGS BELOW PIPE CENTERLINE WITH BRICK AND MORTAR INSTALLED ON THE OUTSIDE OF THE VAULT WALL. CONTINUE BRICK AND MORTAR TO ONE COURSE ABOVE THE PIPE CENTERLINE.

DEPARTMENT OF PUBLIC WORKS
STANDARD WATER DETAILS

STD. VAULTS FOR VERTICAL VALVES WITHOUT GEARING

ISSUED: AUGUST 28, 1995
REVISED: AUGUST 19, 1999
REVISED: JUNE 2006

PLATE W-16A



PIPE SIZE	BASE UNIT LENGTH - MIN.	MIN. (H), A-2 MAX. (H), A-3
8" TO 10" DIA.	2'	5'
12" TO 15" DIA.	3'	6'
18" TO 24" DIA.	4'	7'

NOTES :

1. UNLESS OTHERWISE NOTED, MANHOLE TAPERS, RISERS AND BASES SHALL BE FURNISHED IN STRICT ACCORDANCE WITH A.S.T.M. DESIGNATION C-478 (LATEST) FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS".
2. ALL CONCRETE SHALL BE 4,500 PSI COMPRESSIVE STRENGTH.
3. REINFORCING FOR TYPE A-3 THE SAME AS FOR TYPE A-2.
4. SEE STANDARD DETAIL PLATE G-4 FOR MANHOLE STEP SPECIFICATIONS, SPACING AND PLACEMENT. STEP LOCATION SHOWN IS FOR ILLUSTRATION ONLY. LOCATE STEPS 90° FROM MAIN FLOW CHANNEL WITHIN MANHOLE.
5. A PRECAST MANHOLE SECTION MAY BE PLACED OVER EXISTING PIPE. SEE DETAIL FOR PRECAST MANHOLE "DOGHOUSE" RISER, STANDARD DETAIL PLATE S-15.
6. MINIMUM CIRCUMFERENTIAL REINFORCEMENT PER A.S.T.M. C76 TABLE III WALL B FOR PIPE DIAMETERS GREATER THAN 18".
7. USE A MINIMUM OF 1 MANHOLE STEP IN BASE UNIT.
8. PRECAST MANHOLE RISER JOINTS: THE MANUFACTURER SHALL FORM MALE AND FEMALE ENDS OF JOINTS USING THEIR OWN DESIGN. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR & MADE WATER-TIGHT USING THE MANUFACTURER'S RECOMMENDED ASTM OR AASHTO-APPROVED SEALANT.
9. SEE STANDARD DETAIL PLATE G-3 FOR SPECIFICATIONS AND PLACEMENT OF PRECAST CONCRETE GRADE RINGS.
10. USE LARGEST APPLICABLE RISER UNIT LENGTHS. USE A MAXIMUM OF ONE- 1' LENGTH RISER UNIT PER STRUCTURE, TO BE PLACED IMMEDIATELY BELOW ECCENTRIC CONE SECTION.

DEPARTMENT OF PUBLIC WORKS
SANITARY SEWER DETAILS

48" PRECAST SANITARY MANHOLE
(FOR PIPE 8" THRU 24" HORIZ. DIA.)

ISSUED: OCTOBER 1977
REVISED: SEPTEMBER 1991
REVISED: OCTOBER 2006

PLATE S-4

DESIGN & DRAWING BASED ON
MARYLAND COORDINATE SYSTEM (MCS):
HORIZONTAL NAD 83 (1991)
VERTICAL NAVD 88

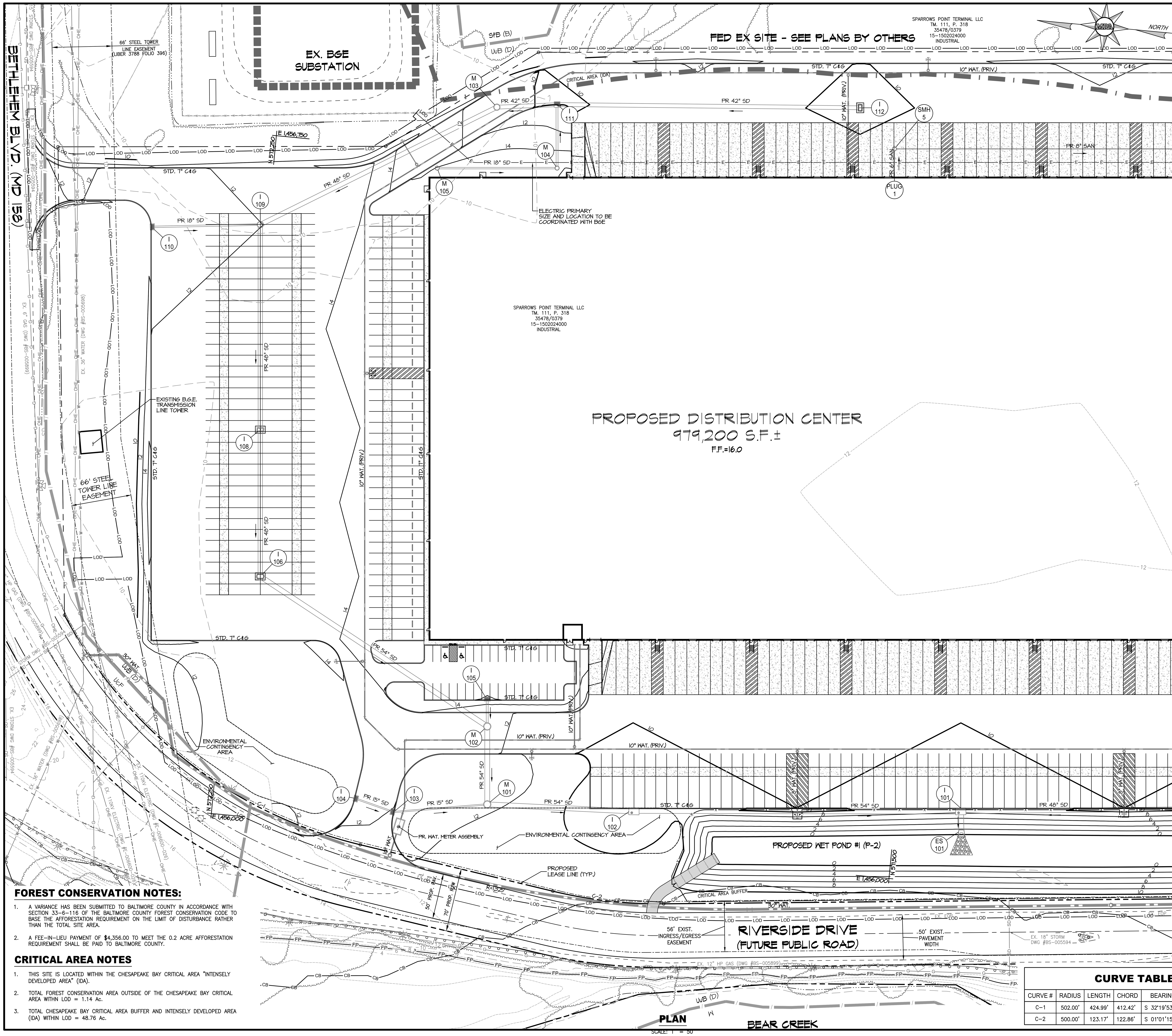
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS & LANDSCAPE ARCHITECTS
1220-C EAST JOPPA RD., SUITE 505
TOWSON, MD 21286
PHONE (410) 821-1690
FAX (410) 821-1748

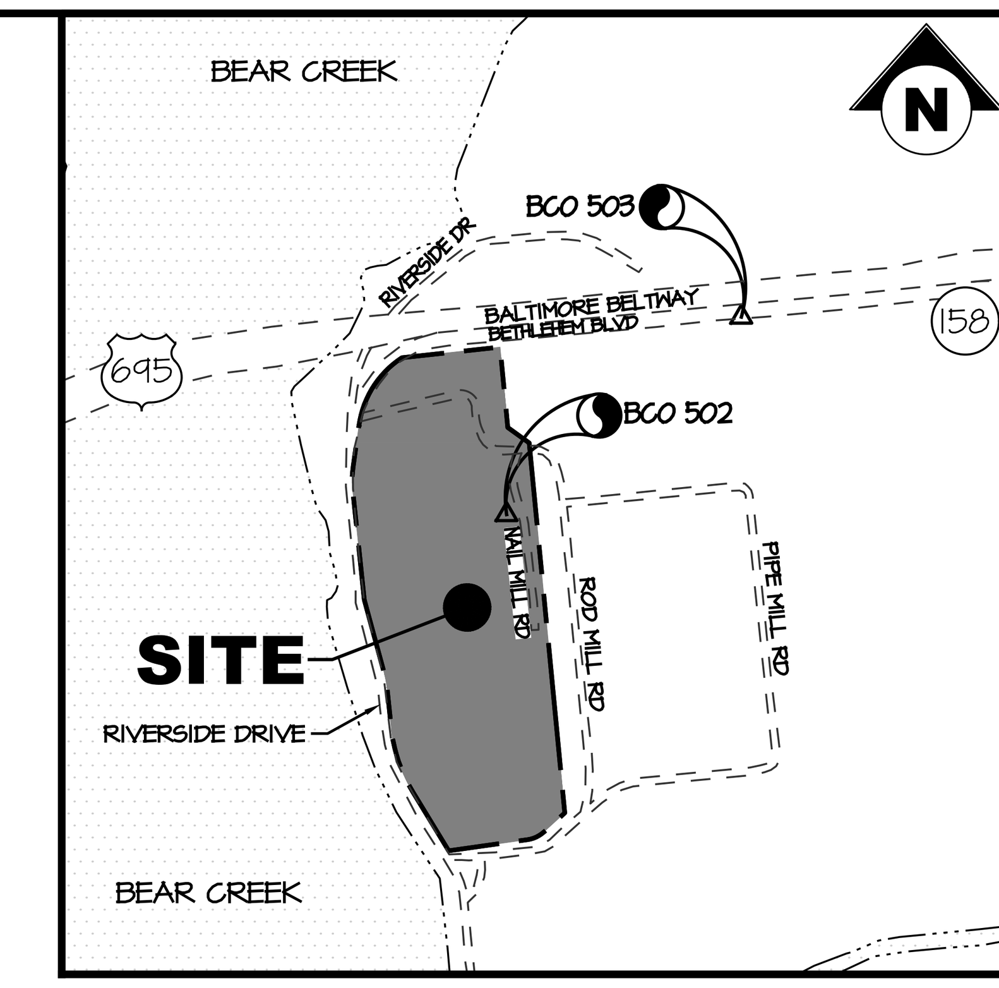
TRADEPOINT ATLANTIC SITE A-3

979,200 SF DISTRIBUTION CENTER

6001 RIVERSIDE DRIVE
15TH ELECTION DISTRICT
7TH COUNCILMANIC DISTRICT
BALTIMORE COUNTY, MARYLAND

DATE	REVISIONS		
		JOB NO.:	19287
		SCALE:	AS SHOWN
		DATE:	11/17/2016
		DRAWN BY:	CEM
		DESIGN BY:	CEM
		REVIEW BY:	AGD
		SHEET:	4 OF 4





VICINITY MAP

SCALE: 1" = 1000'

BENCHMARKS

BCO 502 – PIN & CAP ELEV. 11.73 WEST SIDE NAIL MILL ROAD	N 571,617.57 E 1,456,749.20
BCO 503 – PIN & CAP ELEV. 14.83 SOUTH SIDE 695	N 572,645.36 E 1,457,970.96

GENERAL NOTES:

1. THE PROPOSED GRADING SHOWN ON THIS PLAN MEETS THE REQUIREMENTS SET FORTH BY THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY AND COMPLIES WITH ARTICLE 33, TITLE 5 OF THE BALTIMORE COUNTY CODE. HOWEVER, DUE TO BUILDING TYPES AND LAYOUT, SOME FIELD ADJUSTMENTS MAY BE REQUIRED. ALL CHANGES MUST COMPLY WITH THE ABOVE MENTIONED REQUIREMENTS.
2. ALL SWALES HAVE BEEN DESIGNED BY THE ENGINEER TO CONVEY RUNOFF ACCORDING TO BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS DESIGN STANDARDS.
3. THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION OR DISTURBANCE OF VEGETATION IN THE CRITICAL AREA BUFFER, EXCEPT AS PERMITTED BY THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY.
4. STORMWATER MANAGEMENT HAS BEEN ADDRESSED THROUGH ENVIRONMENTAL SITE DESIGN TO THE MAXIMUM EXTENT PRACTICAL.
5. ALL WORK WITHIN THE STATE RIGHT–OF–WAY SHALL BE IN ACCORDANCE WITH SHA ACCESS PERMIT NO. 00APBA000–XX AND SHA UTILITY PERMIT NO. TO BE ISSUED AT START OF CONSTRUCTION.
6. THE PROPOSED FIRST FLOOR WILL BE CONCRETE SLAB AND PROPOSED WALLS WILL BE CONCRETE BLOCK.

NOTE

THE CORRECTNESS OR COMPLETENESS OF EXISTING INFORMATION SHOWN ON THE DRAWINGS IS NOT WARRANTED OR GUARANTEED. THE CONTRACTOR SHALL VERIFY THE LOCATION OF UTILITIES AND UNDERGROUND FACILITIES, BY TEST PITS OR OTHER METHODS APPROVED BY THE OWNER'S REPRESENTATIVE, AS REQUIRED TO VERIFY EXACT LOCATIONS AND DEPTHS WITHIN THE LIMIT OF DISTURBANCE. ALL DISCREPANCIES BETWEEN INFORMATION SHOWN ON THE DRAWINGS AND THAT VERIFIED IN THE FIELD SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE PRIOR TO BEGINNING WORK.

CONCRETE NOTE:

THE CONTRACTOR SHALL VERIFY CONCRETE FORM PLACEMENT TO ASSURE COMPLIANCE WITH CURRENT LOCAL AND STATE ADA AS WELL AS BUILDING CODES. ADA INSPECTION SHALL BE REQUIRED PRIOR TO POURING CONCRETE. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR MEETING ALL APPLICABLE HANDICAP SLOPE AND DISTANCE REQUIREMENTS AS WELL AS OTHER REQUIREMENTS AS STATED IN THE APPLICABLE CODES.

ANY DISCREPANCIES FOUND SHOULD BE BROUGHT TO THE SITE ENGINEER'S ATTENTION BEFORE ANY CONCRETE IS PLACED.

GRADING OWNER'S/DEVELOPER'S CERTIFICATION

I/WE CERTIFY THAT ALL GRADING ON THIS SITE WILL BE DONE IN ACCORDANCE WITH THE CURRENT GRADING REQUIREMENTS AS SET FORTH BY THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY AND WITH THE REQUIREMENTS SPECIFIED IN ARTICLE 33, TITLE 5 OF THE BALTIMORE COUNTY CODE.

SIGNATURE OF OWNER/DEVELOPER TITLE DATE

PRINT NAME

BALTIMORE COUNTY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND SUSTAINABILITY

APPROVED FOR GRADING

DATE

STORMWATER MANAGEMENT REQUIRED

GRADING PERMIT #X000000
SWM PERMIT # X000000
DRC # 071916D
L.O.D. = 2,173,400 S.F. (49.90 AC.)

FOREST CONSERVATION NOTES:

1. A VARIANCE HAS BEEN SUBMITTED TO BALTIMORE COUNTY IN ACCORDANCE WITH SECTION 33–6–116 OF THE BALTIMORE COUNTY FOREST CONSERVATION CODE TO BASE THE AFFORESTATION REQUIREMENT ON THE LIMIT OF DISTURBANCE RATHER THAN THE TOTAL SITE AREA.
2. A FEE–IN–LIEU PAYMENT OF $4,356.00 TO MEET THE 0.2 ACRE AFFORESTATION REQUIREMENT SHALL BE PAID TO BALTIMORE COUNTY.

CRITICAL AREA NOTES

1. THIS SITE IS LOCATED WITHIN THE CHESAPEAKE BAY CRITICAL AREA "INTENSELY DEVELOPED AREA" (IDA).
2. TOTAL FOREST CONSERVATION AREA OUTSIDE OF THE CHESAPEAKE BAY CRITICAL AREA WITHN LOD = 1.14 Ac.
3. TOTAL CHESAPEAKE BAY CRITICAL AREA BUFFER AND INTENSELY DEVELOPED AREA (IDA) WITHIN LOD = 48.76 Ac.

CURVE TABLE

CURVE #	RADIUS	LENGTH	CHORD	BEARING	DELTA	TANGENT
C–1	502.00'	424.99'	412.42'	S 32°19'53" W	048°30'	226.17'
C–2	500.00'	123.17'	122.86'	S 01°01'15" W	014°07'	61.90'

SCALE: 1"=50'

CONSULTING ENGINEERS
ARCHITECT: GMA ARCHITECTS
STRUCTURAL: M NEALY ENGINEERING INC
MECHANICAL:
ELECTRICAL: AE ICA CASE ENGINEERING, MERUS COURT, ENTON MO
PLUMBING: AE ICA CASE ENGINEERING, MERUS COURT, ENTON MO
FIRE PROTECTION:

CONTRACTOR
ARCO MURRAY DESIGN BUILD
ARCOMURRAY.COM

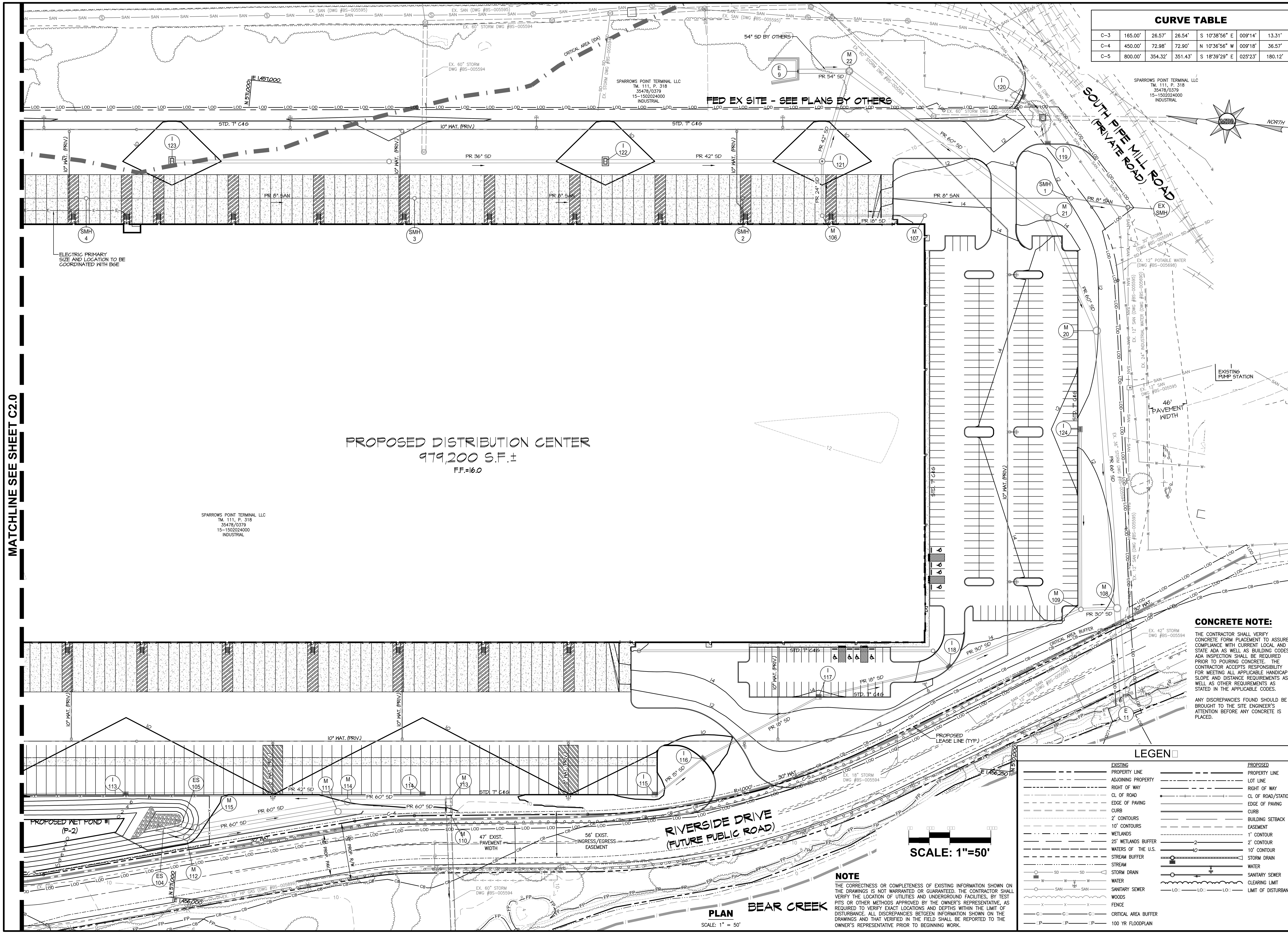
CIVIL
MRA
MORRIS RITCHIE ASSOCIATES INC

NEW WAREHOUSE DISTRIBUTION CENTER
A SPECULATIVE BUILDING
SPARROWS POINT MD

JOB NO :
PA :
DATE :

REVISIONS

SHEET NUMBER
C2.0
FINAL GRADING PLAN



CURVE TABLE

C-3	165.00'	26.57'	26.54'	S 10°38'56" E	009°14'	13.31'
C-4	450.00'	72.98'	72.90'	N 10°36'56" W	009°18'	36.57'
C-5	800.00'	354.32'	351.43'	S 18°39'29" E	025°23'	180.12'

CONCRETE NOTE:

THE CONTRACTOR SHALL VERIFY CONCRETE FORM PLACEMENT TO ASSURE COMPLIANCE WITH CURRENT LOCAL AND STATE ADA AS WELL AS BUILDING CODES. ADA INSPECTION SHALL BE REQUIRED PRIOR TO POURING CONCRETE. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR MEETING ALL APPLICABLE HANDICAP SLOPE AND DISTANCE REQUIREMENTS AS WELL AS OTHER REQUIREMENTS AS STATED IN THE APPLICABLE CODES.

ANY DISCREPANCIES FOUND SHOULD BE BROUGHT TO THE SITE ENGINEER'S ATTENTION BEFORE ANY CONCRETE IS PLACED.

NOTE

THE CORRECTNESS OR COMPLETENESS OF EXISTING INFORMATION SHOWN ON THE DRAWINGS IS NOT WARRANTED OR GUARANTEED. THE CONTRACTOR SHALL VERIFY THE LOCATION OF UTILITIES AND UNDERGROUND FACILITIES, BY TEST PITS OR OTHER METHODS APPROVED BY THE OWNER'S REPRESENTATIVE, AS REQUIRED TO VERIFY EXACT LOCATIONS AND DEPTHS WITHIN THE LIMIT OF DISTURBANCE. ALL DISCREPANCIES BETGEEN INFORMATION SHOWN ON THE DRAWINGS AND THAT VERIFIED IN THE FIELD SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE PRIOR TO BEGINNING WORK.

LEGEND

EXISTING: PROPERTY LINE; ADJOINING PROPERTY; RIGHT OF WAY; CL OF ROAD; EDGE OF PAVING; CURB; 2' CONTOURS; 10' CONTOURS; WETLANDS; 25' WETLANDS BUFFER; WATERS OF THE U.S.; STREAM BUFFER; STREAM; STORM DRAIN; WATER; SANITARY SEWER; WOODS; FENCE; CRITICAL AREA BUFFER; 100 YR FLOODPLAIN

PROPOSED: PROPERTY LINE; LOT LINE; RIGHT OF WAY; CL OF ROAD/STATIONS; EDGE OF PAVING; CURB; BUILDING SETBACK; EASEMENT; 1' CONTOUR; 2' CONTOUR; 10' CONTOUR; STORM DRAIN; WATER; SANITARY SEWER; CLEARING LIMIT; LIMIT OF DISTURBANCE

CIVIL: MORRIS & RITCHIE ASSOCIATES, INC.

CONTRACTOR: ARCO MURRAY DESIGN BUILD — ARCOMURRAY.COM

CONSULTING ENGINEERS
ARCHITECT: GMA ARCHITECTS
STRUCTURAL: MCNEALY ENGINEERING INC.
MECHANICAL:
ELECTRICAL: AEI CASE ENGINEERING
PLUMBING: AEI CASE ENGINEERING
FIRE PROTECTION:

NEW WAREHOUSE DISTRIBUTION CENTER
A SPECULATIVE BUILDING
SPARROWS POINT, MD

JOB NO.:
PA:
DATE:

REVISIONS

THIS DESIGN AND THESE DRAWINGS ARE THE PROPERTY OF GMA ARCHITECTS INC. NO PART OF THIS OR MAY BE REPRODUCED WITHOUT PRIOR WRITTEN PERMISSION FROM GMA ARCHITECTS INC.

SHEET NUMBER
C2.1
FINAL GRADING PLAN

APPENDIX F

STORM WATER MANAGEMENT CONSTRUCTION SPECIFICATIONS

THESE SPECIFICATIONS ARE APPROPIATE TO ALL PONDS WITHIN THE SCOPE OF THE STANDARD FOR PRACTICE MD-378. ALL REFERENCES TO ASTM AND AASHTO SPECIFICATIONS APPLY TO THE MOST RECENT VERSION.

I. SITE PREPARATION

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENTS, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS AND SHARP BREAKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORMWATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

II. EARTH FILL

A. MATERIAL
THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUTOFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE CONSTRUCTION SUPERVISED BY A GEOTECHNICAL ENGINEER.MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE CAPABILITY TO SUPPORT VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

B. PLACEMENT
AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

C. COMPACTION
THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF THE HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPSFOOT, RUBBER TIRED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN +/- 2% OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99 (STANDARD PROCTOR).

III. CUTOFF TRENCH **(NOT APPLICABLE)**

THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION, WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

IV. EMBANKMENT CORE **(NOT APPLICABLE)**

THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL A MINIMUM OF FOUR FEET. THE HEIGHT SHALL BE UP TO THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITION, THE CORE SHALL BE PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

V. STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF THE STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE.

STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI; 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM pH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM-CM. MATERIAL SHALL BE PLACED SUCH THAT A MINIMUM OF 6" (MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE PLACED UNDER (BEDDING), OVER AND ON THE SIDE OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF THE STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURAL BACKFILL (FLOWABLE FILL) ZONE SHALL BE THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

VI. PIPE CONDUITS

ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION.

A. CORRUGATED METAL PIPE

1. MATERIALS

-(POLYMER COATED STEEL PIPE) - STEEL PIPES WITH POLYMERIC COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF 0.01 INCH (10 MIL) ON BOTH SIDES OF THE PIPE. THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATIONS M-245 & M-246 WITH WATERTIGHT COUPLING BANDS OR FLANGES.

-(ALUMINUM COATED STEEL PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-274 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM COATED STEEL PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT.

-(ALUMINUM PIPE) - THIS PIPE AND ITS APPURTENANCES HALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-196 OR M-211 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT. HOT DIP GALVANIZED BOLTS MAY BE USED FOR CONNECTIONS. THE pH OF SURROUNDING SOILS SHALL BE BETWEEN 4 AND 9.

2. COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC. MUST BE COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. METALS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT LEAST 24 MILS IN THICKNESS.

3. CONNECTIONS - ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATERTIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ANTI-SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATERTIGHT. DIMPLE BANDS ARE NOT CONSIDERED TO BE WATERTIGHT.

ALL CONNECTIONS SHALL USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE-ROLLED AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BANDWIDTH. THE FOLLOWING TYPE CONNECTIONS ARE ACCEPTABLE FOR PIPES LESS THAN 24 INCHES IN DIAMETER: FLANGES ON BOTH ENDS OF PIPE WITH A CIRCULAR 3/8 INCH CLOSED CELL NEOPRENE GASKET, PRE-PUNCHED TO THE FLANGE BOLT CIRCLE, SANDWICHED BETWEEN ADJACENT FLANGES; A 12-INCH WIDE STANDARD LAP TYPE BAND WITH 12-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET; AND A 12-INCH WIDE HUGGER TYPE BAND WITH O-RING GASKETS HAVING A MINIMUM DIAMETER OF 1/2 INCH GREATER THAN THE CORRUGATION DEPTH. PIPES 24 INCHES IN DIAMETER AND LARGER SHALL BE CONNECTED BY A 24 INCH LONG ANNULAR CORRUGATED BAND USING A MINIMUM OF 4(FOUR) RODS AND LUGS, 2 ON EACH CONNECTING PIPE END. A 24-INCH NEOPRENE GASKET WILL BE INSTALLED WITH 12 INCHES OF THE END OF EACH PIPE. FLANGED JOINTS WITH 3/8 INCH CLOSED CELL GASKETS THE FULL WIDTH OF THE FLANGE IS ALSO ACCEPTABLE.

HELICALLY CORRUGATED PIPE SHALL HAVE EITHER CONTINUOUSLY WELDED SEAMS OR HAVE LOCK SEAMS WITH INTERNAL CAULKING OR A NEOPRENE BEAD.

4. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

6. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

B. REINFORCED CONCRETE PIPE

1. MATERIALS - REINFORCED CONCRETE PIPE SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM SPECIFICATION C-361.

2. BEDDING - ALL REINFORCED CONCRETE PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING/CRADLE FOR THEIR ENTIRE LENGTH. THIS BEDDING/CRADLE SHALL CONSIST OF HIGH SLUMP CONCRETE PLACED UNDER THE PIPE AND UP THE SIDES OF THE PIPE AT LEAST 50% OF ITS OUTSIDE DIAMETER WITH A MINIMUM THICKNESS OF 6 INCHES. WHERE A CONCRETE CRADLE IS NOT NEEDED FOR STRUCTURAL REASONS, FLOWABLE FILL MAY BE USED AS DESCRIBED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

3. LAYING PIPE - BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL END UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL. AFTER THE JOINTS ARE SEALED FOR THE ENTIRE LINE, THE BEDDING SHALL BE PLACED SO THAT ALL SPACES UNDER THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

C. PLASTIC PIPE (PVC, HDPE, ETC.):

1. MATERIALS - PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORMING TO ASTM D-1785 OR ASTM D-2241. CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, COUPLINGS AND FITTINGS SHALL CONFORM TO FOLLOWING: 4"-10" INCH PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M252 TYPE S, AND 12" THROUGH 24" INCH SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S.

2. JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLETELY WATERTIGHT.

3. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

VII. DRAINAGE DIAPHRAGMS **(NOT APPLICABLE)**

WHEN A DRAINAGE DIAPHRAGM IS USED, A REGISTERED PROFESSIONAL ENGINEER WILL SUPERVISE THE DESIGN AND CONSTRUCTION INSPECTION.

VIII. CONCRETE STRUCTURES

A. CONCRETE
CONCRETE SHALL MEET THE MINIMUM REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 902.10.03 MIX NO. 3.

B. REINFORCEMENT
REINFORCEMENT SHALL MEET THE MINIMUM REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 416 (REINFORCEMENT FOR CONCRETE STRUCTURES): SECTION 908 (REINFORCING STEEL - GRADE 60, WIRE ROPE AND WIRE FABRIC), AND SECTION 909.02 (STEEL FOR MISCELLANEOUS USE).

IX. ROCK RIP RAP

ROCK RIP RAP SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION, STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 311.
GEOTEXTILE SHALL BE PLACED UNDER ALL RIPRAP AND SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION, STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 921.09, CLASS CLASS 'SE' NON-WOVEN.

X. CARE OF WATER DURING CONSTRUCTION

ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE AREAS TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM THE VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM OF REQUIRED EXCAVATIONS AND WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRE DRAINING THE WATER TO SUMPS FROM WHICH THE WATER SHALL BE PUMPED.

XI. STABILIZATION

ALL BORROW AREAS SHALL BE GRADED TO PROVIDE DRAINAGE AND LEFT IN A SIGHTLY CONDITION. ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING, MULCHING OR SODDING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

A. SOD

1. SPECIFICATIONS - SOD SHALL BE "K-31" TALL FESCUE OR KENTUCKY BLUEGRASS/RED FESCUE MIXTURE OR APPROVED EQUAL. CLASS OF TURFGRASS SOD SHALL BE MARYLAND OR VIRGINIA STATE CERTIFIED OR APPROVED SOD.

2. SITE PREPARATION - WHERE SOIL IS ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE SPREAD AT THE RATE OF 100 LBS./1000 SQ. FT. IN ALL SOILS 5-10-5 FERTILIZER OR APPROVED EQUAL SHALL BE APPLIED AT THE RATE OF 30 LBS/1000 SQ.FT. FERTILIZER SHALL BE UNIFORMLY APPLIED AND MIXED INTO THE TOP 3" OF SOIL WITH THE REQUIRED LIME. SLOW RELEASE NITROGEN, AT THE RATE OF 3.5 LBS/1000 SQ. FT., SHALL BE APPLIED TO THE PREPARED SOIL IMMEDIATELY PRIOR TO SOD INSTALLATION. THIS MATERIAL SHALL BE APPROXIMATELY ONE-THIRD IMMEDIATELY AVAILABLE AND TWO-THIRDS WATER INSOLUBLE NITROGEN. UREA FORMALDEHYDE (UF) AND ISOBUTYLIDENE (IBDU) MEET THESE STANDARDS.

3. SOD INSTALLATION - THE FIRST ROW OF SOD SHALL BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACE PARALLEL TO AND TIGHTLY WEDGED AGAINST EACH OTHER. LATERAL JOINTS SHALL BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS. ON SLOPING AREAS WHERE EROSION MAY BE A PROBLEM, SOD SHALL BE LAID WITH LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERED JOINTS. SECURE THE SOD BY TAMPING AND PEGGING OR OTHER APPROVED METHODS. AS SODDING IS COMPLETED IN ANY ONE SECTION, THE ENTIRE AREA SHALL BE ROLLED OR TAMPED TO ENSURE SOLID CONTACT OF ROOTS WITH THE SOIL SURFACE. SOD SHALL BE WATERED IMMEDIATELY AFTER ROLLING OR TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOLID SURFACE BELOW THE SOD ARE THOROUGHLY WET. THE OPERATION OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD SHALL BE COMPLETED WITHIN EIGHT HOURS.

B. PERMANENT SEEDING
ALL DISTURBED AREAS SHALL BE STABILIZED AS FOLLOWS:

1. SEEDBED PREPARATION - LOOSEN UPPER 3 INCHES OF SOIL BY RAKING, DICING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.

2. SOIL AMENDMENTS - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS./1000) SQ. FT.), 600 LBS. PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ. FT.) AND 400 LBS. PER ACRE OF 30-0-0 UREAFORM FERTILIZER (9.2 LBS./100 SQ. FT.). HARROW OR DISC LIME AND FERTILIZER INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE (9.2 LBS./1000 SQ. FT.) OF 30-0-0 UREAFORM FERTILIZER AND 500 LBS. PER ACRE (11.5 LBS./1000 SQ.FT.) OF 10-10-10 FERTILIZER.

3. SEEDING - FOR THE PERIOD MARCH 1 THROUGH APRIL 30 SEED WITH 40 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND 15 LBS. PER ACRE INOCULATED CROWNVETCH. FOR THE PERIOD MAY 1 THROUGH JULY 31 SEED WITH 60 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND 2 LBS. PER ACRE INOCULATED WEEPING LOVEGRASS. FOR THE PERIOD OF AUGUST 1 THROUGH OCTOBER 15 SEED WITH 40 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND 20 LBS. PER ACRE INOCULATED INTERSTATE SERICA LESPEDEZA. DURING THE PERIOD OF OCTOBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY: OPTION (1) - 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) - USE SOD. OPTION (3) - SEED WITH 60 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND MULCH WITH 2 TONS PER ACRE WELL ANCHORED STRAW. FOR THE PERIOD OF MAY 1 THROUGH FEBRUARY 28, INOCULATED CROWNVETCH SHALL BE APPLIED DURING THE SUBSEQUENT PERIOD OF MARCH 1 THROUGH APRIL 30 AT THE RATE OF 15 LBS. PER ACRE.

4. MULCHING - APPLY 1.5 TO 2 TONS PER ACRE OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING 218 GALLONS PER ACRE OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPE 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE FOR ANCHORING.

5. MAINTENANCE - INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDING.

C. TEMPORARY SEEDING

1. SEEDBED PREPARATION - LOOSEN UPPER 3 INCHES OF SOIL BY DICING, RAKING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.

2. SOIL AMENDMENTS - APPLY 600 LBS. PER ACRE OF 10-10-10 FERTILIZER. WHERE SOIL IS ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE APPLIED AT THE RATE OF 2 TONS PER ACRE (92 LBS./1000 SQ.FT.).

3. SEEDING - FOR PERIODS MARCH 1 THROUGH APRIL 30, AND FROM AUGUST 15 THROUGH NOVEMBER 15, SEED WITH 2.5 BUSHELS PER ACRE ANNUAL RYE. FOR THE PERIOD MAY 1 THROUGH AUGUST 14, SEED WITH 3 LBS. PER ACRES OF WEEPING LOVEGRASS. FOR THE PERIOD NOVEMBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING OR USE SOD.

4. MULCHING - SAME AS PERMANENT SEEDING.

XII. EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

XIII. OPERATION AND MAINTENANCE

AN OPERATION AND MAINTENANCE PLAN IN ACCORDANCE WITH LOCAL OR STATE REGULATIONS WILL BE PREPARED FOR ALL PONDS. AS A MINIMUM, THE DAM INSPECTION CHECKLIST LOCATED IN APPENDIX A SHALL BE INCLUDED AS PART OF THE OPERATION AND MAINTENANCE PLAN AND PERFORMED AT LEAST ANNUALLY. WRITTEN RECORDS OF MAINTENANCE AND MAJOR REPAIRS NEEDS TO BE RETAINED IN A FILE. THE ISSUANCE OF A MAINTENANCE AND REPAIR PERMIT FOR ANY REPAIRS OR MAINTENANCE THAT INVOLVES THE MODIFICATION OF THE DAM OR SPILLWAY FROM ITS ORIGINAL DESIGN AND SPECIFICATION IS REQUIRED. A PERMIT IS ALSO REQUIRED FOR ANY REPAIRS OR RECONSTRUCTION THAT INCLUDE A SUBSTANTIAL PORTION OF THE STRUCTURE. ALL INDICATED REPAIRS ARE TO BE MADE AS SOON AS PRACTICAL.

XIV. FENCING

FENCING SHALL BE 42" HIGH CHAIN FENCE CONSTRUCTED IN ACCORDANCE WITH THE LATEST MARYLAND STATE HIGHWAY ADMINISTRATION STANDARD DETAILS 690.02 AND 690.03. THE SPECIFICATIONS FOR A 6'-0" FENCE SHALL BE USED, SUBSTITUTING 42" FABRIC AND 6'-8" LINE POSTS. GATE SHALL BE CONSTRUCTED IN ACCORDANCE WITH STATE HIGHWAY ADMINISTRATION STANDARD DETAIL 692.01 WITH 42" FABRIC. FABRIC FOR FENCE AND GATE SHALL CONFORM TO ASSHTO DESIGNATION M181.74. DARK VINYL COATING IS REQUIRED FOR THE FENCE POSTS AND WIRE FABRIC IN ACCORDANCE WITH THE LANDSCAPE MANUAL ADOPTED BY RESOLUTION 56-90, OCTOBER 1, 1990.

XV. FILTER CLOTH

1. FILTER CLOTH TO BE MIRAFI 140N OR APPROVED EQUAL.

XVI. GABIONS

1. GABIONS TO BE PVC COATED. CLASS IV. SECTION H.24, MARYLAND STANDARD SPECIFICATIONS AND DETAILS FOR SOIL EROSION AND SEDIMENT CONTROL.

XVII. INSPECTION

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 5 WORKING DAYS PRIOR TO STARTING ANY WORK SHOWN ON THESE PLANS SO THAT STORMWATER MANAGEMENT POND MAY BE INSPECTED DURING CONSTRUCTION.

XVIII. REFERENCES

UNLESS OTHERWISE NOTED, ALL CONSTRUCTION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH:

1. BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION MATERIALS, DECEMBER 2007, ERRATA & ADDENDA.

2. NATURAL RESOURCES CONSERVATION SERVICES OF MARYLAND STANDARDS AND SPECIFICATIONS, POND, CODE 378, JANUARY 2000.

3. MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION, JULY 2008, STANDARD SPECIFICATION FOR CONSTRUCTION AND MATERIAL.

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38291, EXPIRATION DATE: 01/13/2018.

SEQUENCE OF CONSTRUCTION

1. NOTIFY BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, (410-887-3226) AT LEAST 48 HOURS PRIOR TO START OF WORK TO ESTABLISH A PRE-CONSTRUCTION MEETING DATE. NOTIFY THE ENGINEER IN CHARGE (410-821-1690) AT LEAST 5 DAYS PRIOR TO COMMENCING CONSTRUCTION.
3. AFTER THE PRE-CONSTRUCTION MEETING AND WITH THE APPROVAL OF BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL AND THE SEDIMENT CONTROL INSPECTOR, CLEAR AND GRUB AS NECESSARY FOR INSTALLATION OF THE SEDIMENT CONTROL MEASURES AND DEVICES. INSTALL SEDIMENT BASINS AND TRAPS.
4. NOTIFY BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, UPON COMPLETION OF ABOVE INSTALLATION.
6. ROUGH GRADE SITE USING ENGINEERED ON-SITE SLAG MATERIAL.
7. INSTALL ONSITE UTILITIES, STORM DRAIN AND INLETS. WITH APPROVAL OF BALTIMORE COUNTY AND SEDIMENT CONTROL INSPECTOR, BEGIN BUILDING CONSTRUCTION.
8. INSTALL CURB AND GUTTER, STONE SUB-BASE FOR ROADWAYS AND SIDEWALKS.
9. FOR WORK THAT REQUIRES DAILY STABILIZATION. CONTRACTOR SHALL LIMIT DISTURBANCE TO THAT AREA WHICH CAN BE STABILIZED AT THE END OF EACH WORKING DAY. IF THE DISTURBED AREA CANNOT BE STABILIZED AT THE END OF THE WORKING DAY, CONTRACTOR SHALL INSTALL SILT FENCE ON THE DOWNSLOPE SIDE.
   A. FOR AREAS TO BE PAVED, INCLUDING SIDEWALKS, STABILIZATION SHALL BE STONE SUB-BASE.
   B. FOR THOSE AREAS TO BE VEGETATIVELY STABILIZED, STABILIZATION SHALL BE AS FOLLOWS:
      - FOR PROPOSED SWALES/CHANNELS, USE PERMANENT SEED & EROSION CONTROL MATTING.
      - FOR ALL OTHER AREAS, USE PERMANENT SEED & MULCH.
      - UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH THE UTILITY NOTE ON THIS SHEET.
10. BRING TO FINAL GRADES. PERMANENTLY STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS. PROPOSED SLOPES SHALL BE STABILIZED WITH PERMANENT SEED AND SOIL STABILIZATION MATTING.
11. FINE GRADE AND VEGETATIVELY STABILIZE ALL DISTURBED AREAS NOT TO BE PAVED. BASE PAVING MAY COMMENCE AT THIS TIME.
12. INSTALL LANDSCAPING.
13. UPON STABILIZATION OF SITE WITH ESTABLISHED VEGETATION AND WITH PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE EROSION AND SEDIMENT CONTROL MEASURES AND DEVICES.
14. CONVERT SEDIMENT BASINS TO FINAL STORMWATER MANAGEMENT FACILITY.
15. COMPLETE PAVING OPERATIONS.
16. UPON STABILIZATION OF SITE WITH ESTABLISHED VEGETATION AND WITH PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE ALL REMAINING SEDIMENT CONTROL MEASURES AND STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS.
17. AS-BUILT SURVEY AND STUDY TO BE COMPLETED WITHIN 30 DAYS OF THE COMPLETION OF FACILITIES CONVERSION AND SUBMITTED TO BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY (DEPS).

INSPECTION SCHEDULE

PRIOR NOTIFICATION SHALL BE GIVEN TO THE ENGINEER SO THAT INSPECTIONS MAY BE MADE AT THE FOLLOWING STAGES AS APPLICABLE:

(1) UPON COMPLETION OF EXCAVATION TO SUBFOUNDATION AND WHERE REQUIRED, INSTALLATION OF STRUCTURAL SUPPORTS OR REINFORCEMENT FOR STRUCTURES, INCLUDING BUT NOT LIMITED TO:
   (I) CORE TRENCHES FOR STRUCTURAL EMBANKMENTS;
   (II) INLET-OUTLET STRUCTURES, DRAIN PIPES, AND WATERTIGHT CONNECTORS ON PIPES; AND
   (III) TRENCHES FOR ENCLOSED STORM DRAINAGE FACILITIES.

(2) DURING PLACEMENT OF STRUCTURAL FILL, CONCRETE, STONE, SAND, SOIL AND INSTALLATION OF PIPING AND CATCH BASINS;

(3) DURING BACKFILL OF FOUNDATIONS AND TRENCHES;

(4) DURING EMBANKMENT CONSTRUCTION; AND

(5) UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION. NO WORK SHALL PROCEED UNTIL THE ENGINEER INSPECTS AND APPROVES THE WORK PREVIOUSLY COMPLETED.

OUTFALL STATEMENT

THE SITE SHALL DISCHARGE TO BEAR CREEK (TIDAL, USE I-P) VIA TWO EXISTING CONCRETE PIPES WHICH DISCHARGE TO STABLE OUTFALLS. THE SITE'S DEVELOPMENT SHALL NOT CAUSE EROSION TO ADJACENT OR DOWN-STREAM PROPERTIES.

MAINTENANCE SCHEDULE

1. ALL TRASH AND DEBRIS SHALL BE REMOVED FROM THE AREA SURROUNDING THE FACILITY AS NECESSARY AND IN A TIMELY MANNER. ALL APPURTENANCES SHALL BE KEPT FREE OF TRASH.
2. SEDIMENT SHOULD BE CLEANED OUT OF THE SEDIMENTATION CHAMBER WHEN IT ACCUMULATES TO A DEPTH OF MORE THAN SIX INCHES.
3. WHEN THE FILTERING CAPACITY DIMINISHES, FAILS TO DRAIN IN 48 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REMOVED AND SHALL BE REPLACED WITH FRESH MATERIAL. THE REMOVED SEDIMENTS SHOULD BE DISPOSED IN AN ACCEPTABLE MANNER. SILT/SEDIMENT SHOULD BE REMOVED FROM THE FILTER BED WHEN THE ACCUMULATION EXCEEDS ONE INCH.
4. THE OWNER(S) OF THE FACILITY SHALL BE RESPONSIBLE FOR THE SAFETY OF THE AREAS SURROUNDING THE FACILITIES AND THE CONTINUED OPERATION, SURVEILLANCE, INSPECTION, AND MAINTENANCE THEREOF.

MAINTENANCE RESPONSIBILITY

THE STORMWATER MANAGEMENT FACILITIES SHOWN ON THESE PLANS ARE PRIVATE AND SHALL BE MAINTAINED BY THE OWNER(S).

STANDARD NON-DISTURBANCE NOTE:

THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION OR DISTURBANCE OF VEGETATION IN THE FOREST BUFFER EASEMENT AND/OR THE FOREST CONSERVATION EASEMENT EXCEPT AS PERMITTED BY THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY.

STANDARD PROTECTIVE COVENANTS NOTE:

ANY FOREST BUFFER EASEMENT AND/OR FOREST CONSERVATION EASEMENT SHOWN HEREON IS SUBJECT TO PROTECTIVE COVENANTS WHICH MAY BE FOUND IN THE LAND RECORDS OF BALTIMORE COUNTY AND WHICH RESTRICT DISTURBANCE AND USE OF THESE AREAS.

ENVIRONMENTAL AND GEOTECHNICAL REPORTS NOTE:

CONTRACTOR SHALL REFER TO THE PHASE II INVESTIGATION REPORT AND PRE-DESIGN INVESTIGATION CHARACTERIZATION REPORT BOTH PREPARED BY ARM GROUP, INC. ON JUNE 10, 2016; THE GEOTECHNICAL ENGINEERING STUDY PREPARED BY HILLIS CARNES ASSOCIATES, INC. ON JUNE 13, 2016; THE REPORT OF PRELIMINARY GEOTECHNICAL EXPLORATION AS PREPARED BY GEOTECHNOLOGY ASSOCIATES, INC. ON SEPTEMBER 25, 2015 ALL RECOMMENDATIONS MADE IN THE REPORTS SHALL BE CONSIDERED PART OF THE PROJECT'S SCOPE OF WORK.

AS BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

SIGNATURE P.E. NO.

DATE

CONTRACTOR'S AS-BUILT NOTE

AS-BUILT PLANS AND CERTIFICATION ARE REQUIRED FOR THIS STORMWATER MANAGEMENT FACILITY. THESE MUST BE PREPARED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER. BALTIMORE COUNTY WILL NOT PERFORM THE INSPECTION OR PREPARE THE AS-BUILT PLANS OR CERTIFICATION. THE STORMWATER MANAGEMENT PERMIT SECURITY WILL NOT BE RELEASED UNTIL THE AS-BUILT PLAN AND CERTIFICATION ARE APPROVED BY BALTIMORE COUNTY.

IN ORDER TO PREPARE THE REQUIRED AS-BUILT PLANS AND CERTIFICATION, THIS STORMWATER MANAGEMENT FACILITY MUST BE INSPECTED BY THE ENGINEER AT SPECIFIC STAGES DURING CONSTRUCTION AS REQUIRED BY THE CURRENT BALTIMORE COUNTY STORMWATER MANAGEMENT POLICY AND DESIGN MANUAL. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST FIVE (5) WORKING DAYS PRIOR TO STARTING ANY WORK SHOWN ON THESE PLANS.

OWNER'S / DEVELOPER'S CERTIFICATION

I/WE CERTIFY THAT ALL WORK SHOWN ON THESE CONSTRUCTION DRAWINGS WILL BE ACCOMPLISHED PURSUANT TO THESE PLANS. I/WE ALSO UNDERSTAND THAT IT IS MY/OUR RESPONSIBILITY TO HAVE THE CONSTRUCTION SUPERVISED AND CERTIFIED, INCLUDING THE SUBMITTAL OF "AS-BUILT" PLANS. BY A REGISTERED PROFESSIONAL ENGINEER WITHIN THIRTY (30) DAYS OF COMPLETION, BY A MARYLAND REGISTERED PROFESSIONAL ENGINEER.

SIGNATURE DATE

ENGINEER'S CERTIFICATION

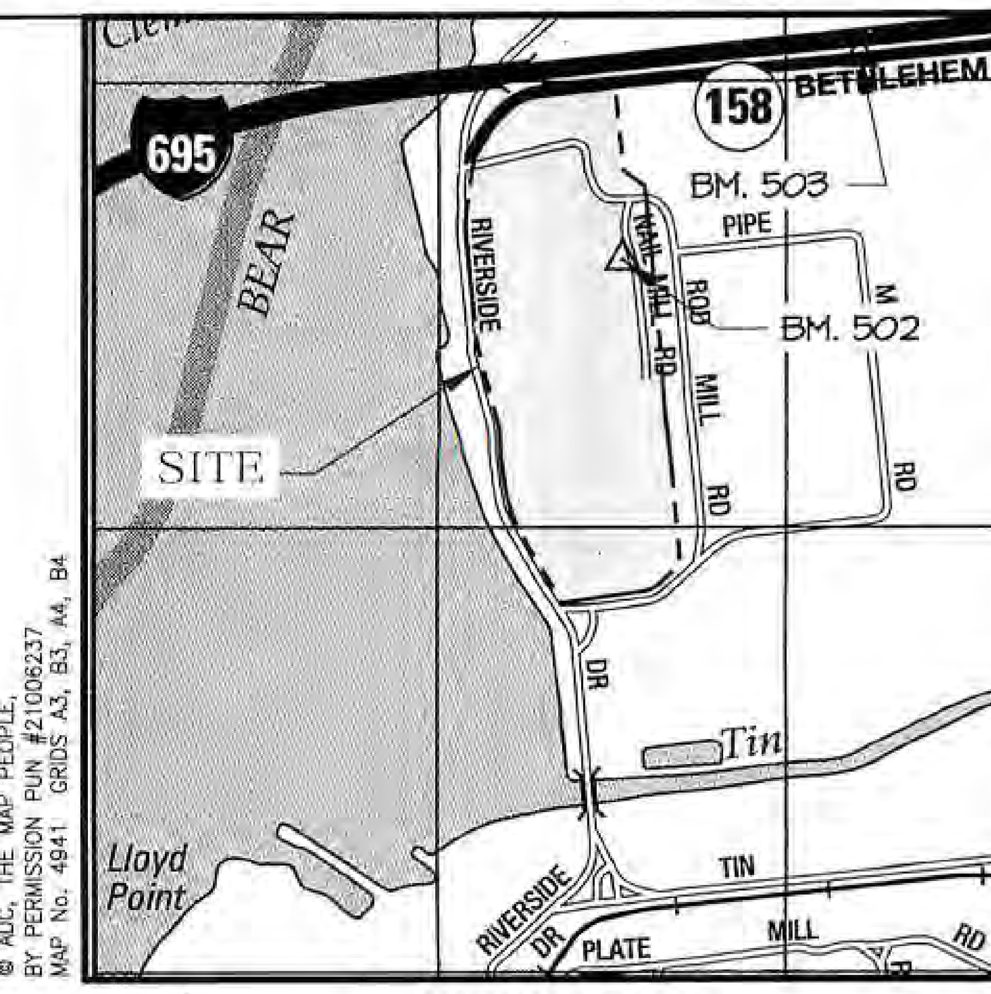
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY OR UNDER MY SUPERVISION AND MEETS THE MINIMUM STANDARDS OF THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY AND THE BALTIMORE COUNTY SOIL CONSERVATION DISTRICT.

SIGNATURE DATE

Baltimore County Soil Conservation District
APPROVED FOR STORM WATER MANAGEMENT

DISTRICT OFFICIAL DATE PLAN NO.
TECHNICAL REVIEW FOR DISTRICT
BY
BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY DATE

APPROVED CHIEF
STORMWATER ENGINEERING
Baltimore County
Department of Environmental Protection and Sustainability



© ADC, THE MAP PEOPLE, BY PERMISSION PUN #21006237 MAP No. 4941 GRIDS A3, B3, A4, B4

N

VICINITY MAP

SCALE: 1" = 1000'

BENCHMARKS

BCO 502 - PIN & CAP
ELEV. 11.73
WEST SIDE NAIL MILL ROAD
N 571,617.57
E 1,456,749.20

BCO 503 - PIN & CAP
ELEV. 14.83
SOUTH SIDE 695
N 572,645.36
E 1,457,970.96

RECEIVED
JUL 1 8 2016
DEPARTMENT OF PERMITS APPROVALS AND INSPECTIONS

SHEET INDEX

SHEET	DESCRIPTION
01 OF 11	NOTES
02 OF 11	EXISTING CONDITIONS - SITE AND RESOURCE MAPPING
03 OF 11	EXISTING CONDITIONS - SITE AND RESOURCE MAPPING
04 OF 11	PROPOSED CONDITIONS - SITE FINGERPRINTING AND DEVELOPMENT LAYOUT
05 OF 11	PROPOSED CONDITIONS - SITE FINGERPRINTING AND DEVELOPMENT LAYOUT
06 OF 11	EROSION AND SEDIMENT CONTROL OVERLAY
07 OF 11	EROSION AND SEDIMENT CONTROL OVERLAY
08 OF 11	EXISTING CONDITIONS - DRAINAGE AREA MAP
09 OF 11	EXISTING CONDITIONS - DRAINAGE AREA MAP
10 OF 11	PROPOSED CONDITIONS - DRAINAGE AREA MAP
11 OF 11	PROPOSED CONDITIONS - DRAINAGE AREA MAP

OWNER / DEVELOPER

TRADEPOINT ATLANTIC, INC.
1600 SPARROWS POINT BOULEVARD
BALTIMORE, MARYLAND 21219
PHONE: (443) 452-1509
ATTN: JUSTIN DUNN; DIRECTOR OF DEVELOPMENT

DESIGN & DRAWING BASED ON MARYLAND COORDINATE SYSTEM (MCS):
HORIZONTAL NAD 83 (1991)
VERTICAL NAVD 88

L.O.D. = 2,135,755 S.F., 49.03 AC.

AS-BUILT PER RECORD PRINT		REVISION	DATE	BY	P. W. A. NO.	KEY SHEETS	POSITION SHEETS	DRAWING SCALE	DEPARTMENT OF PUBLIC WORKS
DRAFTSMAN	DATE				-	ANW	22 SE 24 23 SE 24 24 SE 24 25 SE 24	PLAN: N/A PROFILE: N/A	APPROVED ____ DIRECTOR DATE ____
					RIGHT OF WAY				
					--				

ENGINEER: MICHAEL G. COUGHLIN
DATE: 7/13/2016 LIC. NO.: 38291
DESIGNED BY: CEM
DRAWN BY: CEM/BAW
CHECKED BY: MGC
BUREAU OF ENGINEERING AND CONSTRUCTION
REVIEWED
DATE
HIGHWAYS | STRUCTURES | STORM DRAINS | SEWER | WATER
PRIVATE

SWM PERMIT #:
GRADING PERMIT #:

PAI # XX-XXXX
DRC # 071916D

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

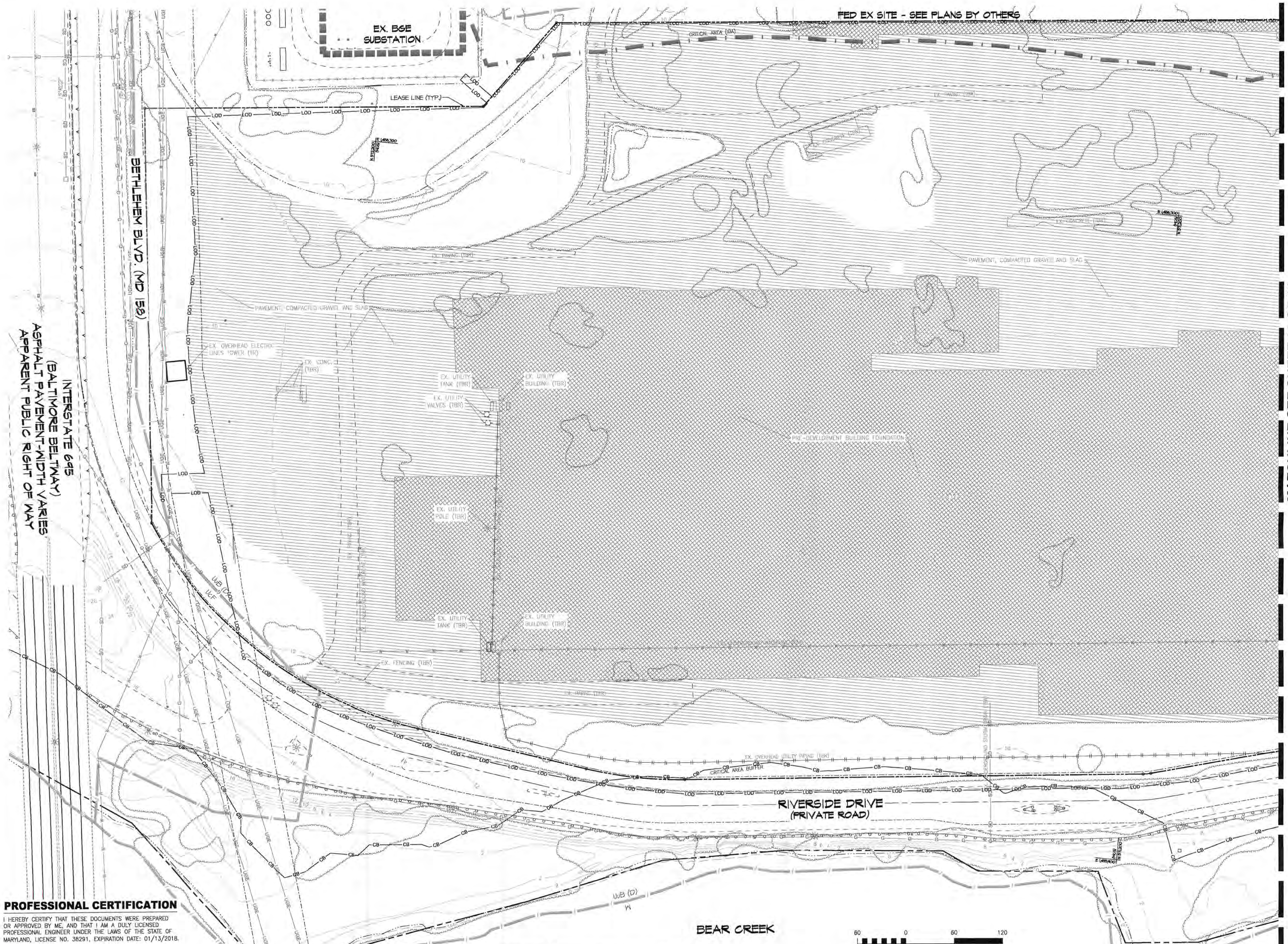
CONCEPT STORMWATER MANAGEMENT PLAN

NOTES

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3
ELECTION DISTRICT NO. 15 C7

SHEET DESIGNATION | CONTRACT NO. | JOB ORDER NO. | SHEET 01 OF 11 | DRAWING NO. | FILE NO.

REVIEWED 8/9/16



60 0 60 120

NORTH

SOILS CHART		
MAP UNIT SYMBOL	SOIL TYPE	HYDROLOGIC SOIL GROUP
UuB	URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPE	D
UcF	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPE	NONE

NATURAL RESOURCES AND THE CORRESPONDING REGULATORY AUTHORITIES	
FEDERAL	
WETLANDS	NO
MAJOR WATERWAYS	NO
FLOODPLAINS	NO
STATE	
TIDAL AND NONTIDAL WETLANDS	NO
WETLANDS OF SPECIAL STATE CONCERN	NO
WETLAND BUFFERS	NO
STREAM BUFFERS	NO
PERENNIAL STREAMS	NO
FLOODPLAINS	NO
FORESTS	NO
FOREST BUFFERS	NO
CRITICAL AREAS	YES
LOCAL	
STEEP SLOPES	NO
HIGHLY ERODIBLE SOILS	NO
ENHANCED STREAM BUFFERS	NO
TOPOGRAPHY/SLOPES	SEE PLAN
SPRINGS	NO
SEEPS	NO
INTERMITTENT STREAMS	NO
VEGETATIVE COVER	NO
SOILS	SEE PLAN
BEDROCK/GEOLOGY	NO
EXISTING DRAINAGE AREAS	SEE PLAN

ENVIRONMENTAL NOTES

1. TOPOGRAPHIC INFORMATION WAS GENERATED BY FIELD SURVEY AND PREPARED BY MORRIS & RITCHIE ASSOCIATES, INC. IN JUNE 2016 AND SUPPLEMENTED WITH AERIAL TOPOGRAPHY PROVIDED BY TRADEPOINT, INC. DATED MARCH, 2014.
2. A PHASE II ENVIRONMENTAL ASSESSMENT REPORT AND PRE-DESIGN INVESTIGATION CHARACTERIZATION REPORT WAS PREPARED BY ARM GROUP, INC. ON JUNE 10, 2016.
3. A REPORT OF SUBSURFACE EXPLORATION AND GEO-TECHNICAL ENGINEERING RECOMMENDATIONS WAS PREPARED BY HILLIS CARNES ASSOCIATES, INC. ON NOVEMBER 13, 2016 AND BY GEO-TECHNOLOGY ASSOCIATES, INC. ON SEPTEMBER 25, 2015.
4. THERE ARE NO SEPTIC SYSTEMS LOCATED ON THIS SITE AND THE SITE IS SERVED BY PUBLIC SEWER.
5. THERE ARE NO EXISTING WELLS ON THE SITE. THE SITE IS SERVED BY AN EXISTING WATER SERVICE LOCATED ALONG BETHLEHEM BOULEVARD.
6. THERE ARE NO KNOWN ARCHAEOLOGICAL SITES ON THE SITE.
7. THERE ARE NO KNOWN ENDANGERED SPECIES ON THE SITE.
8. SOILS WERE OBTAINED FROM THE NRCS WEB SOIL SURVEY.
9. THIS SITE IS LOCATED WITHIN THE CHESAPEAKE BAY CRITICAL AREA INTENSELY DEVELOPED AREA (IDA).
10. WATERSHED: BALTIMORE HARBOR
11. THE SITE SHALL DRAIN TO TWO EXISTING STORM DRAIN OUTFALLS THAT DISCHARGE TO BEAR CREEK.
12. THE LEASE BOUNDARY SHOWN WAS PROVIDED BY TRADEPOINT ATLANTIC, INC.

APPROVED ______________ CHIEF

STORMWATER ENGINEERING
Baltimore County

Department of Environmental Protection and Sustainability

OWNER / DEVELOPER

TRADEPOINT ATLANTIC, INC.
1600 SPARROWS POINT BOULEVARD
BALTIMORE, MARYLAND 21219
PHONE: (443) 452-1509
ATTN: JUSTIN DUNN; DIRECTOR OF DEVELOPMENT

DESIGN & DRAWING BASED ON MARYLAND COORDINATE SYSTEM (MCS):
HORIZONTAL NAD 83 (1991)
VERTICAL NAVD 88

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38291, EXPIRATION DATE: 01/13/2018.

STATE OF MARYLAND · MICHAEL GRAY COUGHLIN · No. 38291 · PROFESSIONAL ENGINEER

AS-BUILT PER RECORD PRINT		REVISION	DATE	BY	P. W. A. NO.	KEY SHEETS	POSITION SHEETS	DRAWING SCALE	DEPARTMENT OF PUBLIC WORKS
DRAFTSMAN	DATE				–	ANW	22 SE 24 23 SE 24 24 SE 24 25 SE 24	PLAN: 1" = 60' PROFILE: N/A	APPROVED ______ DIRECTOR DATE ______
					RIGHT OF WAY				
					–				

©2016 MORRIS & RITCHIE ASSOCIATES, INC.	DESIGNED BY: CEM	BUREAU OF ENGINEERING AND CONSTRUCTION		HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER
ENGINEER: MICHAEL G. COUGHLIN	DRAWN BY: CEM/BAW	REVIEWED						
DATE: 7/13/2016 LIC. NO.: 38291	CHECKED BY: MGC	DATE						

PRIVATE

PAI # XX-XXXX
DRC # 071916D

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

CONCEPT STORMWATER MANAGEMENT PLAN

EXISTING CONDITIONS - SITE AND RESOURCE MAPPING

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

ELECTION DISTRICT NO. 15 C7

BALTIMORE COUNTY MARYLAND

SHEET DESIGNATION	CONTRACT NO.
	JOB ORDER NO.
	SHEET 02 OF 11
	DRAWING NO.
	FILE NO.

LEGEND

	EXISTING
	EASEMENT LINE
	LEASE LINE
	CL OF ROAD
	EDGE OF PAVING
	CURB
	2' CONTOURS
	10' CONTOURS
	CRITICAL AREA LINE
CB CB CB	CRITICAL AREA BUFFER
	STREAM
SD SD SD	STORM DRAIN
W W W W	WATER
SAN SAN SAN	SANITARY SEWER
	TREE LINE
	FENCE
	DRAINAGE AREA DIVIDE
	Tc PATH
	(TR) TO REMAIN
	(TBR) TO BE REMOVED
	(TBA) TO BE ABANDONED
LOD LOD LOD LOD	LIMIT OF DISTURBANCE
	IMPERVIOUS COVER
	IMPERVIOUS COVER (BUILDING FOUNDATION)

APPROVED _____ CHIEF

STORMWATER ENGINEERING
Baltimore County

Department of Environmental Protection and Sustainability

OWNER / DEVELOPER

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STATE OF MARYLAND — MICHAEL GRAY COUGHLIN — NO. 38291 — PROFESSIONAL ENGINEER

60 0 60 120

PAI # XX-XXXX
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					RIGHT OF WAY				DATE _____
					–				

DESIGNED BY: CEM	BUREAU OF ENGINEERING AND CONSTRUCTION		HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER	
DRAWN BY: CEM/BAW	REVIEWED							
CHECKED BY: MCC	DATE							

ENGINEER: MICHAEL G. COUGHLIN
DATE: 7/13/2016 LIC. NO.: 38291

PRIVATE

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

CONCEPT STORMWATER MANAGEMENT PLAN

EXISTING CONDITIONS - SITE AND RESOURCE MAPPING

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

ELECTION DISTRICT NO. 15 C7

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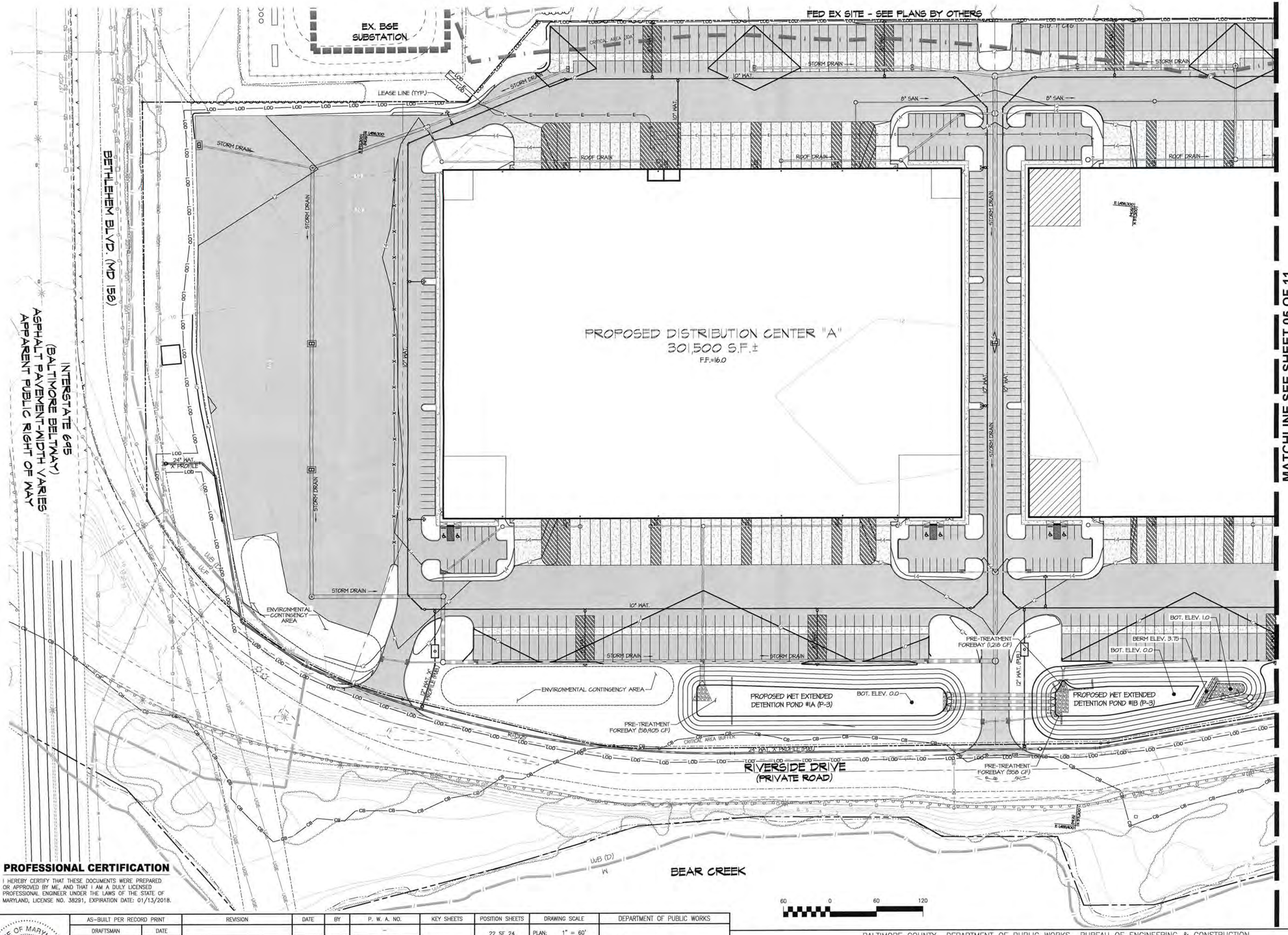

LEGEND

EXISTING
- EASEMENT LINE
- LEASE LINE
- CL OF ROAD
- EDGE OF PAVING
- CURB
- 2' CONTOURS
- 10' CONTOURS
- CRITICAL AREA LINE
- CRITICAL AREA BUFFER
- STREAM
- STORM DRAIN
- WATER
- SANITARY SEWER
- TREE LINE
- FENCE

PROPOSED
- EDGE OF PAVING
- CURB
- BUILDING SETBACK
- EASEMENT
- 1' CONTOUR
- 2' CONTOUR
- 10' CONTOUR
- STORM DRAIN
- WATER
- SANITARY SEWER
- CLEARING LIMIT
- LIMIT OF DISTURBANCE

NOTE:
NO BASEMENTS ARE BEING PROPOSED AS PART OF THIS PLAN.
ALL BUILDINGS SHALL CONSIST OF SLAB ON GRADE CONSTRUCTION.

APPROVED _____ CHIEF
STORMWATER ENGINEERING
Baltimore County
Department of Environmental Protection and Sustainability

OWNER / DEVELOPER

TRADEPOINT ATLANTIC, INC:
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STATE OF MARYLAND — MICHAEL GRAY COUGHLIN — No. 38291 — PROFESSIONAL ENGINEER

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DRAFTSMAN	DATE			

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RIGHT OF WAY			
–			

DEPARTMENT OF PUBLIC WORKS
APPROVED _____ DIRECTOR
DATE _____

DESIGNED BY: CEM	BUREAU OF ENGINEERING AND CONSTRUCTION		HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER	
DRAWN BY: CEM/BAW	REVIEWED							
CHECKED BY: MCC	DATE							

ENGINEER: MICHAEL G. COUGHLIN
DATE: 7/13/2016 LIC. NO.: 38291

PRIVATE

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

CONCEPT STORMWATER MANAGEMENT PLAN

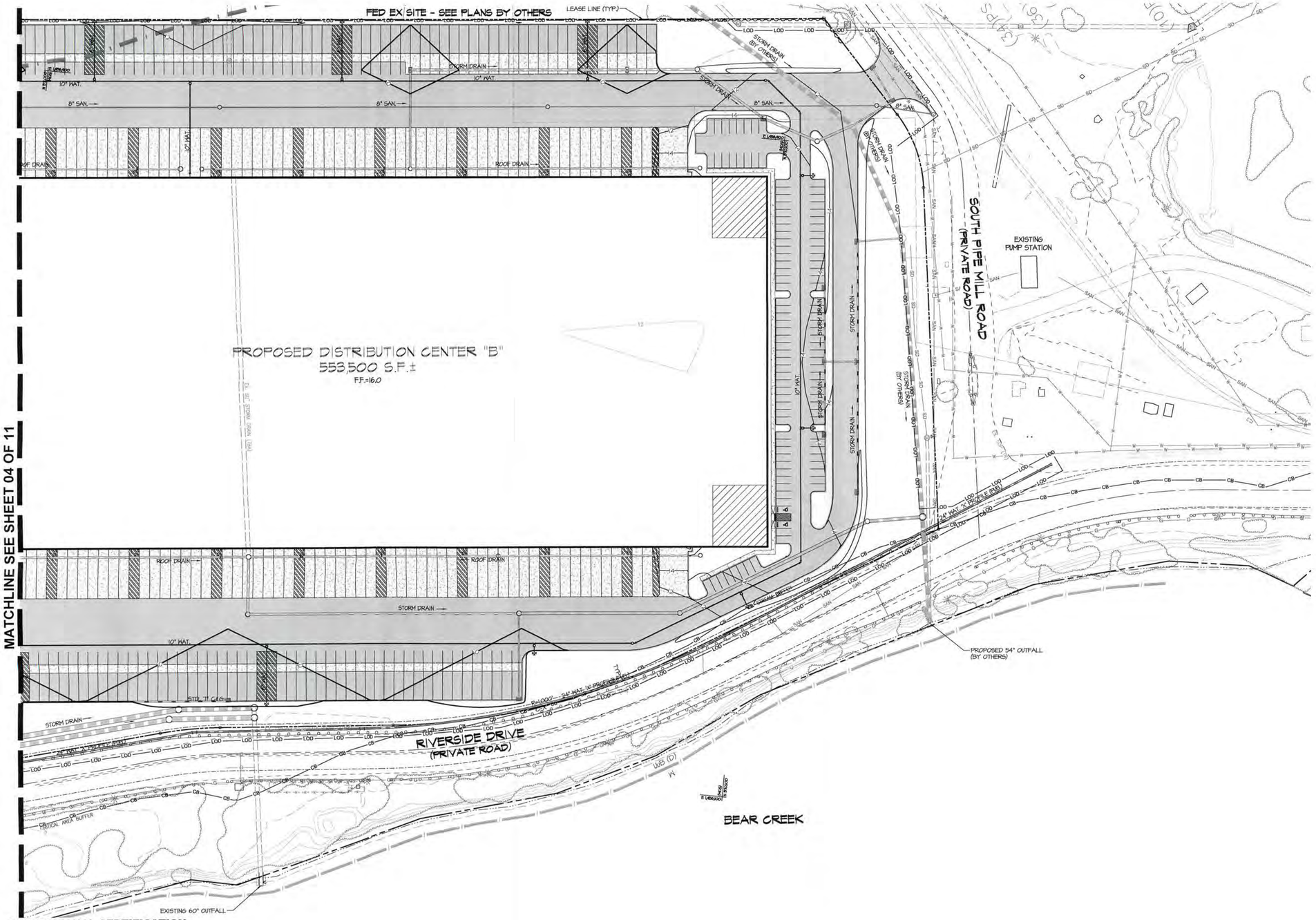
PROPOSED CONDITIONS - SITE FINGERPRINTING AND DEVELOPMENT LAYOUT

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3 ELECTION DISTRICT NO. 15 C7

PAI # XX-XXXX
DRC # 071916D

SHEET DESIGNATION	CONTRACT NO.
JOB ORDER NO.	
SHEET 04 OF 11	
DRAWING NO.	
FILE NO.	

BALTIMORE COUNTY MARYLAND



LEGEND

EXISTING
- EASEMENT LINE
- LEASE LINE
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- EDGE OF PAVING
- CURB
- 2' CONTOURS
- 10' CONTOURS
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- LIMIT OF DISTURBANCE

NOTE:
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ALL BUILDINGS SHALL CONSIST OF SLAB ON GRADE CONSTRUCTION.

APPROVED _____ CHIEF

STORMWATER ENGINEERING
Baltimore County

Department of Environmental
Protection and Sustainability

OWNER / DEVELOPER

TRADEPOINT ATLANTIC, INC.
1600 SPARROWS POINT BOULEVARD
BALTIMORE, MARYLAND 21219
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DESIGN & DRAWING BASED ON
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STATE OF MARYLAND — MICHAEL GRAY COUGHLIN — No. 38291 — PROFESSIONAL ENGINEER

AS-BUILT PER RECORD PRINT		REVISION	DATE	BY	P. W. A. NO.	KEY SHEETS	POSITION SHEETS	DRAWING SCALE	DEPARTMENT OF PUBLIC WORKS
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					RIGHT OF WAY				DATE _____
					–				

© 2016 MORRIS & RITCHIE ASSOCIATES, INC.	DESIGNED BY: CEM	BUREAU OF ENGINEERING AND CONSTRUCTION		HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER	
ENGINEER: MICHAEL G. COUGHLIN	DRAWN BY: CEM/BAW	REVIEWED							
DATE: 7/13/2016 LIC. NO.: 38291	CHECKED BY: MGC	DATE							

PRIVATE

60 0 60 120

PAI # XX-XXXX
DRC # 071916D

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

CONCEPT STORMWATER MANAGEMENT PLAN

PROPOSED CONDITIONS - SITE FINGERPRINTING AND DEVELOPMENT LAYOUT

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

ELECTION DISTRICT NO. 15 C7

SHEET DESIGNATION	CONTRACT NO.
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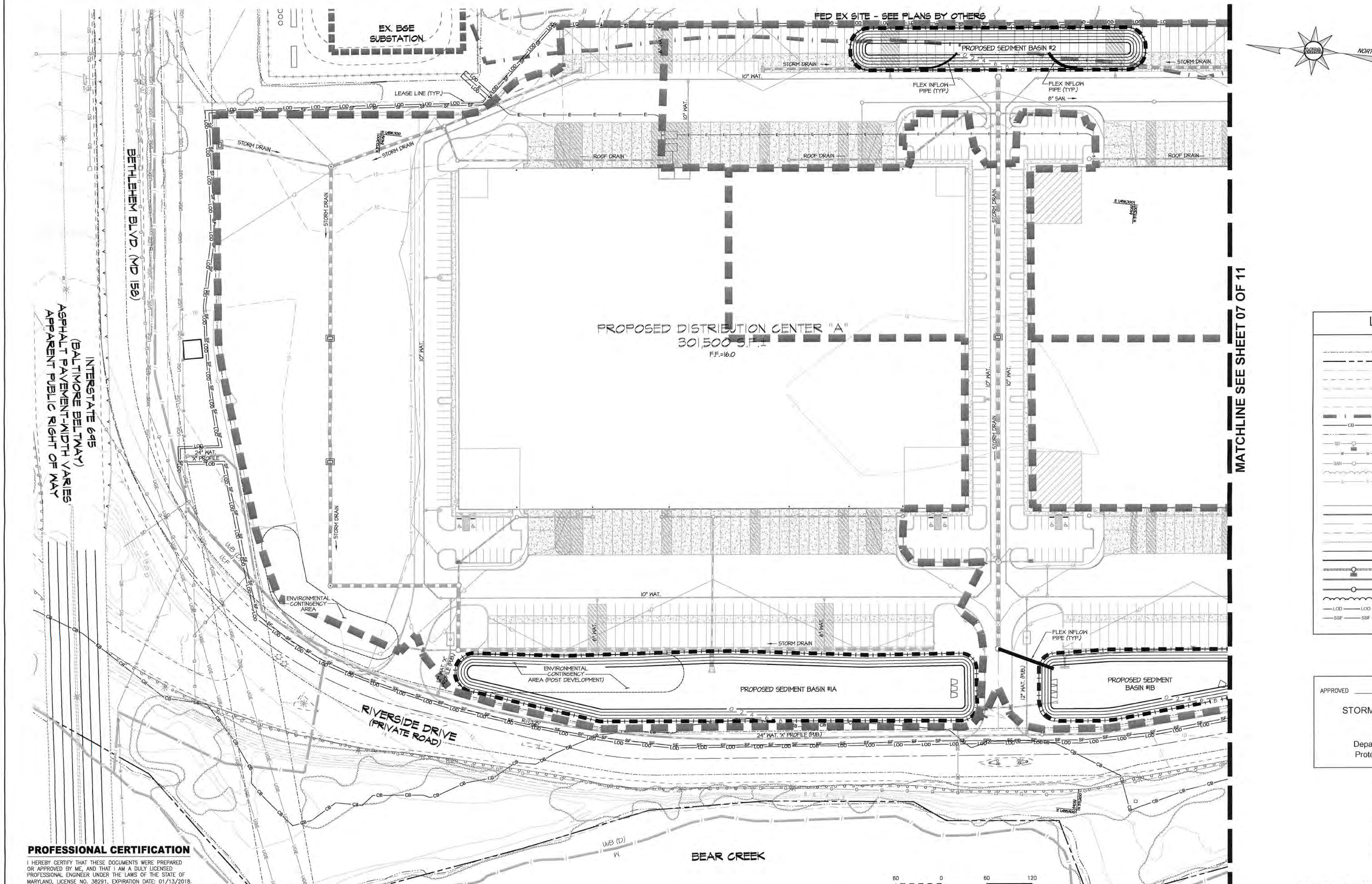

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- WATER
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PROPOSED
- EDGE OF PAVING
- CURB
- BUILDING SETBACK
- EASEMENT
- 1' CONTOUR
- 2' CONTOUR
- 10' CONTOUR
- STORM DRAIN
- WATER
- SANITARY SEWER
- CLEARING LIMIT
- LIMIT OF DISTURBANCE
- SUPER SILT FENCE
- INLET PROTECTION

APPROVED ______ CHIEF
STORMWATER ENGINEERING
Baltimore County
Department of Environmental Protection and Sustainability

OWNER / DEVELOPER
TRADEPOINT ATLANTIC, INC.
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VERTICAL NAVD 88

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38291, EXPIRATION DATE: 01/13/2018.

PAI # XX-XXXX
DRC # 071916D

AS-BUILT PER RECORD PRINT		REVISION	DATE	BY	P. W. A. NO.	KEY SHEETS	POSITION SHEETS	DRAWING SCALE	DEPARTMENT OF PUBLIC WORKS
DRAFTSMAN	DATE				RIGHT OF WAY	ANW	22 SE 24, 23 SE 24, 24 SE 24, 25 SE 24	PLAN: 1" = 60'; PROFILE: N/A	APPROVED ______ DIRECTOR; DATE
©2016 MORRIS & RITCHIE ASSOCIATES, INC.		DESIGNED BY: CEM	BUREAU OF ENGINEERING AND CONSTRUCTION		HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER
ENGINEER: MICHAEL G. COUGHLIN		DRAWN BY: CEM/BAW	REVIEWED		PRIVATE				
DATE: 7/13/2016	LIC. NO.: 38291	CHECKED BY: MGC	DATE						

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

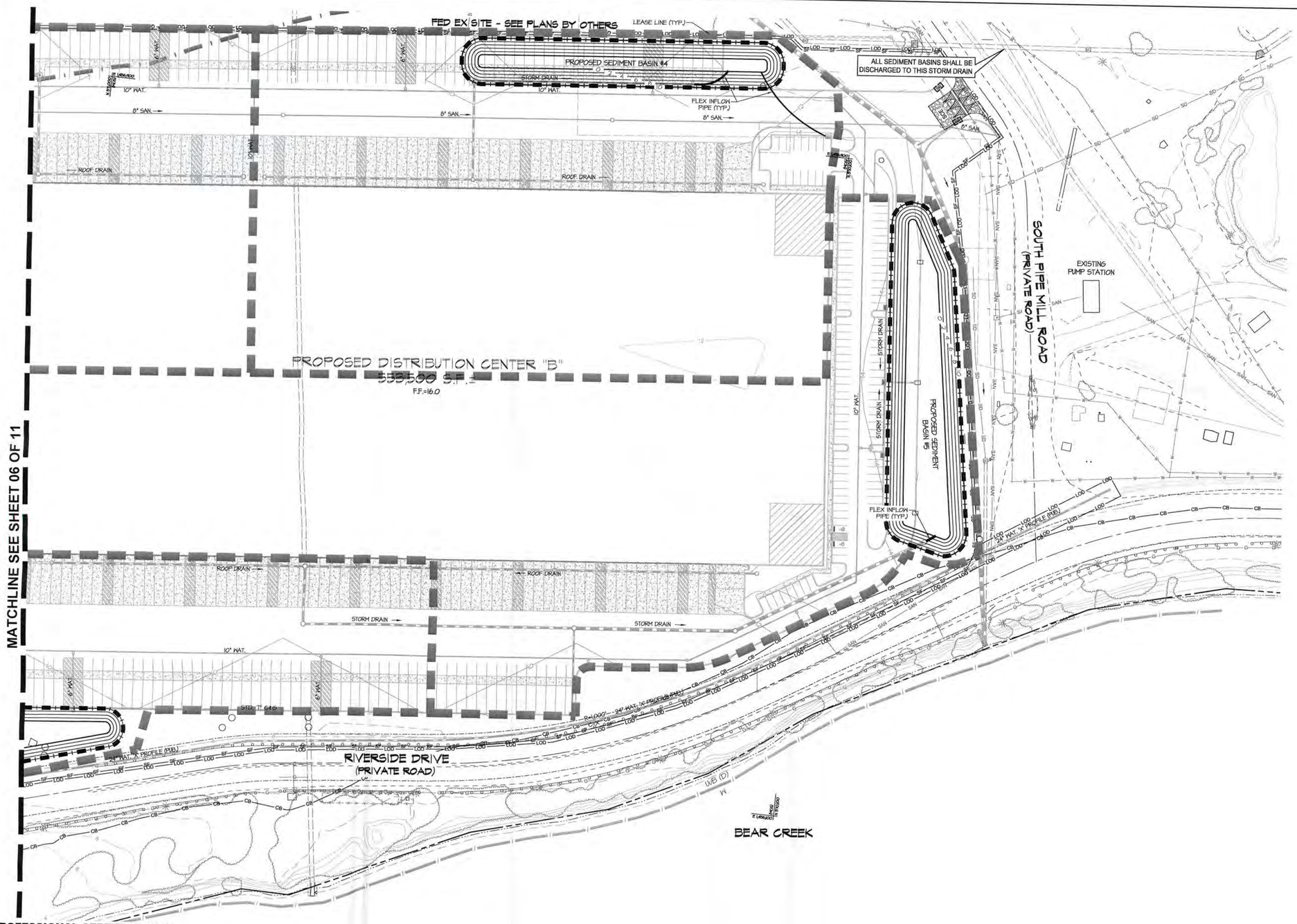
CONCEPT STORMWATER MANAGEMENT PLAN

EROSION & SEDIMENT CONTROL OVERLAY

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

ELECTION DISTRICT NO. 15 C7

SHEET DESIGNATION	CONTRACT NO.
	JOB ORDER NO.
	SHEET 06 OF 11
	DRAWING NO.
	FILE NO.



LEGEND

EXISTING
- EASEMENT LINE
- LEASE LINE
- CL OF ROAD
- EDGE OF PAVING
- CURB
- 2' CONTOURS
- 10' CONTOURS
- CRITICAL AREA LINE
- CRITICAL AREA BUFFER
- STREAM
- STORM DRAIN
- WATER
- SANITARY SEWER
- TREE LINE
- FENCE

PROPOSED
- EDGE OF PAVING
- CURB
- BUILDING SETBACK
- EASEMENT
- 1' CONTOUR
- 2' CONTOUR
- 10' CONTOUR
- STORM DRAIN
- WATER
- SANITARY SEWER
- CLEARING LIMIT
- LIMIT OF DISTURBANCE
- SUPER SILT FENCE
- INLET PROTECTION

APPROVED _____ CHIEF

STORMWATER ENGINEERING
Baltimore County

Department of Environmental Protection and Sustainability

OWNER / DEVELOPER

TRADEPOINT ATLANTIC, INC.
1600 SPARROWS POINT BOULEVARD
BALTIMORE, MARYLAND 21219
PHONE: (443) 452-1509
ATTN: JUSTIN DUNN; DIRECTOR OF DEVELOPMENT

DESIGN & DRAWING BASED ON
MARYLAND COORDINATE SYSTEM (MCS):
HORIZONTAL NAD 83 (1991)
VERTICAL NAVD 88

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STATE OF MARYLAND — CHRISTOPHER E. COUGHLIN — No. 38291 — PROFESSIONAL ENGINEER

AS-BUILT PER RECORD PRINT		REVISION	DATE	BY
DRAFTSMAN	DATE			

ENGINEER: MICHAEL G. COUGHLIN
DATE: 7/13/2016 LIC. NO.: 38291

DESIGNED BY: CEM
DRAWN BY: CEM/BAW
CHECKED BY: MCC

BUREAU OF ENGINEERING AND CONSTRUCTION
REVIEWED
DATE

P. W. A. NO.	KEY SHEETS	POSITION SHEETS	DRAWING SCALE
RIGHT OF WAY	ANW	22 SE 24 23 SE 24 24 SE 24 25 SE 24	PLAN: 1" = 60' PROFILE: N/A

HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER

DEPARTMENT OF PUBLIC WORKS
APPROVED _____ DIRECTOR
DATE _____

PRIVATE

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

60 0 60 120

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

CONCEPT STORMWATER MANAGEMENT PLAN

EROSION & SEDIMENT CONTROL OVERLAY

ELECTION DISTRICT NO. 15 C7

PAI # XX-XXXX
DRC # 071916D

SHEET DESIGNATION	CONTRACT NO.
	JOB ORDER NO.
	SHEET 07 OF 11
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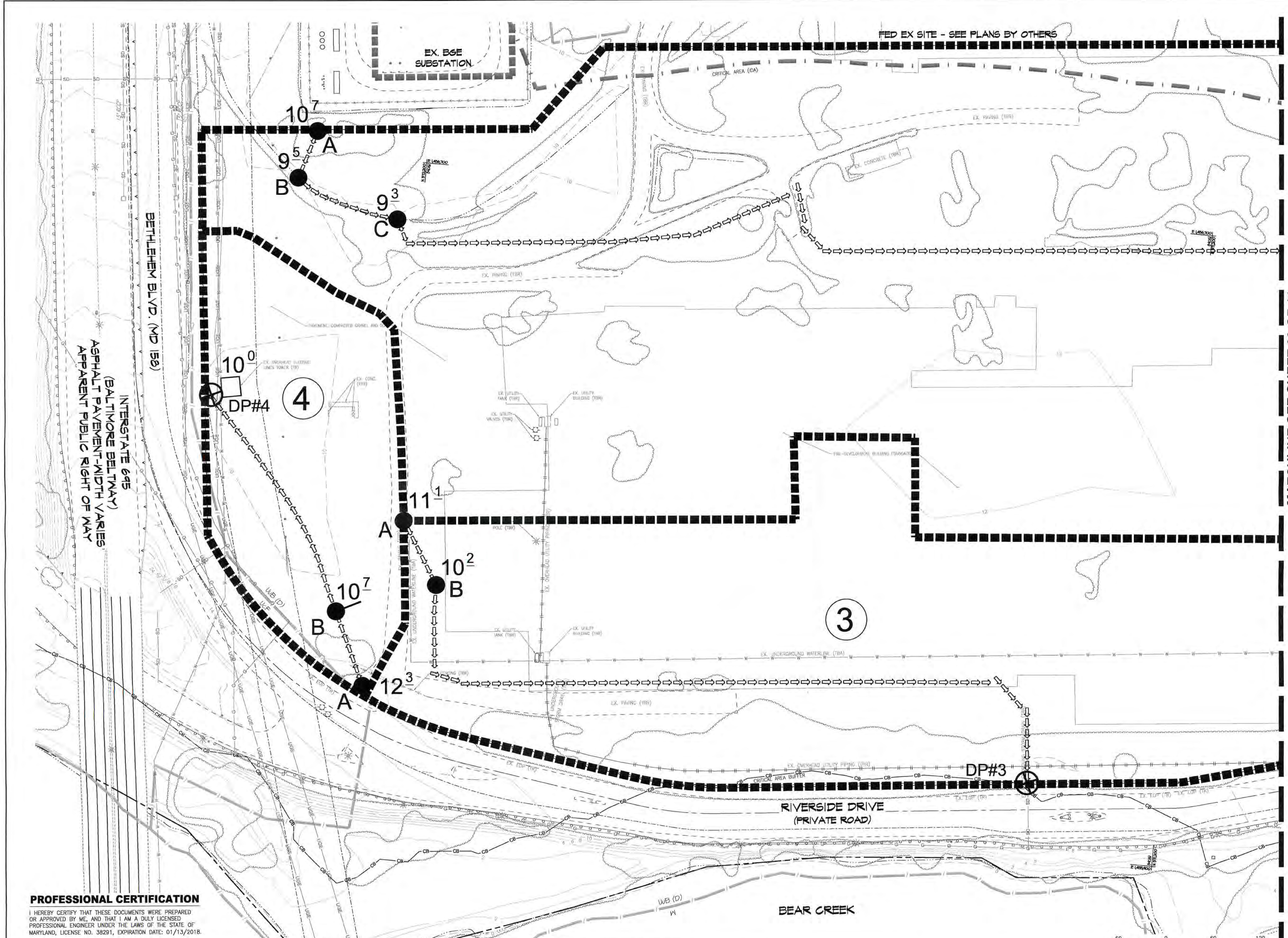
	FILE NO.

BALTIMORE COUNTY MARYLAND



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- WATER
- SANITARY SEWER
- TREE LINE
- FENCE
- DRAINAGE AREA DIVIDE
- Tc PATH

SOILS CHART		
MAP UNIT SYMBOL	SOIL TYPE	HYDROLOGIC SOIL GROUP
UuB	URBAN LAND-UDORTHENTS COMPLEX, 0 TO 8 PERCENT SLOPE	D
UcF	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPE	NONE

EXISTING D.A. SUMMARY

Label	Description	Area (ac)	Area (sq. mi.)	RCN	Tc (hr)
1	To Dp#1 Bear Creek	30.01	0.04689	96	0.249
2	To Dp#2 Bear Creek	6.11	0.00955	98	0.100
3	To Dp#3 Bear Creek	8.77	0.01370	96	0.100
4	To Dp#4 Overland to North	2.64	0.00413	98	0.116
5	To Dp#5 Overland to East	1.60	0.00250	97	0.116

EXISTING Tc PATH SUMMARY

Area	Segment	Distance	Description	Surface Description	Tc (hr)
1	A - B	64'	Sheet Flow @ 1.9%	Grass-Range, Short (n=0.15)	0.115
	B - C	139'	Sh. Conc. Flow @ 0.15%	Unpaved	0.062
	C - D	2139'	Pipe Flow @ 7 fps		0.085
				TOTAL Tc	0.262
2	A - B	1019'	Pipe Flow @ 7 fps		0.040
				* TOTAL Tc	0.100
3	A - B	88'	Sheet Flow @ 1.0%	Smooth Surface (n=.011)	0.024
	B - C	972'	Pipe Flow @ 7 fps		0.039
				* TOTAL Tc	0.100
4	A - B	100'	Sheet Flow @ 1.6%	Smooth Surface (n=.011)	0.022
	B - C	321'	Sh. Conc. Flow @ 0.22%	Paved	0.094
				TOTAL Tc	0.116
5	A - B	100'	Sheet Flow @ 0.3%	Smooth Surface (n=.011)	0.042
	B - C	229'	Sh. Conc. Flow @ 0.18%	Paved	0.074
				TOTAL Tc	0.116

* Min. Tc of 0.100 Min. assumed

APPROVED ______ CHIEF

STORMWATER ENGINEERING
Baltimore County

Department of Environmental Protection and Sustainability

OWNER / DEVELOPER

TRADEPOINT ATLANTIC, INC.
1600 SPARROWS POINT BOULEVARD
BALTIMORE, MARYLAND 21219
PHONE: (443) 452-1509
ATTN: JUSTIN DUNN; DIRECTOR OF DEVELOPMENT

DESIGN & DRAWING BASED ON MARYLAND COORDINATE SYSTEM (MCS): HORIZONTAL NAD 83 (1991) VERTICAL NAVD 88

PROFESSIONAL CERTIFICATION

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PAI # XX-XXXX
DRC # 071916D

AS-BUILT PER RECORD PRINT — DRAFTSMAN — DATE

ENGINEER: MICHAEL G. COUGHLIN
DATE: 7/13/2016 LIC. NO.: 38291

DESIGNED BY: CEM
DRAWN BY: CEM/BAW
CHECKED BY: MGC

BUREAU OF ENGINEERING AND CONSTRUCTION — REVIEWED — DATE

REVISION — DATE — BY — P. W. A. NO. — RIGHT OF WAY

KEY SHEETS: ANW
POSITION SHEETS: 22 SE 24, 23 SE 24, 24 SE 24, 25 SE 24

HIGHWAYS — STRUCTURES — STORM DRAINS — SEWER — WATER

DRAWING SCALE — PLAN: 1" = 60' — PROFILE: N/A

DEPARTMENT OF PUBLIC WORKS — APPROVED — DIRECTOR — DATE

PRIVATE

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

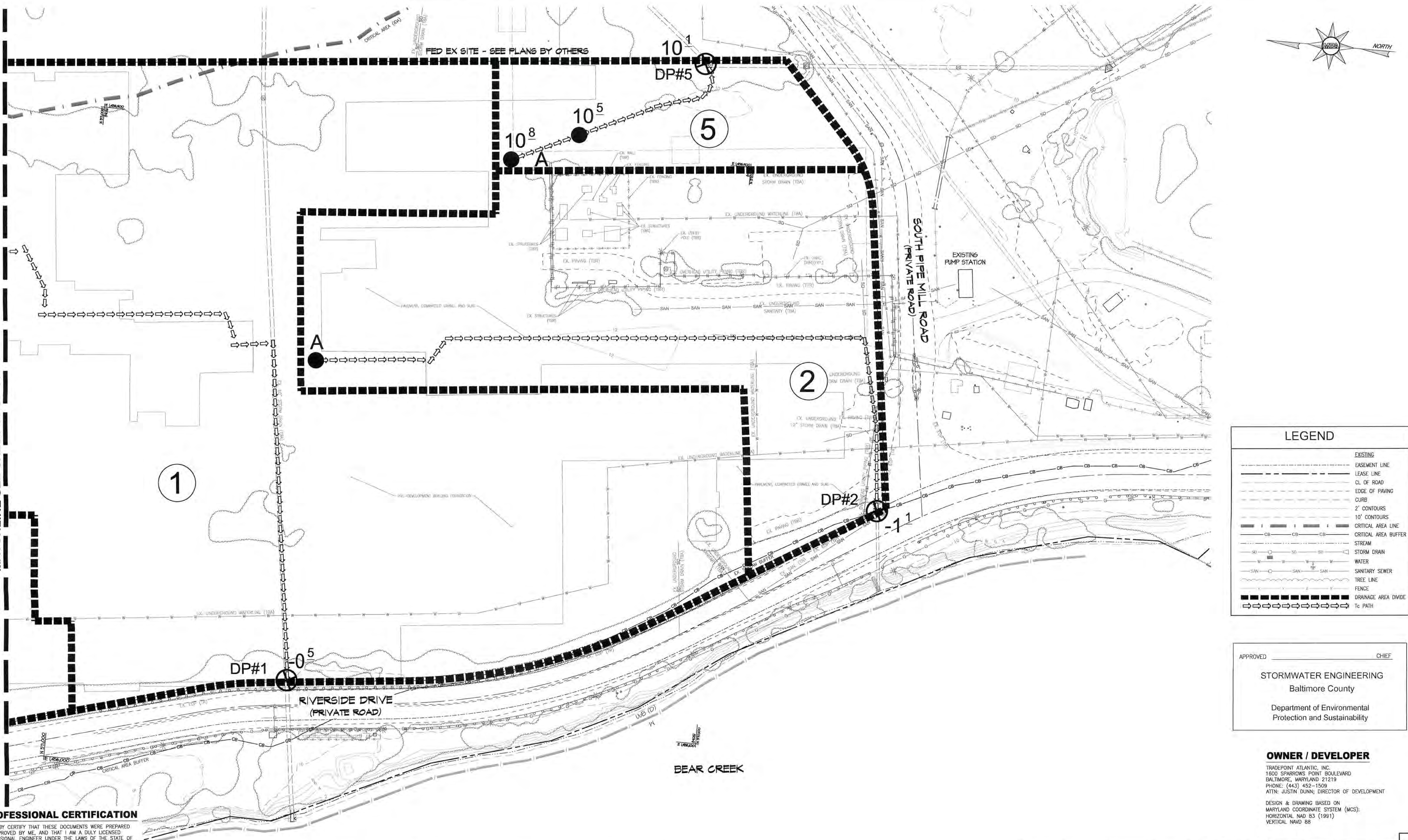
CONCEPT STORMWATER MANAGEMENT PLAN

EXISTING CONDITIONS - DRAINAGE AREA MAP

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

ELECTION DISTRICT NO. 15 C7

SHEET DESIGNATION — CONTRACT NO. — JOB ORDER NO. — SHEET 08 OF 11 — DRAWING NO. — FILE NO.



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APPROVED ______ CHIEF

STORMWATER ENGINEERING
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STATE OF MARYLAND — MICHAEL GRAY COUGHLIN — No. 38291 — PROFESSIONAL ENGINEER

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					–				

	DESIGNED BY: CEM	BUREAU OF ENGINEERING AND CONSTRUCTION	HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER	
ENGINEER: MICHAEL G. COUGHLIN	DRAWN BY: CEM/BAW	REVIEWED						
DATE: 7/13/2016 LIC. NO.: 38291	CHECKED BY: MGC	DATE						

PRIVATE

SCALE: 60 0 60 120

PAI # XX-XXXX
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CONCEPT STORMWATER MANAGEMENT PLAN

EXISTING CONDITIONS - DRAINAGE AREA MAP

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ELECTION DISTRICT NO. 15 C7

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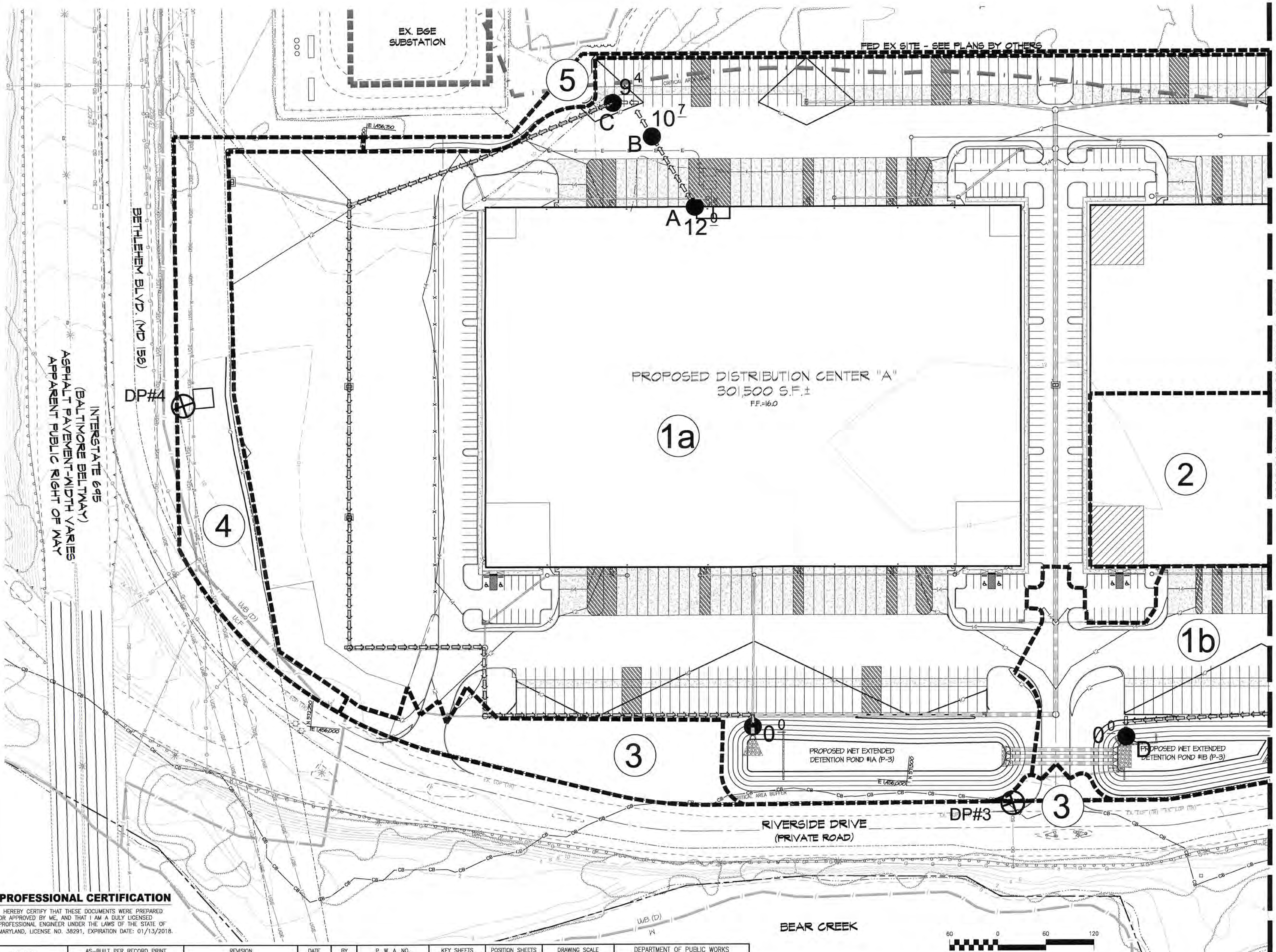

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APPROVED ____________ CHIEF

STORMWATER ENGINEERING
Baltimore County

Department of Environmental
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STATE OF MARYLAND · MICHAEL GRAY COUGHLIN · No. 38291 · PROFESSIONAL ENGINEER

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© 2016 MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEER: MICHAEL G. COUGHLIN
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DESIGNED BY: CEM
DRAWN BY: CEM/BAW
CHECKED BY: MGC

BUREAU OF ENGINEERING AND CONSTRUCTION
REVIEWED
DATE

HIGHWAYS | STRUCTURES | STORM DRAINS | SEWER | WATER

PRIVATE

DEPARTMENT OF PUBLIC WORKS
APPROVED ____________ DIRECTOR
DATE ____________

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BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

CONCEPT STORMWATER MANAGEMENT PLAN

PROPOSED CONDITIONS - DRAINAGE AREA MAP

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

ELECTION DISTRICT NO. 15 C7

BALTIMORE COUNTY MARYLAND

SHEET DESIGNATION

CONTRACT NO.

JOB ORDER NO.

SHEET 10 OF 11

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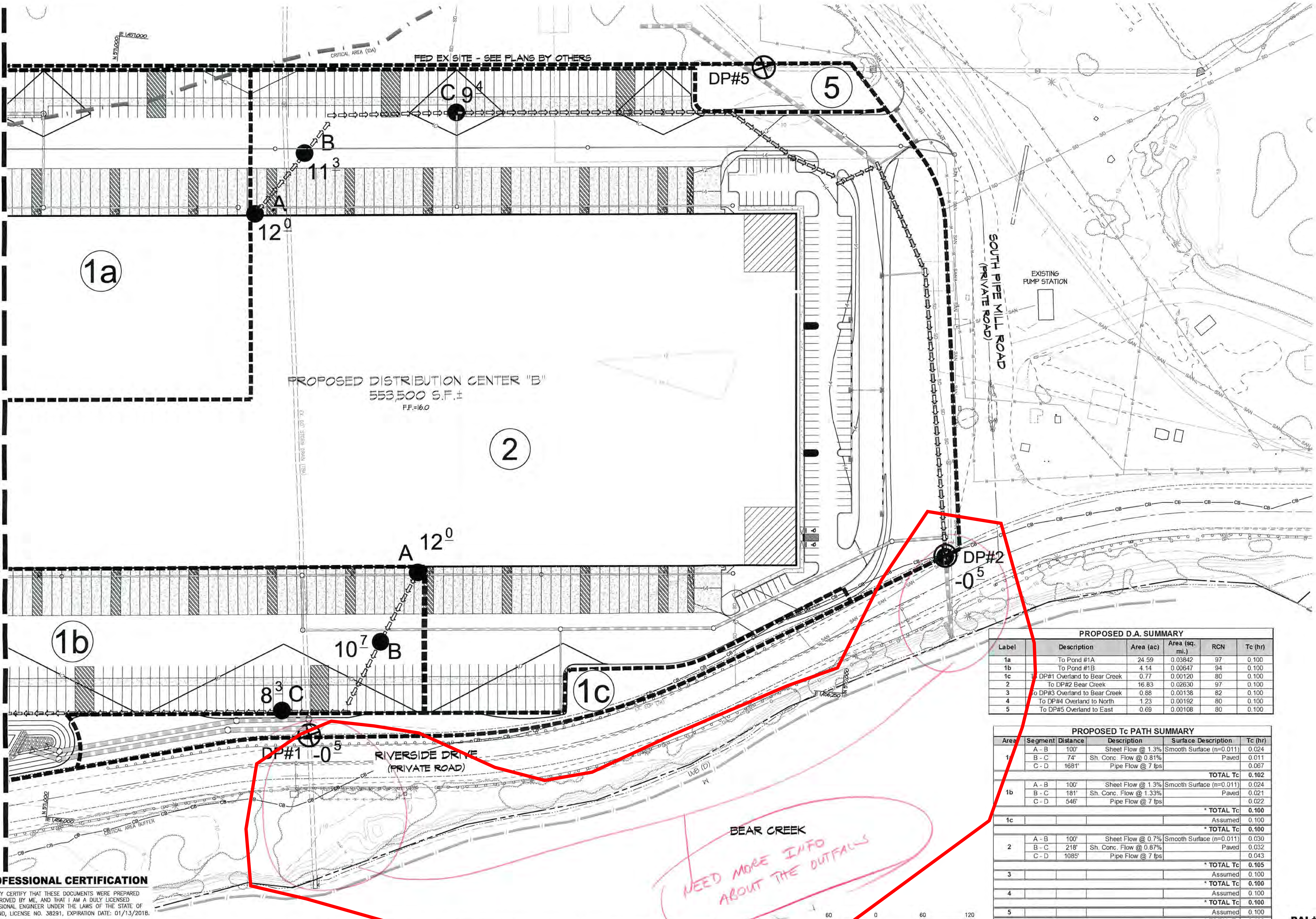
FILE NO.



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- SANITARY SEWER
- CLEARING LIMIT
- LIMIT OF DISTURBANCE
- DRAINAGE AREA DIVIDE
- Tc PATH

PROPOSED D.A. SUMMARY

Label	Description	Area (ac)	Area (sq. mi.)	RCN	Tc (hr)
1a	To Pond #1A	24.59	0.03842	97	0.100
1b	To Pond #1B	4.14	0.00647	94	0.100
1c	To DP#1 Overland to Bear Creek	0.77	0.00120	80	0.100
2	To DP#2 Bear Creek	16.83	0.02630	97	0.100
3	To DP#3 Overland to Bear Creek	0.88	0.00138	82	0.100
4	To DP#4 Overland to North	1.23	0.00192	80	0.100
5	To DP#5 Overland to East	0.69	0.00108	80	0.100

PROPOSED Tc PATH SUMMARY

Area	Segment	Distance	Description	Surface Description	Tc (hr)
1a	A - B	100'	Sheet Flow @ 1.3%	Smooth Surface (n=0.011)	0.024
	B - C	74'	Sh. Conc. Flow @ 0.81%	Paved	0.011
	C - D	1681'	Pipe Flow @ 7 fps		0.067
				TOTAL Tc	**0.102**
1b	A - B	100'	Sheet Flow @ 1.3%	Smooth Surface (n=0.011)	0.024
	B - C	181'	Sh. Conc. Flow @ 1.33%	Paved	0.021
	C - D	546'	Pipe Flow @ 7 fps		0.022
				* TOTAL Tc	**0.100**
1c				Assumed	0.100
				* TOTAL Tc	**0.100**
2	A - B	100'	Sheet Flow @ 0.7%	Smooth Surface (n=0.011)	0.030
	B - C	218'	Sh. Conc. Flow @ 0.87%	Paved	0.032
	C - D	1085'	Pipe Flow @ 7 fps		0.043
				* TOTAL Tc	**0.105**
3				Assumed	0.100
				* TOTAL Tc	**0.100**
4				Assumed	0.100
				* TOTAL Tc	**0.100**
5				Assumed	0.100
				* TOTAL Tc	**0.100**

* Min. Tc of 0.100 Min. assumed

APPROVED ______ CHIEF

STORMWATER ENGINEERING
Baltimore County

Department of Environmental Protection and Sustainability

OWNER / DEVELOPER

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MICHAEL GRAY COUGHLIN
No. 38291
PROFESSIONAL ENGINEER

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ENGINEER: MICHAEL G. COUGHLIN
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DESIGNED BY: CEM
DRAWN BY: CEM/BAW
CHECKED BY: MCC

BUREAU OF ENGINEERING AND CONSTRUCTION
REVIEWED
DATE

HIGHWAYS	STRUCTURES	STORM DRAINS	SEWER	WATER

PRIVATE

PAI # XX-XXXX
DRC # 071916D

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING & CONSTRUCTION

CONCEPT STORMWATER MANAGEMENT PLAN

PROPOSED CONDITIONS - DRAINAGE AREA MAP

SUBDIVISION: TRADEPOINT ATLANTIC SITE A-3

ELECTION DISTRICT NO. 15 C7

BALTIMORE COUNTY MARYLAND

SHEET DESIGNATION	CONTRACT NO.
	JOB ORDER NO.
	SHEET 11 OF 11
	DRAWING NO.
	FILE NO.

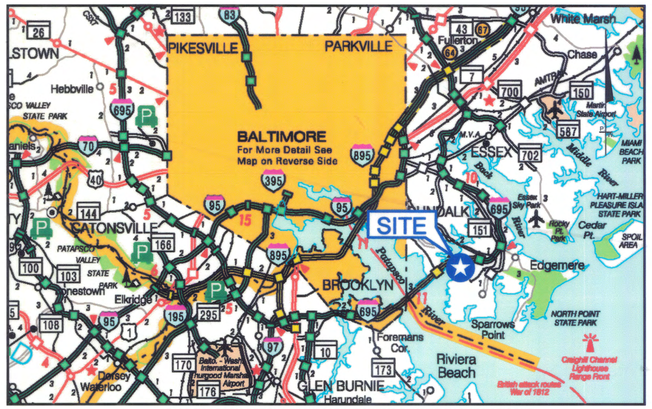
APPENDIX G

SPARROWS POINT PARCEL A3
REMEDIATION PHASE

GRADING PLAN
SEDIMENT AND EROSION CONTROL PLAN

GENERAL NOTES:

1. THE PROPOSED GRADING SHOWN ON THIS PLAN MEETS THE REQUIREMENTS SET FORTH BY BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY AND COMPLIES WITH ARTICLE 33, TITLE 5 OF THE BALTIMORE COUNTY CODE. HOWEVER, DUE TO BUILDING TYPES AND LAYOUT, SOME FIELD ADJUSTMENTS MAY BE REQUIRED. ALL CHANGES MUST COMPLY WITH THE ABOVE MENTIONED REQUIREMENTS.
2. ALL SWALES HAVE BEEN DESIGNED BY THE ENGINEER TO CONVEY RUNOFF ACCORDING TO BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS DESIGN STANDARDS.
3. THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION OR DISTURBANCE OF VEGETATION IN THE CRITICAL AREA BOUNDARY, EXCEPT AS PERMITTED BY THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY.
4. STORMWATER MANAGEMENT HAS BEEN ADDRESSED BY/THROUGH STORMWATER MANAGEMENT VARIANCE.
5. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH BALTIMORE COUNTY'S "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS" AND "STANDARD DETAILS FOR CONSTRUCTION", LATEST EDITIONS.
6. THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE BASED ON ABOVE GROUND FIELD OBSERVATIONS, MISS UTILITY PAINT MARKINGS, AND RECORD DRAWINGS. ADDITIONAL BURIED UTILITIES OR STRUCTURES MAY BE ENCOUNTERED. NO EXCAVATIONS WERE MADE DURING THE PROGRESS OF THIS SURVEY TO LOCATE BURIED UTILITIES/STRUCTURES. ALL SUBSURFACE UTILITIES/ STRUCTURES SHOWN ARE TO BE CONSIDERED APPROXIMATE LOCATIONS ONLY. UNDERGROUND UTILITIES MUST BE VERIFIED BY TEST PITS. THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO EXCAVATION AND SHALL PROTECT THEM DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL NOTIFY MISS UTILITY AT (800) 257-777 AT LEAST 48 HOURS PRIOR TO STARTING EXCAVATION.
8. THE CONTRACTOR SHALL PROTECT ALL TREES FROM DAMAGE BEYOND THE LIMITS OF DISTURBANCE. ANY DAMAGE SHALL BE RECTIFIED TO THE SATISFACTION OF THE OWNER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL PERMITS NECESSARY FOR CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF ANY CHANGES OR CONDITIONS REQUIRED BY ANY PERMIT.
10. CONSTRUCTION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL STANDARDS, SPECIFICATIONS AND REQUIREMENT.



BASE MAP FROM OFFICIAL TRANSPORTATION AND TOURISM MAP OF MARYLAND

VICINITY MAP

3 1.5 0 3 6

GRAPHIC SCALE IN MILES

LOCATION MAP

2,500 1,250 0 2,500 5,000

GRAPHIC SCALE IN FEET

SHEET LIST TABLE

Sheet Number	Sheet Title
1	TITLE
2	ESC AND GRADING PLAN
3	DETAILS
4	SPECIFICATIONS

SITE ADDRESS

1600 SPARROWS POINT BOULEVARD
BALTIMORE, MD 21219
DEED REF: 35478/00379
TAX MAP: 0111 GRID: 0014 PARCEL: 0318

ENGINEER

ARM GROUP INC.
9175 GUILFORD ROAD, SUITE 310
COLUMBIA, MD 21046
(410) 290-7775

DEVELOPER

TRADEPOINT ATLANTIC
1600 SPARROWS POINT BOULEVARD
BALTIMORE, MD 21219

OWNER

SPARROWS POINT TERMINAL LLC
1600 SPARROWS POINT BOULEVARD
BALTIMORE, MD 21219

EROSION AND SEDIMENT CONTROL CERTIFICATIONS

CONSULTANT'S CERTIFICATION:

I certify that this plan of erosion and sediment control represent a practical and workable plan based on my personal knowledge of the site, and this plan was prepared in accordance with the requirements of the Baltimore County Soil Conservation District and the current State of Maryland Specification for Soil Erosion and Sediment Control. I have reviewed this erosion and sediment control plan with the owner/developer.

Signature _____ Date 9/9/2016

Printed Name Jonathan B Meyers MD License Number 40086

OWNER'S/ DEVELOPER CERTIFICATION.

I/We hereby certify that all clearing, grading, construction and/or development will be done pursuant to this plan and that any responsible personnel involved in the construction project will have a Certificate of Attendance at a Maryland Department of the Environment approved training program for the control of sediment and erosion before beginning the project. I/We also certify that the site will be inspected at the end of each working day, and that any needed maintenance will be completed so as to insure that all sediment control practices are left in operational condition. I/We authorize the right of entry for periodic on site evaluation by the Baltimore County Soil Conservation District Board of Supervisors or their authorized agents.

Signature Owner/Developer _____ Date 9/12/2016

Printed Name James Calenda Title Project Manager

Baltimore County Soil Conservation District
APPROVED FOR SEDIMENT CONTROL 9-13-16 Date

DISTRICT OFFICIAL 163-44K10-16 PLAN NO.

Technical Review for the District by:

If a grading permit has not been obtained within two years of this approval, this plan shall be resubmitted to the District.

GRADING CERTIFICATIONS

OWNER'S/ DEVELOPER CERTIFICATION.

I/We hereby certify that all grading on this site will be done in accordance with the current grading requirements as set forth by the Baltimore County Department on Environmental Protection and Sustainability and with the requirements specified in Article 33, Title 5 of the Baltimore County Code

Signature Owner/Developer _____ Title Project Manager Date 9/12/2016

Print Name James Calenda

KLQ
BALTIMORE COUNTY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND SUSTAINABILITY

APPROVED FOR GRADING

DEPUTY 9/23/16
DATE

STORMWATER MANAGEMENT PERMIT
NOT REQUIRED

PROFESSIONAL CERTIFICATION

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 40086
Expiration Date 02/19/2017

STATE OF MARYLAND
JONATHAN B. MEYERS
No. 40086
PROFESSIONAL ENGINEER

9/9/2016

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

No.	Revision	Date	By

scale AS NOTED
date 9/8/2016
project no. M150298-1

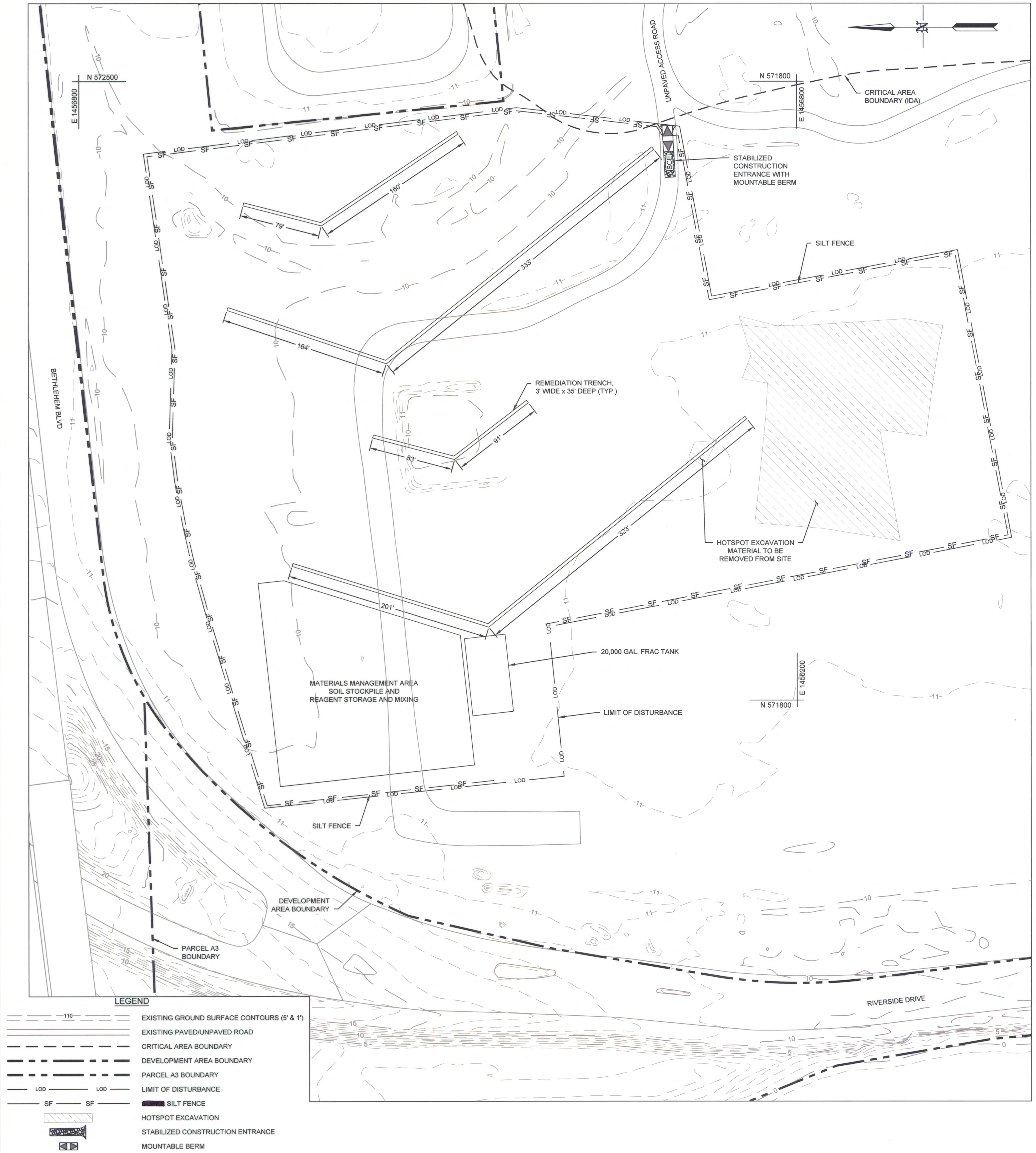
designed JMA
checked TNP
drawn JMA
graphic back-

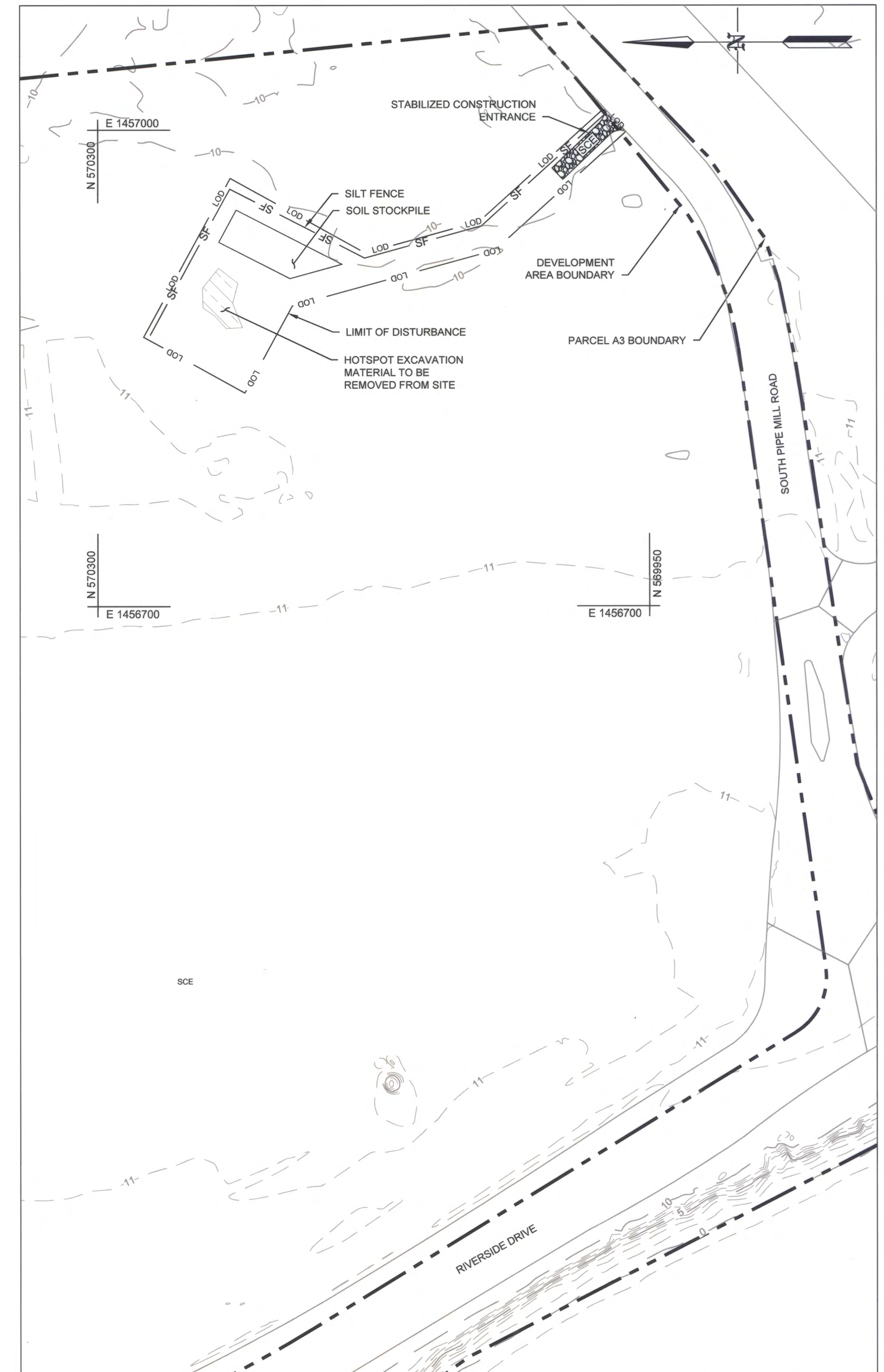
drawing title TITLE

project title
SPARROWS POINT AREA A: PARCEL A3
ENVIROANALYTICS GROUP

SPARROWS POINT
BALTIMORE COUNTY, MARYLAND

Sheet 1





MATERIALS MANAGEMENT AREA NOTES

1. THE REAGENT MIX WILL INCLUDE TERRABOND AND AGRICULTURAL LIME WHICH WILL BE MIXED WITH EXCAVATED EXISTING SOILS AND REPLACED IN TRENCHES TO TREAT LOW PH GROUNDWATER.
2. EXCESS SPOILS FROM THE TRENCHES WILL BE STORED IN THIS AREA PENDING TESTING TO DETERMINE IF MATERIALS CAN BE DISPOSED OF AT THE ON-SITE LANDFILL OR MUST BE DISPOSED OF OFF-SITE.
3. STOCKPILES ARE TO BE PLACED ON PLASTIC AND COVERED WHENEVER THEY ARE NOT IN USE.
4. FRAC TANK WILL BE USED IN THE EVENT THERE IS GROUNDWATER SEEPAGE INTO THE TRENCHES THAT NEEDS TO BE CONTROLLED.

PROFESSIONAL CERTIFICATION

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No. 40086 Expiration Date 02/13/2017

STATE OF MARYLAND · JONATHAN B. MEYERS · No. 40086 · PROFESSIONAL ENGINEER

9/9/2016

Baltimore County Soil Conservation District
APPROVED FOR SEDIMENT CONTROL

9-13-16
Date

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

No.	Revision	Date	By

designed	JMA	scale	1" = 50'
checked	TNP	date	9/8/2016
drawn	JMA	project no.	M150298-10

graphic scale: 0 50 100 150 — SCALE IN FEET

drawing title: REMEDIATION PHASE ESC & GRADING PLAN

SPARROWS POINT
BALTIMORE COUNTY, MARYLAND

project title: SPARROWS POINT AREA A: PARCEL A3
ENVIROANALYTICS GROUP

Sheet 2

H-1 STANDARDS AND SPECIFICATIONS FOR MATERIAL

TABLE H.1: GEOTEXTILE FABRICS

		WOVEN SLIT FILM GEOTEXTILE		WOVEN MONOFILAMENT GEOTEXTILE		NONWOVEN GEOTEXTILE	
		MINIMUM AVERAGE ROLL VALUE[1]					
PROPERTY	TEST METHOD	MD	CD	MD	CD	MD	CD
GRAB TENSILE STRENGTH	ASTM D-4632	200 LB	200 LB	370 LB	250 LB	200 LB	200 LB
GRAB TENSILE ELONGATION	ASTM D-4632	15%	10%	15%	15%	50%	50%
TRAPEZOIDAL TEAR STRENGTH	ASTM D-4533	75 LB	75 LB	100 LB	60 LB	80 LB	80 LB
PUNCTURE STRENGTH	ASTM D-6241	450 LB		900 LB		450 LB	
APPARENT OPENING SIZE[2]	ASTM D-4751	U.S. SIEVE 30 (0.59 mm)		U.S. SIEVE 70 (0.21 mm)		U.S. SIEVE 70 (0.21 mm)	
PERMITTIVITY	ASTM D-4491	0.05 sec^{-1}		0.28 sec^{-1}		1.1 sec^{-1}	
ULTRAVIOLET RESISTANCE RETAINED AT 500 HOURS	ASTM D-4355	70% STRENGTH		70% STRENGTH		70% STRENGTH	

[1] ALL NUMERIC VALUES EXCEPT APPARENT OPENING SIZE (AOS) REPRESENT MINIMUM AVERAGE ROLL VALUE (MARV). MARV IS CALCULATED AS THE TYPICAL MINUS TWO STANDARD DEVIATIONS. MD IS MACHINE DIRECTION; CD IS CROSS DIRECTION.

[2] VALUES FOR AOS REPRESENT THE AVERAGE MAXIMUM OPENING.

GEOTEXTILE MUST BE EVALUATED BY THE NATIONAL TRANSPORTATION PRODUCT EVALUATION PROGRAM (NTPEP) AND CONFORM TO THE VALUES IN THE ABOVE TABLE.

GEOTEXTILE MUST BE INERT TO COMMONLY ENCOUNTERED CHEMICALS AND HYDROCARBONS AND MUST BE ROT AND MILDEW RESISTANT. THE GEOTEXTILE MUST BE MANUFACTURED FROM FIBERS CONSISTING OF LONG CHAIN SYNTHETIC POLYMERS AND COMPOSED OF A MINIMUM OF 95 PERCENT BY WEIGHT OF POLYOLEFINS OR POLYESTERS, AND FORMED INTO A STABLE NETWORK SO THE FILAMENTS OR YARNS RETAIN THEIR DIMENSIONAL STABILITY RELATIVE TO EACH OTHER, INCLUDING SELVAGES.

WHEN MORE THAN ONE SECTION OF GEOTEXTILE IS NECESSARY, OVERLAP THE SECTIONS BY AT LEAST ONE FOOT. THE GEOTEXTILE MUST BE PULLED TAUT OVER THE APPLIED SURFACE. EQUIPMENT MUST NOT RUN OVER EXPOSED FABRIC. WHEN PLACING RIPRAP ON GEOTEXTILE, DO NOT EXCEED A ONE FOOT DROP HEIGHT.

SITE SUMMARY

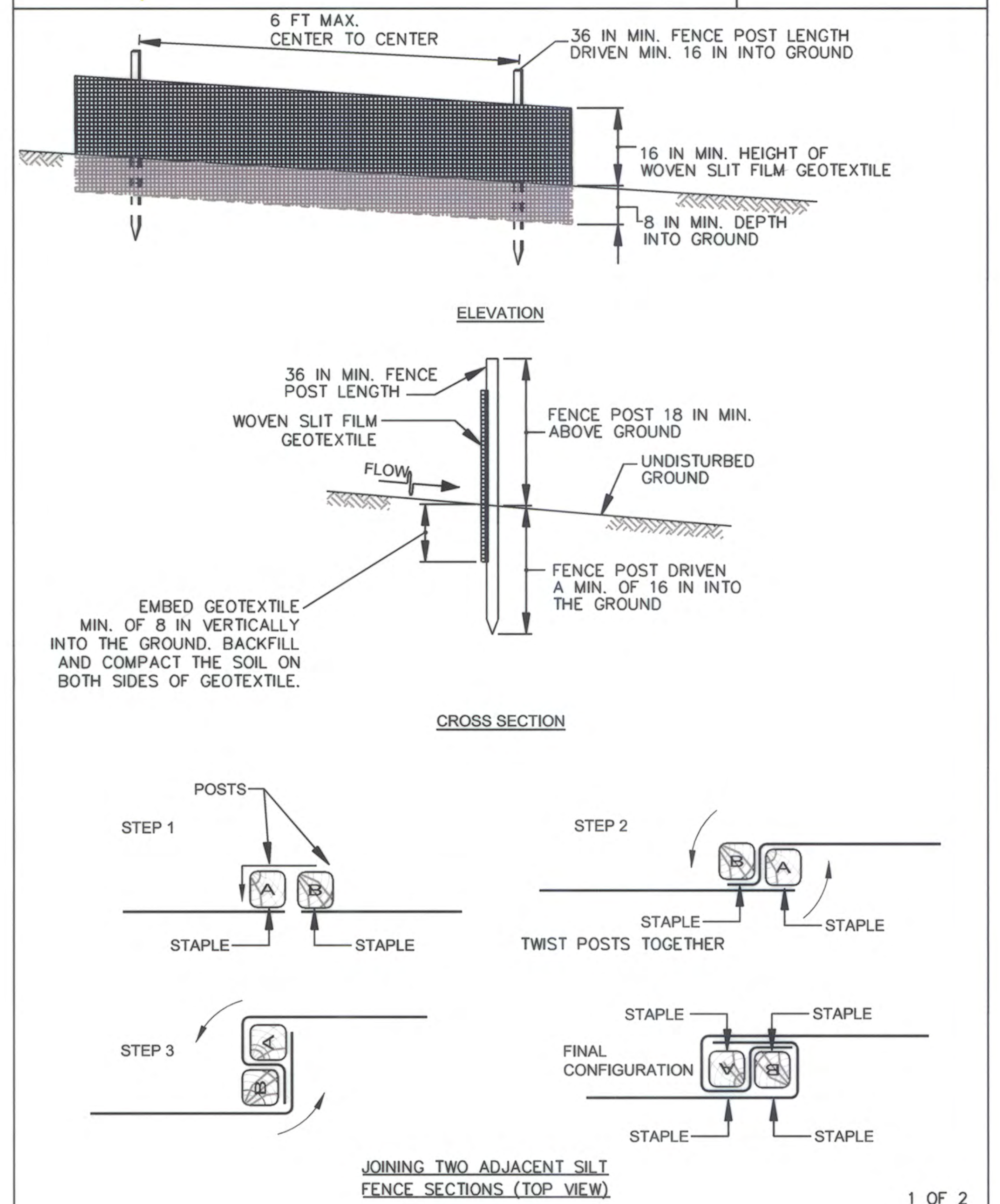
1) TOTAL AREA OF PROPERTY	54.7 AC.
2) DISTURBED AREA	391,900 SF = 9.0 AC
3) TOTAL CUT	11,577 CY
4) TOTAL FILL	5,577 CY
5) NET	6,000 CY (CUT)

SEDIMENT CONTROL SUMMARY

1) SILT FENCE	2,905 LF
2) STABILIZED CONSTRUCTION ENTRANCE	2 EA.
3) MOUNTABLE BERM	1 EA.

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: SF



1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: SF

CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ± 1/16 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

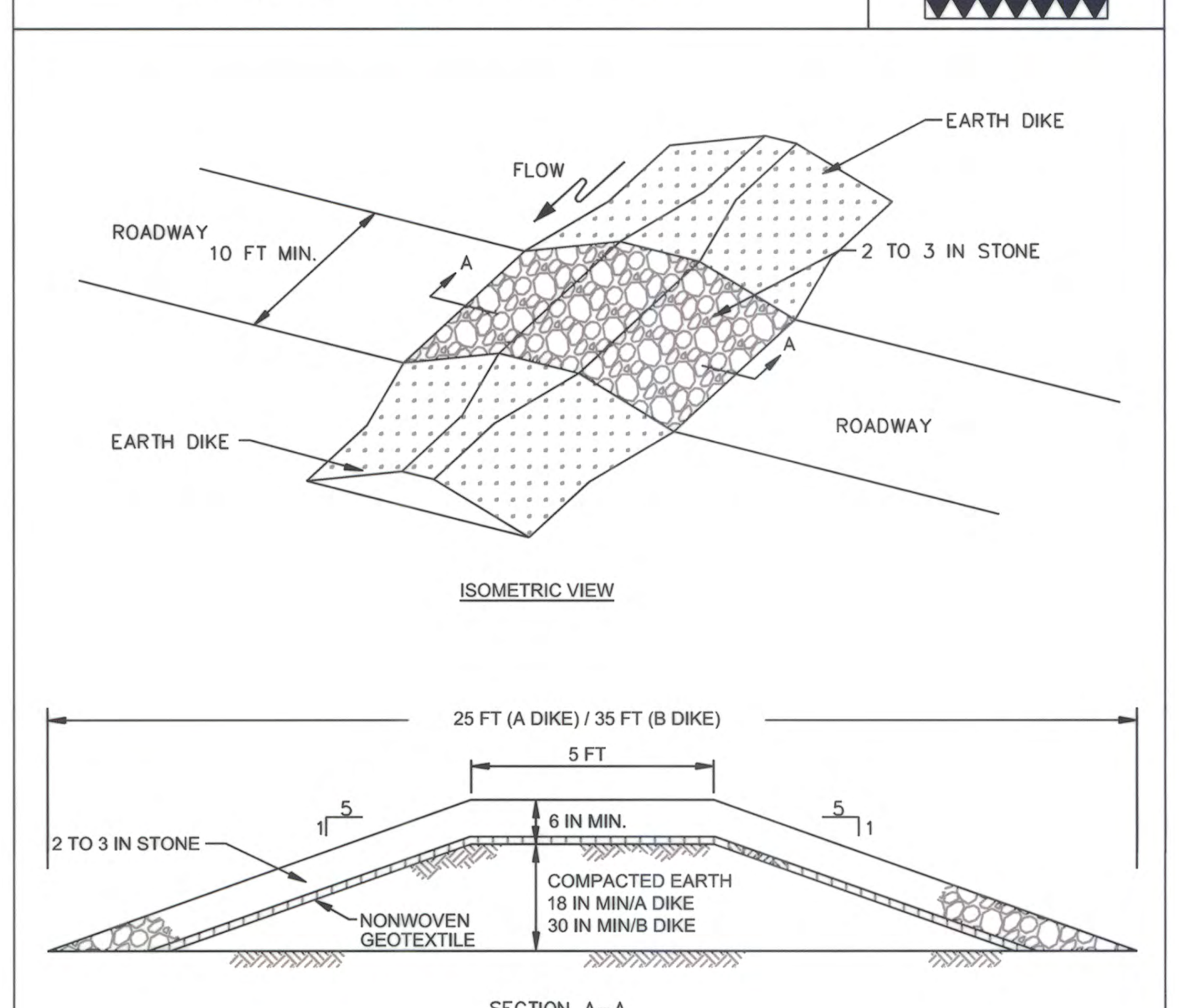
2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL C-8 MOUNTABLE BERM

STANDARD SYMBOL: MB



CONSTRUCTION SPECIFICATIONS

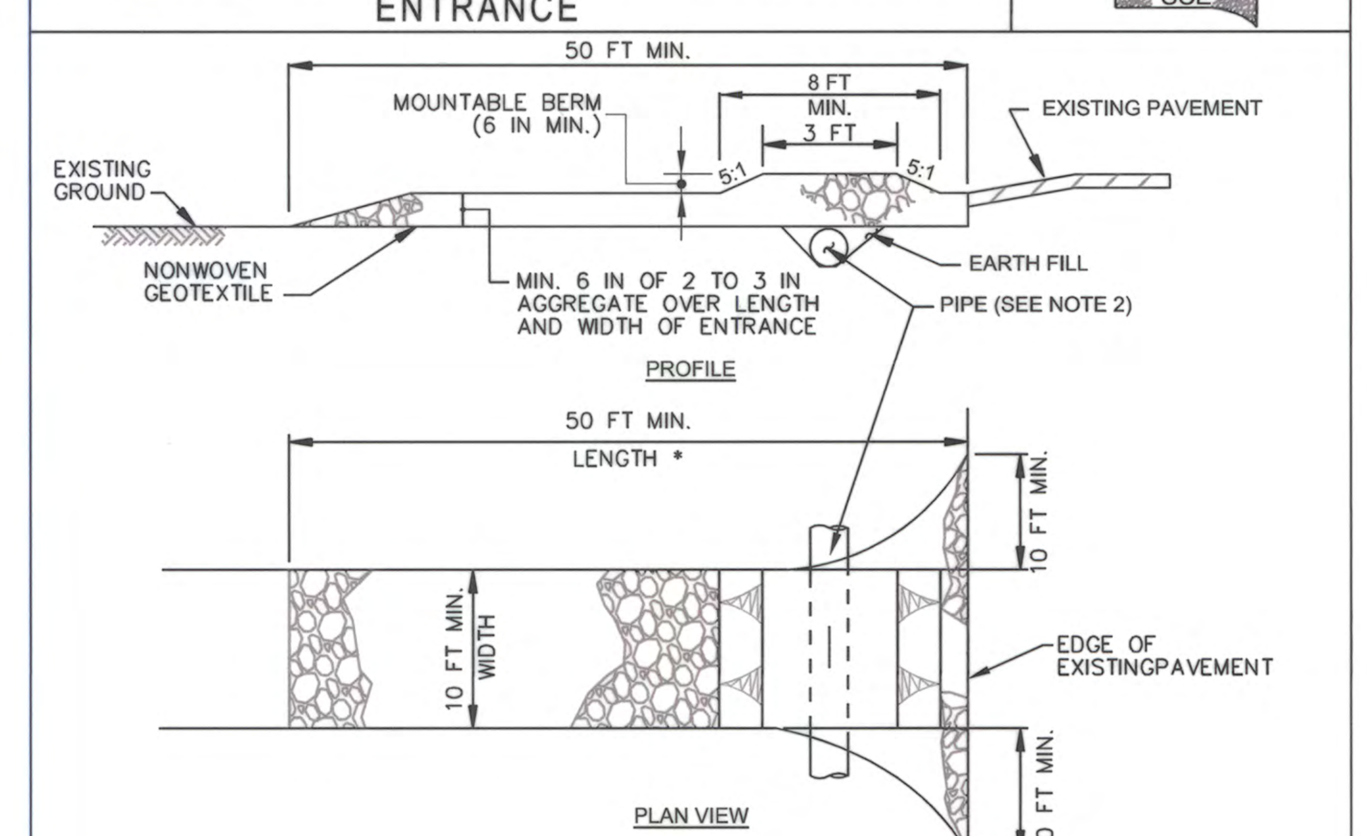
1. USE MINIMUM WIDTH OF 10 FEET TO ALLOW FOR VEHICULAR PASSAGE.
2. PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE EARTH MOUND PRIOR TO PLACING STONE.
3. PLACE 2 TO 3 INCH STONE OR EQUIVALENT RECYCLED CONCRETE AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE MOUNTABLE BERM.
4. MAINTAIN LINE, GRADE, AND CROSS SECTION. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN SPECIFIED DIMENSIONS. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. MAINTAIN POSITIVE DRAINAGE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL: SCE



CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

SEQUENCE OF CONSTRUCTION

1. NOTIFY BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, (410) 887-3226 AT LEAST 48 HOURS PRIOR TO BEGINNING WORK.
2. IF APPLICABLE, ORANGE HIGH VISIBILITY FENCE SHALL BE MANUALLY INSTALLED ALONG THE LIMIT OF DISTURBANCE, WHERE THE LIMIT IS WITHIN 50 FEET OF THE FOREST BUFFER/CONSERVATION EASEMENT. THIS SHALL BE COMPLETED BY AND INSPECTED AT THE PRE-CONSTRUCTION MEETING.
3. CLEAR AND GRUB FOR SEDIMENT & EROSION CONTROL MEASURES OR DEVICES ONLY.
4. INSTALL ALL SEDIMENT & EROSION CONTROL MEASURES OR DEVICES INCLUDING SILT FENCE AND STABILIZED CONSTRUCTION ENTRANCES WITH MOUNTABLE BERM.
5. NOTIFY BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, UPON COMPLETION OF SAID INSTALLATION.
6. WITH THE APPROVAL OF BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL AND THE SEDIMENT CONTROL INSPECTOR, PROCEED TO NEXT STEP.
7. EXCAVATE TRENCHES AS SHOWN ON PLAN. EXCAVATED MATERIAL SHALL BE PLACED ON PLASTIC LINER AND COVERED WHEN NOT IN USE. BACKFILL TRENCH 20 FEET WITH REAGENT MIX. BACKFILL UP TO THE LAST TWO FEET OF THE TRENCH WITH EXCAVATED MATERIAL. FILL REMAINING TWO FEET WITH CLEAN FILL. REMAINING EXCAVATED MATERIAL SHALL BE TESTED FOR SUITABILITY TO REMAIN ON SITE.
8. EXCAVATE HOTSPOTS AS SHOWN ON PLAN. EXCAVATED MATERIAL SHALL BE PLACED ON PLASTIC LINER AND COVERED AT ALL TIMES. HOTSPOT AREAS TO BE BACKFILLED DURING DEVELOPMENT PHASE.
9. MAINTAIN ALL PERIMETER SEDIMENT CONTROLS IN ACCORDANCE WITH THIS PLAN FOR THE DURATION OF REMEDIATION PHASE ON SITE.
10. UPON STABILIZATION OF THE SITE WITH ESTABLISHED VEGETATION, AND WITH APPROVAL OF SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL MEASURES AND STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS.
11. THE SEDIMENT CONTROL INSPECTOR MAY ALLOW THE SUBSEQUENT DEVELOPMENT PHASE PROJECT TO PROCEED PRIOR TO THE ESTABLISHMENT OF VEGETATION, IF:
    - THE DEVELOPMENT PROJECT SEDIMENT CONTROLS ARE IN PLACE, ENCOMPASS THE REMEDIATION PROJECT AREA, AND HAVE BEEN APPROVED BY THE SEDIMENT CONTROL INSPECTOR; AND,
    - NO INTERRUPTIONS IN SEDIMENT CONTROLS EXIST BETWEEN THE REMEDIATION AND DEVELOPMENT PROJECTS; AND,
    - ALL NECESSARY PROVISIONS HAVE BEEN MADE FOR THE CONTAINMENT OF SEDIMENT AND THE PREVENTION OF SOIL EROSION.

SEDIMENT AND EROSION CONTROL NOTES:

1. REFER TO "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL" FOR STANDARD DETAILS AD DETAILED SPECIFICATIONS OF EACH PRACTICE HEREIN.
2. WITH THE APPROVAL OF THE SEDIMENT CONTROL INSPECTOR, MINOR FIELD ADJUSTMENTS CAN AND WILL BE MADE TO INSURE THE CONTROL OF ANY SEDIMENT. CHANGES IN SEDIMENT CONTROL PRACTICES REQUIRE PRIOR APPROVAL OF THE SEDIMENT CONTROL INSPECTOR AND THE BALTIMORE COUNTY SOIL CONSERVATION DISTRICT.
3. AT THE END OF EACH WORKING DAY, ALL SEDIMENT CONTROL PRACTICES WILL BE INSPECTED AND LEFT IN OPERATIONAL CONDITION.
4. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION MUST BE COMPLETED WITHIN: A.) THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER THAN THREE HORIZONTAL TO ONE VERTICAL (3:1), AND B.) SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.
5. ANY CHANGE TO THE GRADING PROPOSED ON THIS PLAN REQUIRES RE-SUBMISSION TO BALTIMORE COUNTY SOIL CONSERVATION DISTRICT FOR APPROVAL.
6. DUST CONTROL WILL BE PROVIDED FOR ALL DISTURBED AREAS. REFER TO "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", PG. H.22, FOR ACCEPTABLE METHODS AND SPECIFICATIONS FOR DUST CONTROL.
7. ANY VARIATIONS FOR THE SEQUENCE OF OPERATIONS STATED ON THIS PLAN REQUIRED THE APPROVAL OF THE SEDIMENT CONTROL INSPECTOR AND THE BALTIMORE COUNTY SOIL CONSERVATION DISTRICT PRIOR TO THE INITIATION OF THE CHANGE.
8. EXCESS CUT OR BORROW MATERIAL SHALL GO TO, OR COME FROM, RESPECTIVELY, A SITE WITH AN OPEN GRADING PERMIT AND APPROVED SEDIMENT CONTROL PLAN.
9. THE FOLLOWING ITEM MAY BE USED AS APPLICABLE: REFER TO "MARYLAND'S GUIDELINES TO WATERWAY CONSTRUCTION" BY THE WATER MANAGEMENT ADMINISTRATION OF THE MARYLAND DEPARTMENT OF THE ENVIRONMENT, REVISED NOVEMBER 2000, FOR STANDARD DETAILS AND DETAILED SPECIFICATIONS OF EACH PRACTICE SPECIFIED HEREIN FOR WATERWAY CONSTRUCTION.
10. PUMPING SEDIMENT LADEN WATER INTO WATERS OF THE STATE IS STRICTLY PROHIBITED. ANY PORTABLE DEWATERING DEVICE MUST BE LOCATED WITHIN THE LIMIT OF DISTURBANCE.

TEMPORARY STOCKPILE NOTE:

TEMPORARY STOCKPILES SHALL BE:

1. LOCATED WITHIN THE LIMIT OF DISTURBANCE (LOD).
2. DRAIN TO A FUNCTIONING SEDIMENT CONTROL DEVICE.
3. POSITIONED TO NOT IMPEDE UPON, OR IMPAIR THE FUNCTION OF SAID DEVICE.
4. POSITIONED TO NOT ALTER DRAINAGE DIVIDES.

MAINTENANCE NOTE:

CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SEDIMENT CONTROL MEASURE AND DEVICES AFTER EVERY STORM EVENT. MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO THE REMOVAL OF ALL ACCUMULATED SEDIMENT. GEOTEXTILE FABRIC SHALL BE REPLACED AS NEEDED TO ENSURE PROPER FUNCTION.

PROFESSIONAL CERTIFICATION
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 40086
Expiration Date 02\13\2017

STATE OF MARYLAND — JONATHAN B. MEYERS — No. 40086 — PROFESSIONAL ENGINEER

9/9/2016

Baltimore County Soil Conservation District
APPROVED FOR SEDIMENT CONTROL
9-13-16
Date

ARM Group Inc.
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No.	Revision	Date	By

designed: JMA
checked: TNP
drawn: JMA
graphic scale
scale: AS NOTED
date: 9/8/2016
project no.: M150298-10

drawing title: REMEDIATION PHASE ESC DETAILS

project title: SPARROWS POINT AREA A: PARCEL A3 ENVIROANALYTICS GROUP
SPARROWS POINT BALTIMORE COUNTY, MARYLAND

Sheet 3

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STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

INCREMENTAL STABILIZATION

A. INCREMENTAL STABILIZATION – CUT SLOPES

1. EXCAVATE AND STABILIZE CUT SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL CUT SLOPES AS THE WORK PROGRESSES.
2. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.1 2011 MARYLAND STANDARDS AND SPECIFICATIONS):
   a. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO CONVEY RUNOFF AROUND THE EXCAVATION.
   b. PERFORM PHASE 1 EXCAVATION, PREPARE SEEDBED, AND STABILIZE.
   c. PERFORM PHASE 2 EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PHASE 1 AREAS AS NECESSARY.
   d. PERFORM FINAL PHASE EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE EXCAVATION HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

B. INCREMENTAL STABILIZATION – FILL SLOPES

3. CONSTRUCT AND STABILIZE FILL SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL SLOPES AS THE WORK PROGRESSES.
4. STABILIZE SLOPES IMMEDIATELY WHEN THE VERTICAL HEIGHT OF A LIFT REACHES 15 FEET, OR WHEN THE GRADING OPERATION CEASES AS PRESCRIBED IN THE PLANS.
5. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
6. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.2 2011 MARYLAND STANDARDS AND SPECIFICATIONS):
   a. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO DIVERT RUNOFF AROUND THE FILL. CONSTRUCT SILT FENCE ON LOW SIDE OF FILL UNLESS OTHER METHODS SHOWN ON THE PLANS ADDRESS THIS AREA.
   b. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
   c. PLACE PHASE 1 FILL, PREPARE SEEDBED, AND STABILIZE.
   d. PLACE PHASE 2 FILL, PREPARE SEEDBED, AND STABILIZE.
   e. PLACE FINAL PHASE FILL, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE THE PLACEMENT OF FILL HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

1. TEMPORARY STABILIZATION
   a. TEMPORARY STABILIZATION SHALL BE PROVIDED WHERE GROUND COVER IS NEEDED FOR A PERIOD OF 6 MONTHS OR LESS FOR A LONGER DURATION OF TIME, PERMANENT STABILIZATION PRACTICES ARE REQUIRED.
   b. SEEDBED PREPARATION CONSISTS OF LOOSENING SOIL TO A DEPTH OF 3 TO 5 INCHES BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS OR CHISEL PLOWS OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED, IT MUST NOT BE ROLLED OR DRAGGED SMOOTH BUT LEFT IN THE ROUGHENED CONDITION. SLOPES 3:1 OR FLATTER ARE TO BE TRACKED WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.
   c. APPLY FERTILIZER AND LIME AS PRESCRIBED ON THE PLANS. (SEE TABLE)
   d. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.

2. PERMANENT STABILIZATION
   a. PERMANENT STABILIZATION SHALL BE PROVIDED WHERE GROUND COVER IS NEEDED FOR 6 MONTHS OR MORE.
   b. A SOIL TEST IS REQUIRED FOR ANY EARTH DISTURBANCE OF 5 ACRES OR MORE. THE MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT ARE:

1. SOIL PH BETWEEN 6.0 AND 7.0.
2. SOLUBLE SALTS LESS THAN 500 PARTS PER MILLION (PPM).
3. SOIL CONTAINS LESS THAN 40 PERCENT CLAY BUT ENOUGH FINE GRAINED MATERIAL (GREATER THAN 30 PERCENT SILT PLUS CLAY) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION: IF LOVEGRASS WILL BE PLANTED, THEN A SANDY SOIL (LESS THAN 30 PERCENT SILT PLUS CLAY) WOULD BE ACCEPTABLE.
4. SOIL CONTAINS 1.5 PERCENT MINIMUM ORGANIC MATTER BY WEIGHT.
5. SOIL CONTAINS SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.

   c. APPLICATION OF AMENDMENTS OR TOPSOIL IS REQUIRED IF ON-SITE SOILS DO NOT MEET THE ABOVE CONDITIONS.
   d. GRADED AREAS MUST BE MAINTAINED IN A TRUE AND EVEN GRADE AS SPECIFIED ON THE APPROVED PLAN, THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES.
   e. APPLY SOIL AMENDMENTS AS SPECIFIED ON THE APPROVED PLAN OR AS INDICATED BY THE RESULTS OF A SOIL TEST.
   f. MIX SOIL AMENDMENTS INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS. RAKE LAWN AREAS TO SMOOTH THE SURFACE, REMOVE LARGE OBJECTS LIKE STONES AND BRANCHES, AND READY THE AREA FOR SEED APPLICATION. LOOSEN SURFACE SOIL BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION. TRACK SLOPES 3:1 OR FLATTER WITH TRACKED EQUIPMENT LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. LEAVE THE TOP 1 TO 3 INCHES OF SOIL LOOSE AND FRIABLE. SEEDBED LOOSENING MAY BE UNNECESSARY ON NEWLY DISTURBED AREAS.

B. TOPSOILING

1. TOPSOIL IS PLACED OVER PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION. THE PURPOSE IS TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.
2. TOPSOIL SALVAGED FROM AN EXISTING SITE MAY BE USED PROVIDED IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-NRCS.
3. TOPSOILING IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPES WHERE:
   a. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.
   b. THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.
   c. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.
   d. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT FEASIBLE.
4. AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN.
5. TOPSOIL SPECIFICATIONS: SOIL TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING CRITERIA:
   a. TOPSOIL MUST BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, OR LOAMY SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. TOPSOIL MUST NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND MUST CONTAIN LESS THAN 5 PERCENT BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH, OR OTHER MATERIALS LARGER THAN 1½ INCHES IN DIAMETER.
   b. TOPSOIL MUST BE FREE OF NOXIOUS PLANTS OR PLANT PARTS SUCH AS BERMUDA GRASS, QUACK GRASS, JOHNSON GRASS, NUT SEDGE, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.
   c. TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED BY A QUALIFIED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF NATURAL TOPSOIL.
6. TOPSOIL APPLICATION
   a. EROSION AND SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED WHEN APPLYING TOPSOIL.
   b. UNIFORMLY DISTRIBUTE TOPSOIL IN A 5 TO 8 INCH LAYER AND LIGHTLY COMPACT TO A MINIMUM THICKNESS OF 4 INCHES. SPREADING IS TO BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL PREPARATION AND TILLAGE. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS MUST BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.
   c. TOPSOIL MUST NOT BE PLACED IF THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.

C. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)

1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OF 5 ACRES OR MORE. SOIL ANALYSIS MAY BE PERFORMED BY A RECOGNIZED PRIVATE OR COMMERCIAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSES.
2. FERTILIZERS MUST BE UNIFORM IN COMPOSITION, FREE FLOWING AND SUITABLE FOR ACCURATE APPLICATION BY APPROPRIATE EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS MUST ALL BE DELIVERED TO THE SITE FULLY LABELED ACCORDING TO THE APPLICABLE LAWS AND MUST BEAR THE NAME, TRADE NAME OR TRADEMARK AND WARRANTY OF THE PRODUCER.
3. LIME MATERIALS MUST BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED EXCEPT WHEN HYDROSEEDING) WHICH CONTAINS AT LEAST 50 PERCENT TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUMOXIDE). LIMESTONE MUST BE GROUND TO SUCH FINENESS THAT AT LEAST 50 PERCENT WILL PASS THROUGH A #100 MESH SIEVE AND 98 TO 100 PERCENT WILL PASS THROUGH A #20 MESH SIEVE.
4. LIME AND FERTILIZER ARE TO BE EVENLY DISTRIBUTED AND INCORPORATED INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
5. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, SPREAD GROUND LIMESTONE AT THE RATE OF 4 TO 8 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL.

D. SEEDING AND MULCHING

1. SPECIFICATIONS
   a. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED MUST BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED MUST HAVE BEEN TESTED WITHIN THE 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON ANY PROJECT. REFER TO TABLE B.4 OF THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL REGARDING THE QUALITY OF SEED. SEED TAGS MUST BE AVAILABLE UPON REQUEST TO THE INSPECTOR TO VERIFY TYPE OF SEED AND SEEDING RATE.
   b. MULCH ALONE MAY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES ONLY IF THE GROUND IS FROZEN. THE APPROPRIATE SEEDING MIXTURE MUST BE APPLIED WHEN THE GROUND THAWS.
   c. INOCULANTS: THE INOCULANT FOR TREATING LEGUME SEED IN THE SEED MIXTURES MUST BE A PURE CULTURE OF NITROGEN FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS MUST NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANTS AS DIRECTED ON THE PACKAGE. USE FOUR TIMES THE RECOMMENDED RATE WHEN HYDROSEEDING. NOTE: IT IS VERY IMPORTANT TO KEEP INOCULANT AS COOL AS POSSIBLE UNTIL USED. TEMPERATURES ABOVE 75 TO 80 DEGREES FAHRENHEIT CAN WEAKEN BACTERIA AND MAKE THE INOCULANT LESS EFFECTIVE.
   d. SOD OR SEED MUST NOT BE PLACED ON SOIL WHICH HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL UNTIL SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF PHYTO-TOXIC MATERIALS.

2. APPLICATION

   a) DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.

      (1) INCORPORATE SEED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON TEMPORARY SEEDING TABLE B.1, PERMANENT SEEDING TABLE B.3, OR SITE-SPECIFIC SEEDING SUMMARIES.

      (2) APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION. ROLL THE SEEDED AREA WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.

   b) DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.

      (1) CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST 1/4 INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.

      (2) APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.

   c) HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER).

      (1) IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES SHOULD NOT EXCEED THE FOLLOWING: NITROGEN, 100 POUNDS PER ACRE TOTAL OF SOLUBLE NITROGEN; P2O5 (PHOSPHOROUS), 200 POUNDS PER ACRE; K2O (POTASSIUM), 200 POUNDS PER ACRE

      (2) LIME: USE ONLY GROUND AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE MAY BE APPLIED BY HYDROSEEDING). NORMALLY, NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN HYDROSEEDING.

      (3) MIX SEED AND FERTILIZER ON SITE AND SEED IMMEDIATELY AND WITHOUT INTERRUPTION.

      (4) WHEN HYDROSEEDING, DO NOT INCORPORATE SEED INTO THE SOIL.

E. MULCHING

1. MULCH MATERIALS (IN ORDER OF PREFERENCE)

   a. STRAW CONSISTING OF THOROUGHLY THRESHED WHEAT, RYE, OAT, OR BARLEY AND REASONABLY BRIGHT IN COLOR. STRAW IS TO BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW AND NOT MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY. NOTE: USE ONLY STERILE STRAW MULCH IN AREAS WHERE ONE SPECIES OF GRASS IS DESIRED.

   b. WOOD CELLULOSE FIBER MULCH (WCFM) CONSISTING OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.

      (1) WCFM IS TO BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.
      (2) WCFM, INCLUDING DYE, MUST CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.
      (3) WCFM MATERIALS ARE TO BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER AND OTHER ADDITIVES TO FORM A HOMOGENEOUS SLURRY. THE MULCH MATERIAL MUST FORM A BLOTTER-LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND MUST COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDLINGS.
      (4) WCFM MATERIAL MUST NOT CONTAIN ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTOTOXIC.
      (5) WCFM MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH OF APPROXIMATELY 10 MILLIMETERS, DIAMETER APPROXIMATELY 1 MILLIMETER, PH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6 PERCENT MAXIMUM AND WATER HOLDING CAPACITY OF 90 PERCENT MINIMUM.

2. APPLICATION

   a) APPLY MULCH TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING

   b) WHEN STRAW MULCH IS USED, SPREAD IT OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS PER ACRE TO A UNIFORM LOOSE DEPTH OF 1 TO 2 INCHES. APPLY MULCH TO ACHIEVE A UNIFORM DISTRIBUTION AND DEPTH SO THAT THE SOIL SURFACE IS NOT EXPOSED. WHEN USING A MULCH ANCHORING TOOL, INCREASE THE APPLICATION RATE TO 2.5 TONS PER ACRE.

   c) WOOD CELLULOSE FIBER USED AS MULCH MUST BE APPLIED AT A NET DRY WEIGHT OF 1500 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER TO ATTAIN A MIXTURE WITH A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER I 00 GALLONS OF WATER.

3. ANCHORING

   a) PERFORM MULCH ANCHORING IMMEDIATELY FOLLOWING APPLICATION OF MULCH TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON THE SIZE OF THE AREA AND EROSION HAZARD:

      (1) A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF 2 INCHES. THIS PRACTICE IS MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD FOLLOW THE CONTOUR.

      (2) WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. APPLY THE FIBER BINDER AT A NET DRY WEIGHT OF 750 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER AT A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.

      (3) SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRO-TACK), DCA-70, PETROSET, TERRA TAX II, TERRA TACK AR OR OTHER APPROVED EQUAL MAY BE USED. FOLLOW APPLICATION RATES AS SPECIFIED BY THE MANUFACTURER. APPLICATION OF LIQUID BINDERS NEEDS TO BE HEAVIER AT THE EDGES WHERE WIND CATCHES MULCH, SUCH AS IN VALLEYS AND ON CRESTS OF BANKS. USE OF ASPHALT BINDERS IS STRICTLY PROHIBITED.

      (4) LIGHTWEIGHT PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4 TO 15 FEET WIDE AND 300 TO 3,000 FEET LONG.

TEMPORARY STABILIZATION CRITERIA:

1. SELECT ONE OR MORE OF THE SPECIES OR SEED MIXTURES LISTED IN TABLE B.I FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE B.3), AND ENTER THEM IN THE TEMPORARY SEEDING SUMMARY BELOW ALONG WITH APPLICATION RATES, SEEDING DATES AND SEEDING DEPTHS. I F THIS SUMMARY IS NOT PUT ON THE PLAN AND COMPLETED, THEN TABLE B.1 PLUS FERTILIZER AND LIME RATES MUST BE PUT ON THE PLAN.

2. FOR SITES HAVING SOIL TESTS PERFORMED, USE AND SHOW THE RECOMMENDED RATES BY THE TESTING AGENCY. SOIL TESTS ARE NOT REQUIRED FOR TEMPORARY SEEDING.

3. WHEN STABILIZATION IS REQUIRED OUTSIDE OF A SEEDING SEASON, APPLY SEED AND MULCH OR STRAW MULCH ALONE AS PRESCRIBED IN SECTION B-4-3.A.I .B AND MAINTAIN UNTIL THE NEXT SEEDING SEASON.

TEMPORARY SEEDING SUMMARY					FERTILIZER RATE 10-20-20	LIME RATE
SEED MIXTURE (FOR HARDINESS ZONE 7A)						
NO.	SPECIES	APPLICATION RATE (LB/AC)	RECOMMENDED SEEDING DATES	SEEDING DEPTHS		
COOL-SEASON GRASSES						
	ANNUAL RYEGRASS	40	2/15 TO 4/30 AND 8/15 TO 11/30	0.5"	436 LB/AC 10 LB/1000 SF	2 TONS/AC 90 LB/1000 SF
WARM-SEASON GRASSES						
	FOXTAIL MILLET	30	5/1 TO 8/14	0.5"	436 LB/AC 10 LB/1000 SF	2 TONS/AC 90 LB/1000 SF

NOTES:

1. SEEDING RATES FOR THE WARM-SEASON GRASSES ARE IN POUNDS OF PURE LIVE SEED (PLS). ACTUAL PLANTING RATES SHALL BE ADJUSTED TO REFLECT PERCENT SEED GERMINATION AND PURITY, AS TESTED. ADJUSTMENTS ARE USUALLY NOT NEEDED FOR THE COOL-SEASON GRASSES.

   SEEDING RATES LISTED ABOVE ARE FOR TEMPORARY SEEDINGS, WHEN PLANTED ALONE. WHEN PLANTED AS A NURSE CROP WITH PERMANENT SEED MIXES, USE 1/3 OF THE SEEDING RATE LISTED ABOVE FOR BARLEY, OATS, AND WHEAT. FOR SMALLER-SEEDED GRASSES (ANNUAL RYEGRASS, PEARL MILLET, FOXTAIL MILLET), DO NOT EXCEED MORE THAN 5% (BY WEIGHT) OF THE OVERALL PERMANENT SEEDING MIX. CEREAL RYE GENERALLY SHOULD NOT BE USED AS A NURSE CROP, UNLESS PLANTING WILL OCCUR IN VERY LATE FALL BEYOND THE SEEDING DATES FOR OTHER TEMPORARY SEEDINGS. CEREAL RYE HAS ALLELOPATHIC PROPERTIES THAT INHIBIT THE GERMINATION AND GROWTH OF OTHER PLANTS. IF IT MUST BE USED AS A NURSE CROP, SEED AT 1/3 OF THE RATE LISTED ABOVE.

   OATS ARE THE RECOMMENDED NURSE CROP FOR WARM-SEASON GRASSES.

2. FOR SANDY SOILS, PLANT SEEDS AT TWICE THE DEPTH LISTED ABOVE.

3. THE PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE AND MAY REQUIRE ADJUSTMENT TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONE.

PERMANENT STABILIZATION CRITERIA:

A. SEED MIXTURES

1. GENERAL USE

   a. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE B.3 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE 8.3) AND BASED ON THE SITE CONDITION OR PURPOSE FOUND ON TABLE B.2. ENTER SELECTED MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.

   b. ADDITIONAL PLANTING SPECIFICATIONS FOR EXCEPTIONAL SITES SUCH AS SHORELINES, STREAM M BANKS, OR DUNES OR FOR SPECIAL PURPOSES SUCH AS WILDLIFE OR AESTHETIC TREATMENT MAY BE FOUND IN USDA-NRCS TECHNICAL FIELD OFFICE GUIDE, SECTION 342 – CRITICAL AREA PLANTING.

   c. FOR SITES HAVING DISTURBED AREA OVER 5 ACRES, USE AND SHOW THE RATES RECOMMENDED BY THE SOIL TESTING AGENCY.

   d. FOR AREAS RECEIVING LOW MAINTENANCE, APPLY UREA FORM FERTILIZER (46-0-0) AT 3 1/2 POUNDS PER 1000 SQUARE FEET (150 POUNDS PER ACRE) AT THE TIME OF SEEDING IN ADDITION TO THE SOIL AMENDMENTS SHOWN IN THE PERMANENT SEEDING SUMMARY .

2. TURFGRASS MIXTURES

   a. AREAS WHERE TURFGRASS MAY BE DESIRED INCLUDE LAWNS, PARKS, PLAYGROUNDS, AND COMMERCIAL SITES WHICH WILL RECEIVE A MEDIUM TO HIGH LEVEL OF MAINTENANCE.

   b. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED BELOW BASED ON THE SITE CONDITIONS OR PURPOSE. ENTER SELECTED MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.

   i. KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN AREAS THAT RECEIVE INTENSIVE MANAGEMENT. IRRIGATION REQUIRED IN THE AREAS OF CENTRAL MARYLAND AND EASTERN SHORE. RECOMMENDED CERTIFIED KENTUCKY BLUEGRASS CULTIVARS SEEDING RATE: 1.5 TO 2.0 POUNDS PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.

   ii. KENTUCKY BLUEGRASS/PERENNIAL RYE: FULL SUN MIXTURE: FOR USE IN FULL SUN AREAS WHERE RAPID ESTABLISHMENT IS NECESSARY AND WHEN TURF WILL RECEIVE MEDIUM TO INTENSIVE MANAGEMENT. CERTIFIED PERENNIAL RYEGRASS CULTIVARS/CERTIFIED KENTUCKY BLUEGRASS SEEDING RATE: 2 POUNDS MIXTURE PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM I0 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.

   iii. TALL FESCUE/KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN DROUGHT PRONE AREAS AND/OR FOR AREAS RECEIVING LOW TO MEDIUM MANAGEMENT IN FULL SUN TO MEDIUM SHADE. RECOMMENDED MIXTURE INCLUDES; CERTIFIED TALL FESCUE CULTIVARS 95 TO 100 PERCENT, CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 0 TO 5 PERCENT. SEEDING RATE: 5 TO 8 POUNDS PER 1000 SQUARE FEET. ONE OR MORE CULTIVARS MAY BE BLENDED.

   iv. KENTUCKY BLUEGRASS/FINE FESCUE: SHADE MIXTURE: FOR USE IN AREAS WITH SHADE IN BLUEGRASS LAWNS. FOR ESTABLISHMENT IN HIGH QUALITY, INTENSIVELY MANAGED TURF AREA. MIXTURE INCLUDES; CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 30 TO 40 PERCENT AND CERTIFIED FINE FESCUE AND 60 TO 70 PERCENT. SEEDING RATE: 1 1/2 TO 3 POUNDS PER 1000 SQUARE FEET.

NOTES:
SELECT TURFGRASS VARIETIES FROM THOSE LISTED IN THE MOST CURRENT UNIVERSITY OF MARYLAND PUBLICATION, AGRONOMY MEMO #77, "TURFGRASS CULTIVAR RECOMMENDATIONS FOR MARYLAND"

CHOOSE CERTIFIED MATERIAL. CERTIFIED MATERIAL IS THE BEST GUARANTEE OF CULTIVAR PURITY. THE CERTIFICATION PROGRAM OF THE MARYLAND DEPARTMENT OF AGRICULTURE, TURF AND SEED SECTION, PROVIDES A RELIABLE MEANS OF CONSUMER PROTECTION AND ASSURES A PURE GENETIC LINE.

   c. IDEAL TIMES OF SEEDING FOR TURF GRASS MIXTURES

      WESTERN MD: MARCH 15 TO JUNE 1, AUGUST 1 TO OCTOBER 1 (HARDINESS ZONES: 5B, 6A)

      CENTRAL MD: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONE: 6B)

      SOUTHERN MD, EASTERN SHORE: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONES: 7A, 7B)

   d. TILL AREAS TO RECEIVE SEED BY DISKING OR OTHER APPROVED METHODS TO A DEPTH OF 2 TO 4 INCHES, LEVEL AND RAKE THE AREAS TO PREPARE A PROPER SEEDBED. REMOVE STONES AND DEBRIS OVER 1 1/2 INCHES IN DIAMETER. THE RESULTING SEEDBED MUST BE IN SUCH CONDITION THAT FUTURE MOWING OF GRASSES WILL POSE NO DIFFICULTY.

   e. IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER FOR PLANT GROWTH (1/2 TO 1 INCH EVERY 3 TO 4 DAYS DEPENDING ON SOIL TEXTURE) UNTIL THEY ARE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY OR HOT SEASONS, OR ON ADVERSE SITES.

PERMANENT SEEDING SUMMARY				FERTILIZER RATE 10-20-20			LIME RATE
SEED MIXTURE (FOR HARDINESS ZONE 7A)							
SPECIES	APPLICATION RATE (LB/AC)	RECOMMENDED SEEDING DATES	SEEDING DEPTHS	N	P_2O_5	K_2O	
TALL FESCUE/KENTUCKY BLUEGRASS TURFGRASS MIXTURE	300	2/15 TO 4/30 AND 8/15 TO 10/31	0.25 - 0.5"	45 LBS/AC (1.0 LB/1000 SF)	90 LBS/AC (2.0 LB/1000 SF)	90 LBS/AC (2.0 LB/1000 SF)	2 TONS/AC (90 LB/1000 SF)

* FOR DATES 5/1 – 8/14 ADD 15 LB/AC OF EITHER FOXTAIL MILLET OR PEARL MILLET TO THE PERMANENT SEEDING MIXTURE ABOVE.

B. SOD: TO PROVIDE QUICK COVER ON DISTURBED AREAS (2:1 GRADE OR FLATTER).

1 . GENERAL SPECIFICATIONS

   a. CLASS OF TURFGRASS SOD MUST BE MARYLAND STATE CERTIFIED. SOD LABELS MUST BE MADE AVAILABLE TO THE JOB FOREMAN AND INSPECTOR.

   b. SOD MUST BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4 INCH, PLUS OR MINUS 1/4 INCH, AT THE TIME OF CUTTING. MEASUREMENT FOR THICKNESS MUST EXCLUDE TOP GROWTH AND THATCH. BROKEN PADS AND TOM OR UNEVEN ENDS WILL NOT BE ACCEPTABLE.

   c. STANDARD SIZE SECTIONS OF SOD MUST BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED VERTICALLY WITH A FIRM GRASP ON THE UPPER 10 PERCENT OF THE SECTION.

   d. SOD MUST NOT BE HARVESTED OR TRANSPLANTED WHEN MOISTURE CONTENT (EXCESSIVELY DRY OR WET) MAY ADVERSELY AFFECT ITS SURVIVAL.

   e. SOD MUST BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS. SOD NOT TRANSPLANTED WITHIN THIS PERIOD MUST BE APPROVED BY AN AGRONOMIST OR SOIL SCIENTIST PRIOR TO ITS INSTALLATION.

2. SOD INSTALLATION

   a. DURING PERIODS OF EXCESSIVELY HIGH TEMPERATURE OR IN AREAS HAVING DRY SUBSOIL, LIGHTLY IRRIGATE TBE SUBSOIL IMMEDIATELY PRIOR TO LAYING THE SOD.

   b. LAY THE FIRST ROW OF SOD I N A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO IT AND TIGHTLY WEDGED AGAINST EACH OTHER. STAGGER LATERAL JOINTS TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS.

   c. WHEREVER POSSIBLE, LAY SOD WITH THE LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERING JOINTS. ROLL AND TAMP, PEG OR OTHERWISE SECURE THE SOD TO PREVENT SLIPPAGE ON SLOPES. ENSURE SOLID CONTACT EXISTS BETWEEN SOD ROOTS AND THE UNDERLYING SOIL SURFACE.

   d. WATER THE SOD IMMEDIATELY FOLLOWING ROLLING AND TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOIL SURFACE BELOW THE SOD ARC THOROUGHLY WET. COMPLETE THE OPERATIONS OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD WITHIN EIGHT HOURS.

3. SOD MAINTENANCE

   a. IN THE ABSENCE OF ADEQUATE RAINFALL, WATER DAILY D U RING THE FIRST WEEK OR AS OFTEN AND SUFFICIENTLY AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF 4 INCHES. WATER SOD DURING THE HEAT OF THE DAY TO PREVENT WILTING.

   b. AFTER THE FIRST WEEK, SOD WATERING IS REQUIRED AS NECESSARY TO MAINTAIN ADEQUATE MOISTURE CONTENT.

   c. DO NOT MOW UNTIL THE SOD IS FIRMLY ROOTED. NO MORE THAN 1/3 OF THE GRASS LEAF MUST BE REMOVED BY THE INITIAL CUTTING OR SUBSEQUENT CUTTINGS. MAINTAIN A GRASS HEIGHT OF AT LEAST 3 INCHES UNLESS OTHERWISE SPECIFIED.

PROFESSIONAL CERTIFICATION
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland
License No. 40086
Expiration Date 02\13\2017

STATE OF MARYLAND · JONATHAN B. MEYERS · No. 40086 · PROFESSIONAL ENGINEER
9/9/2016

Baltimore County Soil Conservation District
APPROVED FOR SEDIMENT CONTROL
9-13-16
Date

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

Revision	Date	By
No.		

designed	JMA	scale	AS NOTED
checked	TNP	date	9/8/2016
drawn	JMA	project no.	M150298-10
graphic scale			

drawing title: REMEDIATION PHASE VEGETATIVE SPECIFICATIONS

project title: SPARROWS POINT AREA A: PARCEL A3
ENVIROANALYTICS GROUP
SPARROWS POINT
BALTIMORE COUNTY, MARYLAND

Sheet 4

APPENDIX H

Utility Excavation NAPL Contingency Plan

Revision 3 – April 11, 2017

Introduction:

Proposed underground utilities and excavations necessary for the redevelopment of the Tradepoint Atlantic property may encounter areas of petroleum and/or Oil & Grease contamination in soil. The assessment of total petroleum hydrocarbons (TPH) diesel range organics (DRO), gasoline range organics (GRO), Oil & Grease, and/or non-aqueous phase liquid (NAPL) completed as part of each Phase II Investigation includes the following:

- Each soil boring with evidence of free-phase NAPL in the soil core, whether located near utilities or not, is investigated via the installation of a piezometer to assess mobility to groundwater. If measureable NAPL is present in the initial piezometer, additional soil borings and shallow temporary piezometers are installed surrounding the initial detection to delineate the impacts. Each piezometer installed to delineate the presence or absence of NAPL is checked with an oil-water interface probe immediately after installation, 48 hours after installation, and at least 30 days after installation.
- TPH-DRO/GRO and Oil & Grease data, once received, are assessed in their magnitude and location respective to subsurface utilities, stormwater conveyances, and surface waters.
- Locations that exhibit elevated detections of TPH/Oil & Grease or evidence of NAPL, that are within reasonable proximity (i.e. 25 feet) to subsurface utilities or stormwater conveyances and/or within reasonable proximity (i.e. 100 feet) to surface waters, are identified for further delineation and selective removal (if warranted).

Any NAPL identified in soil borings or piezometers during the Phase II Investigation would be noted on relevant logs and identified in Response and Development Work Plans for construction planning purposes. Despite these planning efforts, unidentified pockets of contamination (including NAPL) may still be encountered during construction. This contingency plan provides the procedures to be utilized during construction work to properly address response and construction techniques if any materials impacted with NAPL are encountered.

Objectives:

The purpose of this plan is to describe procedures to be followed in the event that NAPL is encountered in utility trenches or other excavations during development of the Tradepoint Atlantic property. The specific objectives of this plan and the procedures outlined herein are:

1. To ensure identification and proper management of Oil & Grease and petroleum-contaminated soils.
2. To ensure proper worker protection for working in areas of Oil & Grease and petroleum contamination.
3. To ensure that the installation of new utilities does not create new preferential flow paths for the migration of free-phase hydrocarbons (Oil & Grease, TPH-DRO/GRO, etc.) or soil vapors.

Identification of Oil & Grease and Petroleum Contaminated Soil:

An Environmental Professional (EP) will be on-site to determine if soils show evidence of the presence of Oil & Grease or TPH present as NAPL during installation of utility trenches or other excavation activities completed during development. Oil & Grease or petroleum-contaminated soils can be identified by the presence of free oil, oil staining, a petroleum odor, or any combination of these conditions. Free oil (NAPL) is liquid oil which could potentially be drained or otherwise extracted from the soil, and is the focus of this contingency plan, although severe staining accompanied by odors should be addressed via the same contingency measures provided herein (based on the judgement of the EP). The appearance of oil staining is not always consistent, but varies depending on the nature of the oil, the soil type, and the age of the release. Staining associated with old petroleum contamination often has a greenish hue, but may also be brown or black. The olfactory sense is the most sensitive instrument for identifying petroleum contamination in the field. Therefore, a petroleum odor may be noted although there is no visible sign of oil or staining. In some instances, decaying organic matter can produce an odor similar to petroleum, but this is rare.

If NAPL is encountered during construction, the extent of impacts shall be delineated by excavating trenches or installing four soil borings (two in each direction) perpendicular to the utility alignment or excavation to examine the soil for physical evidence of NAPL. Perpendicular transects will be investigated every 50 feet along the section of the utility trench or excavation where there is physical evidence of NAPL. Each transect will extend to a distance of 10 feet from the edge of the utility trench or excavation. This represents the maximum distance which would require mandatory excavation to mitigate potential migration risks (see below).

NAPL delineation will be guided primarily by screening observations from the perpendicular borings or trenches, and samples will be collected to test for extractable Oil & Grease or petroleum-contaminated soil using the Oil Sticks™ test kit. This test kit provides a determination of whether hydrocarbons are present in soil and extractable (i.e. could mobilize as a NAPL). Oil Sticks™ change from a pale blue to a deep blue color when they come in contact with free product. This instantaneous change in color occurs even when miniscule amounts of product come in contact with the strip. The sensitivity of Oil Sticks™ to determine the presence/absence of oil is reported by the manufacturer to be about 1,000 to 2,000 mg/kg. The

field test is performed by placing approximately 3 tablespoons of soil in a clean sample cup and adding enough water to cover the sample. After stirring the sample and waiting ~1 minute, the Oil Sticks™ test strip should be swished through the water, making sure to touch the strip to the sides of the cup where product may collect at the interface (meniscus) between the cup, water, and air. If the strip turns deep blue, or deep blue spots appear, oil or hydrocarbon is present. However, the MDE has observed that the Oil Sticks™ method may produce inconsistent results. Therefore, documentation of all screening methods is necessary during boring/trenching work. This documentation shall include an accurate record of visual and olfactory screening, along with a narrative with photographs. Field screening will be aided by photoionization detector (PID) results, and Oil Sticks™ samples should be biased to target elevated PID readings, if any. The agencies have requested that all soil samples prepared for the Oil Sticks™ field test be photographed for evidence of sheen/residue on the cup sides. Detailed records are required to be submitted with the project-specific Completion Report.

If petroleum or Oil & Grease impacts are identified in Site soils based on use of the Oil Sticks™ test kit or other field screening methods, disposal requirements will be determined using the quantitative PetroFLAG™ hydrocarbon analysis system or fixed laboratory analysis (see following section). The PetroFLAG™ hydrocarbon analysis system is a broad spectrum field test kit suitable for TPH contamination regardless of the source or state of degradation (Dexsil Corporation). PetroFLAG™ field test kits do not distinguish between aromatic and aliphatic hydrocarbons, but quantify all fuels, oils, and greases as TPH. Dilutions can be used to determine concentrations of TPH/Oil & Grease above the normal calibration range. Dexsil notes that positive results for TPH may occur if naturally occurring waxes and oils, such as vegetable oils, are present in the sample. Additional detail regarding the procedure for the PetroFLAG™ kit is given in **Attachment 1**.

Soil Excavation, Staging, Sampling and Disposal:

The EP will monitor all utility trenching and excavation activities for signs of potential contamination. In particular, soils will be monitored with a hand-held PID for potential VOCs, and will also be visually inspected for the presence of staining, petroleum waste materials, or other indications of NAPL contamination that may be different than what was already characterized. Excavated material that is visibly stained or that exhibits a sustained PID reading of greater than 10 ppm will be segregated and containerized or placed in a stockpile on polyethylene or impervious surface until the material can be analyzed using the PetroFLAG™ kit (or via fixed laboratory) to characterize the material for appropriate disposal. In addition, any hydrocarbon contamination discovered during construction activities that was not previously characterized must also be analyzed for PCBs prior to removal and transport to an appropriate disposal facility. If excavated and stockpiled, such materials will be covered with a plastic tarp so that the entire stockpile is encapsulated, and anchored to prevent the elements from affecting the integrity of the containment. The MDE will be notified if such materials are encountered during utility work.

Soil exhibiting physical evidence of NAPL contamination or elevated TPH/Oil & Grease with detections in the low percentage range, which is located within 10 feet of a proposed new utility or subsurface structure (i.e., foundation, sump, electrical vault, underground tank, etc.), will be excavated and segregated for disposal at the on-site nonhazardous landfill (Greys Landfill) pending the completion of any required PCB analytical testing. Impacted soil which is located greater than 10 feet away from the proposed utility or subsurface structure may be left in place and undisturbed. The extent of the excavation will be determined in the field following visual/olfactory screening supplemented by the PID and Oil Sticks™ test kit, but soil disposal requirements will be determined with the PetroFLAG™ test kit or via fixed laboratory analysis for TPH/Oil & Grease (since the Oil Sticks™ method is not quantitative).

Any recovered NAPL will be collected for off-site disposal. As required by the appropriate and MDE approved facility, samples impacted by free-phase NAPL (i.e., containing free oil) will be collected for profiling/waste characterization and submitted to a fixed laboratory for the following analyses: metals, VOCs, TPH-DRO/GRO, and any additional analysis required by the selected disposal facility. Upon receipt of any additional characterization analytical results, the MDE Voluntary Cleanup Program (VCP) will be notified of the proposed disposal facility. Non-impacted material without evidence of NAPL (i.e. soils that may contain measureable concentrations of TPH/Oil & Grease but below percentage levels) may be placed on the Site in areas to be paved or capped.

Initial Reporting:

If evidence of NAPL in soil or groundwater is encountered during excavation, it will be reported to the MDE (VCP Project Manager) within two hours. Information regarding the location and characteristics of any NAPL contaminated soil will be documented as follows:

- Location (exact stationing);
- Extent of contamination (horizontally and vertically – prepare a sketch including dimensions);
- Relative degree of contamination (i.e. free oil with strong odor vs. staining); and
- Visual documentation (take photographs and complete a photograph log)

Utility Installations in Impacted Areas:

Underground piping or conduits installed through areas of Oil & Grease or petroleum contamination shall be leak proof and water tight. All joints will be adequately sealed or gasketed, and pipes or conduits will be properly bedded and placed to prevent leakage. All trench backfill will meet the MDE definition of Clean Fill. Pipe bedding will be installed to minimize the potential for accumulation of water and concentrated infiltration. This can be achieved by using a relatively small amount of low-permeability pipe bedding; open-graded stone will be avoided or only used in thicknesses of 6 inches or less. Bedding must be properly

placed and compacted below the haunches of the pipe. Clay, flowable fill, or concrete plugs will be placed every 100 feet across any permeable bedding to minimize the preferential flow and concentration of water along the bedding of such utilities.

If required, each trench plug will be constructed with a 2-foot-thick clay plug or 1-foot-thick flowable fill or concrete plug, perpendicular to the pipe, which extends at least 1 foot in all directions beyond the permeable pipe bedding. The plug acts as an anti-seep collar, and will extend above the top of the pipe. Installation of each trench plug will follow the completion of the trench excavation, installation of granular pipe bedding (because dense-graded aggregate or soil or other pipe bedding is difficult to properly compact below the haunches of the pipe), and seating of the pipe. The trench plug will then be installed by digging out a 1-foot trench below and around the pipe corridor, and placing clay or flowable fill to construct the plug. A specification drawing for installation of the trench plug has been provided as **Figure 1**.

Attachment 1 - PetroFLAG™ Procedure

PetroFLAG™ field test kits use a proprietary turbidimetric reaction to determine the TPH concentration of solvent extracted samples (USEPA). Calibration standards provided with the unit are used to perform a two-point calibration for the PetroFLAG™. A blank and a 1,000 ppm standard are run by the analyzer unit to create an internal calibration curve.

Analysis of a soil sample is performed using three simple steps: extraction, filtration, and analysis. The PetroFLAG™ analysis is performed as follows:

- Place a 10 gram soil sample in a test tube.
- Add extraction solvent to the tube.
- Shake the tube intermittently for four minutes.
- Filter the extract into a vial that contains development solution
- Allow the solution to react for 10 minutes.

The filtration step is important because the PetroFLAG™ analyzer measures the turbidity or "optical density" of the final solution. Approximately 25 samples can be analyzed per hour. The vial of developed solution is placed in the meter, and the instrument produces a quantitative reading that reveals the concentration of hydrocarbons in the soil sample. The PetroFLAG™ method quantifies all fuels, oils, and greases as TPH between 15 and 2000 ppm (Dexsil Corporation). A 10x dilution of the filtered extraction solvent will be completed to allow for quantification of soil concentrations in excess of 10,000 ppm. The specially designed PetroFLAG™ analyzer allows the user to select, in the field, the response factor that is appropriate for the suspected contaminant at each site. Vegetable-based oils have been shown to exhibit a response factor of 18% (EPA Method 9074). Using the selected response factor, the analyzer compensates for the relative response of each analyte and displays the correct concentration in parts per million (ppm).

References:

U.S. Environmental Protection Agency (EPA). Contaminated Site Clean-up Information (Clu-IN): Test Kits. Office of Superfund Remediation and Technology Innovation. http://www.clu-in.net/characterization/technologies/color.cfm

Dexsil Corporation. 2016. PetroFLAG Analyzer System (PF-MTR-01). http://www.dexsil.com/products/detail.php?product_id=23

EPA SW-846 Method Number 9074 - Turbidimetric Screening Procedure for Total Recoverable Hydrocarbons in Soil

GENERAL NOTES:

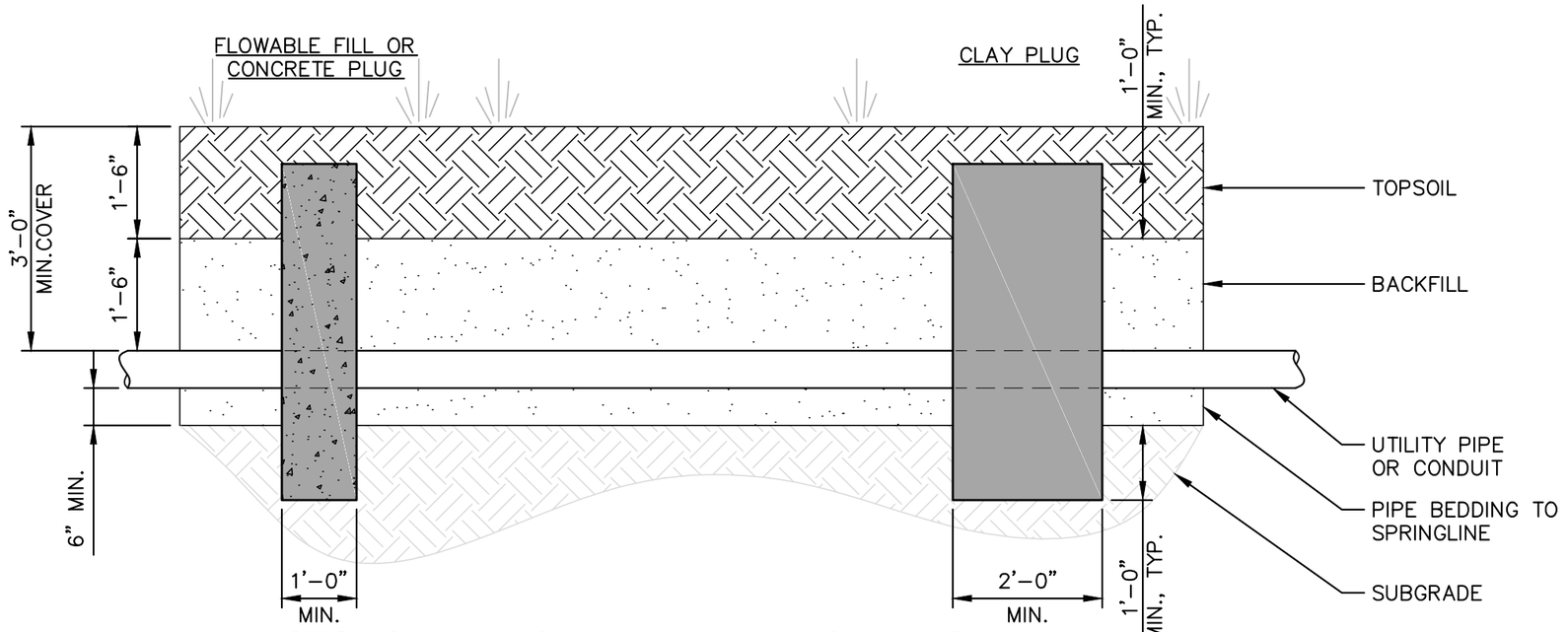
1. ALL PIPES OR CONDUIT PASSING THROUGH AREAS OF PETROLEUM CONTAMINATION SHALL BE LEAK–PROOF AND WATERTIGHT. ALL JOINTS SHALL BE SEALED OR GASKETED.

2. ALL PIPES SHALL BE PROPERLY PLACED AND BEDDED TO PREVENT MISALIGNMENT OR LEAKAGE. PIPE BEDDING SHALL BE INSTALLED IN SUCH A MANNER AS TO MINIMIZE THE POTENTIAL FOR ACCUMULATION OF WATER AND CONCENTRATED INFILTRATION.

3. ALL TRENCH BACKFILL SHALL MEET THE MDE DEFINITION OF CLEAN FILL.

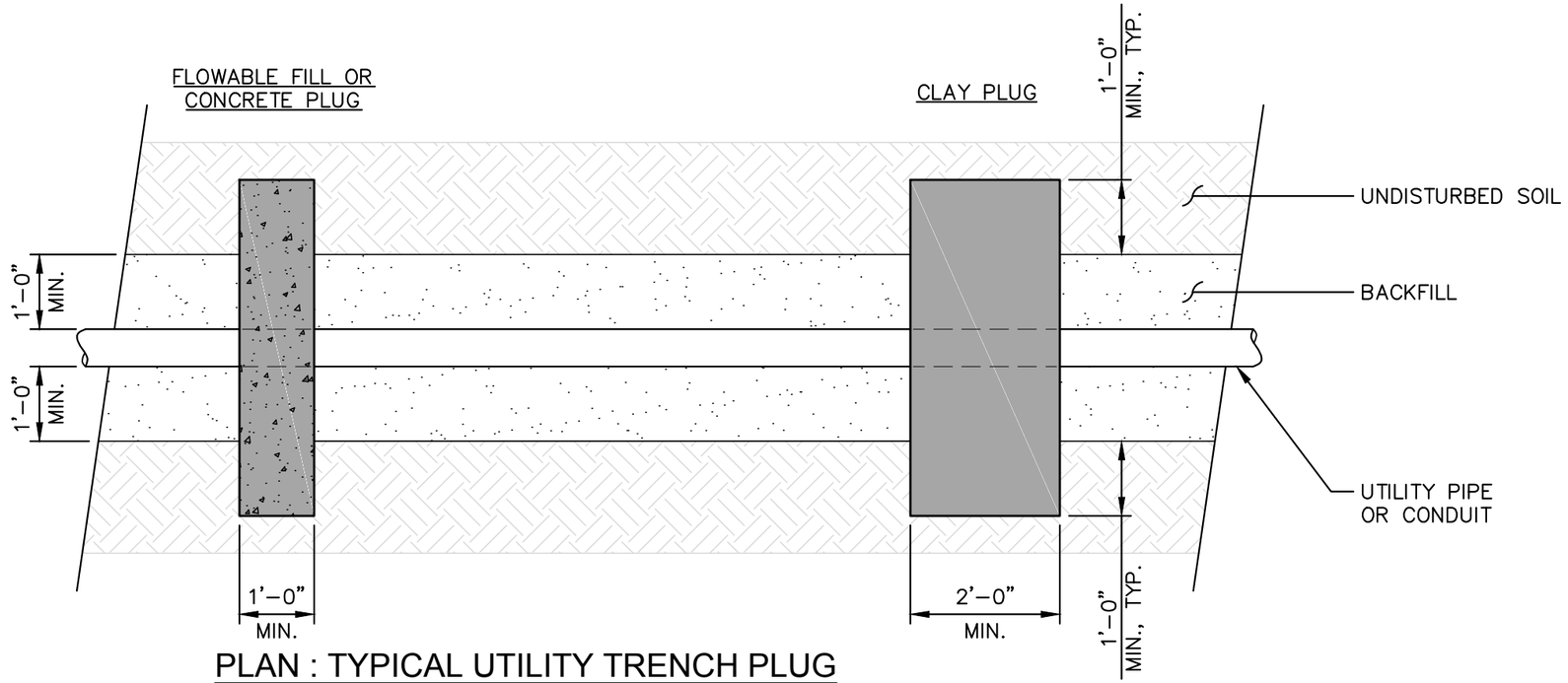
4. TRENCH PLUGS SHALL EXTEND A MINIMUM OF ONE (1) FOOT BEYOND PERMEABLE BEDDING OR BACKFILL IN ALL DIRECTIONS.

5. ANTI–SEEP COLLARS FROM THE PIPE MANUFACTURER, THAT ARE PRODUCED SPECIFICALLY FOR THE PURPOSE OF PREVENTING SEEPAGE AROUND THE PIPE, ARE ACCEPTABLE IF INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AND ONLY WITH PRIOR APPROVAL BY EAG.



SECTION : TYPICAL UTILITY TRENCH PLUG

SCALE: 1/2" = 1'–0"



PLAN : TYPICAL UTILITY TRENCH PLUG

SCALE: 1/2" = 1'–0"

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

UTILITY TRENCH PLUG
Sparrows Point Site
EnvirAnalytics Group, LLC

January 2017
NONE
160443M

Figure 1

APPENDIX I

CONTAINMENT REMEDY OPERATIONS AND MAINTENANCE PLAN SUB-PARCEL A3-1 FORMER SPARROWS POINT STEEL MILL

Containment Remedy Operations and Maintenance Overview

In accordance with the Response Action Plan (RAP) for the Sub-Parcel A3-1 development located on the northern portion of the Sparrows Point Peninsula in Sparrows Point, Maryland (the Site), post remediation care requirements include compliance with the conditions placed on the No Further Action Letter, Certificate of Completion, and deed restrictions recorded for the Site. In addition, maintenance will be performed on the capped areas to control degradation and exposure to the underlying soil. Inspections of the capped areas will be conducted semi-annually. The responsible party will perform cap inspections, maintenance of the cap, and retain cap inspection records. Maintenance records will include the date of the inspection, name of the inspector, any noted issues, and subsequent resolution of the issues. Maintenance records will be maintained in a designated area at the Site for Maryland Department of the Environment (MDE) inspection and review, if requested.

The containment remedy (capping) will be constructed as described in the MDE-approved RAP. The following sections provide details of the Operations and Maintenance Plan (O&M Plan) procedures to be followed at the Site to assess when maintenance of the capped areas is necessary.

Designated Pavement Area Inspections

The asphalt paved areas will consist of a 8 or 14-inch thick combination of road base and asphalt. The paved areas, as identified in the RAP, will be maintained to ensure the integrity of the cap.

Pavement area inspections will be conducted on a semi-annual basis to ensure that the capped areas are maintained as needed. During the inspection, the capped surfaces will be inspected to check for the following potential conditions:

- Differential settlement and significant surface-water ponding;
- Erosion or cracking of the cap materials; and
- Obstruction or blocking of drainage facilities.

When inspections indicate that cap repair is necessary, repairs will be completed as soon as practically possible in compliance with any recorded deed restrictions. The work will be documented on a form similar to the attached example Pavement Inspection Form. The inspection documentation will include the results of each inspection, recommended maintenance actions, and the actual maintenance/repair implemented. The responsible party will maintain inspection forms and any resulting repair records.

Pavement Inspection Protocol

A pavement management system (pavement condition index) will be implemented in the designated areas of the Site. The purpose of this system is to plan and prioritize future pavement maintenance needs. The system is based on a numerical rating of pavement distresses as published by the United States Army Corps of Engineers. The following chart will be used to provide an index of the pavement condition.

PAVEMENT CONDITION INDEX (PCI)		
PCI	**Characterization**	**Description**
1	New crack-free surface	Black in color, smooth texture
2	Oxidation has started	Short hairline cracks start to develop; dark gray color.
3	Oxidation in advanced state	Hairline cracks are longer and wider; gray in color
4	Oxidation complete	Cracked area 0.25 inch wide and crack lines have found base faults
5	Moisture penetrating through 0.25 inch cracks; loose material, stone and sand, evident	Texture of surface becoming rough; Preventative maintenance
6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter lines
7	Potholes develop in low spots	Gatoring areas begin to break up; overall texture very rough.
8	Potholes developing	Pavement breaking up
9	Heaving due to excessive moisture in base	Distorts entire surface

PAVEMENT CONDITION INDEX (PCI)		
PCI	**Characterization**	**Description**
10	General breakup of surface	General breakup of surface

An inspection indicating a PCI of 4 or greater for designated areas of the Site will require maintenance. The intent is that repairs should be completed before the pavement degrades beyond a PCI of 4. MDE will be notified in a timely manner of any repairs that are the result of a PCI of 4 or greater. The notification will include documentation of the conditions being repaired and the location of the repair.

Designated Landscaped Area Inspections

The planned Site redevelopment includes landscaped areas primarily along the site perimeter. In designated landscaped areas, as identified in the RAP, capping will include an MDE-approved geotextile fabric beneath a minimum two-foot thick clean fill and top soil layer. The designated landscaped areas will be maintained to ensure the integrity of the cap.

Landscape Inspection Protocol

Inspections will be performed by traversing the designated landscaped areas and observing the surface conditions. Landscaped areas will be inspected to evaluate the condition of the plants, signs of animal burrows, erosion, or other features that may compromise the cap integrity. If plants need to be replaced, they will be replaced with shallow-rooted species whose root systems will not penetrate beyond the cap thickness. Alternatively, an excavation notification may be submitted to the MDE VCP for review and approval to extend the cap thickness in the area of the plants to allow for deeper-rooted species. The extended cap thickness will encompass the maximum anticipated root depth of the plant(s).

When inspections indicate that capped landscaped areas are in need of repair, repairs will be completed as soon as practically possible and in compliance with the MDE deed restriction. A form similar to the attached example Landscape Inspection Form will be used to document the results of each inspection, the recommended maintenance actions, and the actual maintenance/repair implemented. The responsible party will maintain inspection forms and any resulting repair records. MDE will be notified in a timely manner if damage to the capped landscaped area(s) exceeds one foot in diameter and/or two feet in depth.

PAVEMENT INSPECTION FORM	Sub-Parcel A3-1 Former Sparrows Point Steel Mill
Date:	Time:
Weather Conditions:	
General Pavement Conditions:	

PCI		Characterization	Description
1		New crack-free surface	Black in color, smooth texture
2		Oxidation has started	Short hairline cracks start to develop; dark gray color
3		Oxidation in advanced state	Hairline cracks are longer and wider; gray in color
RESPONSE REQUIRED	4	Oxidation complete	Crack area 0.25 inch wide and crack lines have found base faults
	5	Moisture penetrating through 0.25-inch cracks; loose material, stone and sand,evident	Texture of surface becoming rough; preventative maintenance
	6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter lines
	7	Potholes develop in low spots	Gatoring areas begin to break up; overall texture very rough
	8	Potholes developing	Pavement breaking up
	9	Heaving due to excessive moisture in base	Distorts entire surface
	10	General breakup of surface	General breakup of surface

PAVEMENT INSPECTION FORM	Sub-Parcel A3-1 Former Sparrows Point Steel Mill
CURB CONDITION	☐ Exists ☐ Sound ☐ Cracked ☐ Root Intrusion ☐ Deteriorated Comments: _____
SIDEWALK CONDITION	Comments: _____
RESPONSE REQUIRED	
WORK COMPLETED	
PHOTOGRAPHS / FIGURES ATTACHED	
RESPONSE CONTRACTOR	Work Completed By: _____ Date: Signature:

LANDSCAPE INSPECTION FORM	Sub-Parcel A3-1 Former Sparrows Point Steel Mill
Date:	Time:
Weather Conditions:	
General Landscaping Description:	

GENERAL LANDSCAPE CONDITION	☐ Sound ☐ Erosion ☐ Root Intrusion ☐ Healthy Plant Condition ☐ Signs of Mortality ☐ Animal Burrows
GROUND COVER	☐ Dry ☐ Damp ☐ Wet Comments: _____
TREES	☐ Exists ☐ Healthy ☐ Poor Health ☐ Dead ☐ Fallen Comments: _____
SHRUBS	☐ Exists ☐ Healthy ☐ Poor Health ☐ Dead ☐ Fallen Comments: _____
EROSION	☐ Exists ☐ Slight ☐ Moderate ☐ Significant Comments: _____
HOLES	☐ Exists Depth of Holes: _____ Comments: _____

LANDSCAPE INSPECTION FORM	Sub-Parcel A3-1 Former Sparrows Point Steel Mill
RESPONSE REQUIRED	
WORK COMPLETED	
PHOTOGRAPHS / FIGURES ATTACHED	
RESPONSE CONTRACTOR	Work Completed By: _____ Date: Signature: