RESPONSE AND DEVELOPMENT WORK PLAN

AREA A: SUB-PARCEL A8-3
TRADEPOINT ATLANTIC
SPARROWS POINT, MARYLAND

Prepared For:

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1.0 INTRODUCTION

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic, has prepared this Response and Development Work Plan (RADWP) for a portion of the Tradepoint Atlantic property that has been designated as Area A: Sub-Parcel A8-3 (the Site). Tradepoint Atlantic submitted a letter (dated September 16, 2021; **Appendix A**) requesting an expedited plan review to achieve construction deadlines for the proposed development on this Site. As shown on **Figure 1**, Sub-Parcel A8-3 consists of approximately 3.36 acres located within Parcel A8 of the approximately 3,100-acre former steel plant property.

Sub-Parcel A8-3 is slated for development and occupancy as a truck scan station. The scan station will include four pits that will house the truck scan equipment. Associated water lines, electric lines, and sanitary sewer lines are also proposed. The planned development activities will generally include paving, installation of utilities, and installation of vaults housing the scanning equipment. Subsequent site-use will involve workers in an on-site trailer, and truck drivers entering and leaving the Site.

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 (MDE), 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 (USEPA), effective November 25, 2014.

Sub-Parcel A8-3 is part of the acreage that was removed (Carveout Area) from inclusion in the Multimedia Consent Decree between Bethlehem Steel Corporation, the USEPA, and the MDE (effective October 8, 1997) as documented in correspondence received from USEPA on September 12, 2014. Based on this agreement, USEPA determined that no further investigation or corrective measures will be required under the terms of the Consent Decree for the Carveout Area. However, the SA reflects that the property within the Carveout Area will remain subject to the USEPA's Resource Conservation and Recovery Act (RCRA) Corrective Action authorities.

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

In consultation with the MDE, 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 MDE and Tradepoint Atlantic agree that the Controlled Hazardous Substance (CHS) Act (Section 7-222 of the Environment Article) and the CHS Response Plan (Code of Maryland Regulations (COMAR) 26.14.02) shall serve as the governing statutory and regulatory authority for completing the development activities on Sub-Parcel A8-3 and complement the statutory requirements of the VCP (Section 7-501 of the Environment Article). Upon submission of a RADWP and completion of any remedial activities for the sub-parcel, the MDE shall issue a No Further Action Letter (NFA) 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 RADWP are implemented and a NFA 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 cleanup and redevelopment activities described in the RADWP, 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 RADWP.

This RADWP provides a Site description and history; summary of environmental conditions identified by the Phase I Environmental Site Assessment (ESA); summary of relevant findings and environmental conditions identified by the relevant Phase II Investigations; a human health Screening Level Risk Assessment (SLRA) conducted for the identified conditions; and any necessary engineering and/or institutional controls to facilitate the planned development and address the impacts and potential human health exposures. These controls include work practices and applicable protocols that are submitted for approval to support the development and use of the Site. Engineering/institutional controls approved and installed for this RADWP shall be described in closure certification documentation submitted to the MDE demonstrating that exposure pathways on the Site are addressed in a manner that protects public health and the environment.

Portions of Parcel A8 have been previously developed under the Sub-Parcel A8-1 RADWP (Revision 0 dated February 15, 2018; as amended by the RADWP Addendum dated October 11, 2018 and two Comment Response Letters dated November 14, 2018 and February 18, 2019) and Sub-Parcel A8-2 RADWP (Revision 1 dated September 15, 2020; as amended by three addenda

dated May 22, 2020, September 7, 2021, and September 20, 2021). The Sub-Parcel A8-1 Development Area consists of 4.3 acres in the northwestern section of Parcel A8 and includes one new industrial structure, totaling approximately 95,000 square feet, and associated access drives. Sub-Parcel A8-2 consists of 5.36 acres located primarily in the center of Parcel A8, with an access road extending to the northeast into Parcel A15. The Sub-Parcel A8-1 and A8-2 development boundaries are shown on **Figure 2**.

The remainder of Parcel A8 will be addressed in separate development plans in accordance with the requirements of the ACO that will include RADWPs, if necessary. This work will include assessments of risk and, if necessary, RADWPs to address unacceptable risks associated with future land use.

2.0 SITE DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

The Sub-Parcel A8-3 development project consists of approximately 3.36 acres comprising most of the southern portion of Parcel A8 (**Figure 3**). A small portion of the Site also extends into Parcel A15. The development will include construction of a truck scan station. The Site is currently zoned Manufacturing Heavy-Industrial Major (MH-IM), and is currently used to stage vehicles. There is no groundwater use on-site or within the surrounding Tradepoint Atlantic property.

Ground surface elevation at the Site is approximately 12 feet above mean sea level (amsl) and is generally flat. According to Figure B-2 of the property Stormwater Pollution Prevention Plan (SWPPP) Revision 8 dated April 30, 2020, runoff from the Site appears to be collected in the adjacent Industrial Water Reservoir to the east, which is designated as Parcel A15.

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 southern portion of Parcel A8 was formerly occupied by several buildings making up the Oxygen Plant (also referred to as the Air Products Facility). The Oxygen Plant was an air separation unit. This facility supplied oxygen and nitrogen gas to the steel mill during its operation. Pure gases were separated from air by first cooling it until it liquefied, then selectively distilling the components at their various boiling temperatures. After its closure, equipment was salvaged from the facility and the buildings were demolished. Concrete building slabs remain on grade.

3.0 ENVIRONMENTAL SITE ASSESSMENT RESULTS

3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT 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 in 1991 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 VSI is regularly cited in DCC Report.

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 were identified at the Site from information presented in the Phase I ESA:

Exposed Cold Box Insulation (REC 11A, Finding 242):
When the Air Products Facility was abandoned, partial demolition occurred, and cold boxes were cut open. The friable insulation of the cryogenic cold boxes was thought to contain asbestos. Subsequent testing of the cold box insulation during demolition revealed no evidence of asbestos. Waste characterization testing of the cold box insulation indicated the insulation waste to be non-hazardous. However, the testing identified non-friable asbestos in some of the building materials (siding, floor tile, roofing, etc.).

Oily Surface Water Discharge (REC 11B, Finding 243):
During a site visit by Weaver Boos, oily surface water was observed on the Industrial Water Reservoir in the discharge area from a pipe leading from beneath the Air Products Facility. Booms had been placed around the discharge pipe, although oil was observed on both sides of the booms.

Relevant SWMUs and AOCs were also identified as located on Figure 3-1 from the DCC Report. This figure generally shows the SWMUs, AOCs, and main facility areas within the property boundaries. There were no SWMUs or AOCs identified within the Sub-Parcel A8-3 boundary.

3.2 PHASE II INVESTIGATION RESULTS – SUB-PARCEL A8-3

Phase II Investigations specific to soil and groundwater conditions were performed for the property area including Sub-Parcel A8-3 in accordance with the requirements outlined in the ACO as further described in the following agency-approved Parcel A8 Phase II Investigation Work Plan (Revision 3) dated October 23, 2015.

All soil samples and groundwater samples were collected and analyzed in accordance with agency-approved protocols during the Phase II Investigation, the specific details of which can be reviewed in the agency-approved Work Plan. The Phase II Investigation was developed to target specific features which represented a potential release of hazardous substances and/or petroleum products to the environment, including RECs, SWMUs, and AOCs, as applicable, as well as numerous other targets identified from former operations that would have the potential for environmental contamination. Samples were also collected at site-wide locations to ensure full coverage of each investigation area. The full analytical results and conclusions of the investigation have been presented to the agencies in the Parcel A8 Phase II Investigation Report (Revision 1) dated November 6, 2017.

This RADWP summarizes the relevant soil and groundwater findings from these Phase II Investigation with respect to the proposed development of Sub-Parcel A8-3.

3.2.1 Phase II Soil Investigation Findings

Based on the scope of development for Sub-Parcel A8-3, 14 soil samples collected from five soil borings were included in this evaluation of the Sub-Parcel. The five boring locations are shown on **Figure 4**, and the samples obtained from these borings provided relevant analytical data for discussion of on-site conditions.

Soil samples collected during the Phase II Investigation were analyzed for the Target Compound List (TCL) semi-volatile organic compounds (SVOCs) and polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbon (TPH) diesel range organics (DRO) and gasoline range organics (GRO), Oil & Grease, Target Analyte List (TAL) metals, hexavalent chromium, and cyanide. Shallow soil samples (0 to 1 foot below ground surface (bgs)) were also analyzed for polychlorinated biphenyls (PCBs). Samples from any depth interval with a sustained photoionization detector (PID) reading above 10 ppm were also analyzed for TCL volatile organic compounds (VOCs). The laboratory Certificates of Analysis (including Chains of Custody) and Data Validation Reports (100% validated soil data) are included as electronic attachments. The Data Validation Reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

Soil sample results were screened against the Project Action Limits (PALs) established in the property-wide Quality Assurance Project Plan (QAPP) (Revision 3 dated April 5, 2016), or based

on other direct agency guidance. Several PALs have been adjusted based on revised toxicity data published by the USEPA (May 2021). **Table 1** and **Table 2** provide summaries of the detected organic compounds and inorganics in the soil samples collected from the five soil borings relevant for this Site evaluation. **Figure 5** presents the soil sample results that exceeded the PALs among these soil borings. PAL exceedances consist of one inorganic parameter (arsenic).

Evidence of non-aqueous phase liquid (NAPL) was observed at one Phase II soil boring location: A8-017-SB. A temporary NAPL screening piezometer was installed at this location to identify the presence of NAPL on the water table. Contingency measures to address the presence of NAPL which could be encountered during construction are addressed in subsequent sections of this RADWP.

3.2.2 Phase II Groundwater Investigation Findings

Groundwater conditions were also investigated in accordance with the referenced Phase II Investigation Work Plan. During these Phase II Investigation, groundwater samples were obtained from four temporary groundwater sample collection points (piezometers) in close proximity to Sub-Parcel A8-3. An additional six piezometers were installed as part of the A8 Chlorinated Volatile Organic Compound (CVOC) Supplemental Investigation, as described in the Investigation Report dated January 22, 2020. The 10 groundwater points which provided relevant site-wide analytical data for the proposed development are shown on **Figure 6**. There is no direct exposure risk for future Composite Workers at the Site because there is no use of groundwater on the Tradepoint Atlantic property; however, groundwater could potentially be encountered in the sub-parcel during some construction tasks.

The groundwater samples collected from piezometers were analyzed for TCL-VOCs, TCL-SVOCs, TAL-dissolved metals, Oil & Grease, TPH-DRO/GRO, total and/or dissolved hexavalent chromium, and total and/or available cyanide based on the parcel-specific sampling plans for Parcel A8. The laboratory Certificates of Analysis (including Chains of Custody) and relevant Data Validation Reports are included as electronic attachments. The Data Validation Reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

The Phase II Investigation groundwater results were screened against the PALs established in the property-wide QAPP (Revision 3 dated April 5, 2016), or based on other direct agency guidance (e.g., TPH). **Table 3** and **Table 4** provide a summary of the detected organic compounds and inorganics in the groundwater samples submitted for laboratory analysis, and **Figure 7** presents the groundwater results that exceeded the PALs. Similar to the evaluation of soil data, the PALs for relevant PAHs have been adjusted upward based on revised toxicity data published in the USEPA RSL Resident Tapwater Table. PAL exceedances in the groundwater samples collected from piezometers in the vicinity of the proposed development project consisted of six VOCs (1,1-dichloroethane, 1,1-dichlorethene, benzene, chloroform, trichloroethene, and vinyl chloride), five SVOCs (1,1-biphenyl, 1,4-dioxane, 2, methylnaphthalene, benz[a]anthracene, and naphthalene),

TPH-DRO, Oil & Grease, and five metals (arsenic, cobalt, manganese, vanadium, and hexavalent chromium).

Each groundwater collection point was also inspected for evidence of NAPL using an oil-water interface probe prior to sampling. NAPL was identified in the NAPL piezometers A8-017-PZ and A8-017F-PZ. Following these NAPL observations, the piezometers were replaced with permanent NAPL monitoring wells SW-098-MWS and SW-099-MWS at these two locations and subsequently gauged monthly. NAPL has not been observed at these locations since May 2020. Therefore, NAPL monitoring activities at these locations have concluded per MDE instruction (via email dated September 20, 2021) as documented in the NAPL Gauging Completion Letter dated November 15, 2021.

Vapor intrusion (VI) risks were evaluated for each piezometer as summarized in **Table 5**. A cumulative risk assessment of each individual sample location indicated that six locations exceeded the allowable limit for cumulative VI non-cancer hazards and/or cumulative cancer risks. No structures are proposed as part of this development, so there are no vapor intrusion risks to future Composite Workers. If buildings are ever proposed in the future at the Site, a RADWP Addendum will re-evaluate VI risk.

3.2.3 Locations of Potential Concern

As noted above, groundwater data were screened to determine whether any sample results exceeded the USEPA Vapor Intrusion Target Cancer Risk (TCR; carcinogen) or Target Hazard Quotient (THQ; non-carcinogen) Screening Levels. Several individual sample results exceeded the VI TCR and/or THQ criteria. The VI risk evaluation results are summarized in **Table 5**.

Other locations of potential concern which are subject to special requirements could include elevated lead, PCBs, or TPH/Oil & Grease in soil. The soil data for Sub-Parcel A8-3 were evaluated to determine the presence of any such locations of potential concern including: lead concentrations above 10,000 mg/kg, PCB concentrations above 50 mg/kg, or TPH/Oil & Grease concentrations above 6,200 mg/kg. There were no soil concentrations of lead, PCBs, or TPH/Oil & Grease above the specified criteria.

Locations with physical evidence of NAPL are also considered to be locations of potential concern with respect to proposed development. One soil boring (A8-017-SB) had visual observations of NAPL. The extent of NAPL in this area was subsequently delineated with a NAPL piezometer network. NAPL was identified in two piezometers (A8-017-PZ and A8-017F-PZ) as shown on **Figure 8**, which were subsequently converted into permanent NAPL monitoring wells SW-098-MWS and SW-099-MWS. NAPL has not been observed in these monitoring wells since May 2020.

3.3 HUMAN HEALTH SCREENING LEVEL RISK ASSESSMENT

3.3.1 Analysis Process

A human health Screening Level Risk Assessment (SLRA) has been completed based on the analytical data obtained from the characterization of surface and subsurface soils. The SLRA was conducted to evaluate the existing soil conditions to determine if any response measures are necessary. It should be noted that industrial fill including processed slag aggregate or MDE approved recycled concrete sourced from the Tradepoint Atlantic property will be used at the Site; therefore, regardless of the findings of the Composite Worker baseline SLRA, Sub-Parcel A8-3 will be subject to surface engineering controls (i.e., capping) unless separate approvals are received from the MDE following appropriate laboratory testing of the industrial fill materials.

The SLRA included the following evaluation process:

Identification of Exposure Units (EUs): The SLRA was evaluated using a single site-wide EU (EU1) with an area of 3.36 acres. Risk for both the Composite Worker and Construction Worker were evaluated using the same EU.

Identification of Constituents of Potential Concern (COPCs): For the project-specific SLRA, COPC screening was completed assuming a Target Risk (TR) of 1E-6 and Target Hazard Quotient (THQ) of 0.1. The initial screening also identified parameters detected at a frequency greater than 5%. Based on that data set, parameters were identified as COPCs if:

- The compound was detected in soil at a frequency of greater than 5%;
- The maximum detection exceeded the USEPA's Composite Worker Soil Regional Screening Levels (RSLs).

A COPC screening analysis is provided in **Table 6** to identify all compounds above the relevant screening levels.

All aroclor mixtures (e.g., Aroclor 1248, Aroclor 1260) are taken into account for the reported concentrations of total PCBs. The total PCBs concentrations are used to evaluate the carcinogenic risk associated with PCBs.

Exposure Point Concentrations (EPCs): Due to the limited number of relevant soil sample locations within the EU, the maximum detection values were used as the EPCs for each COPC. For lead, the arithmetic mean for each depth was calculated for comparison to the Adult Lead Model (ALM) based values.

Risk Ratios: The surface soil EPCs, subsurface soil EPCs, and pooled soil EPCs were compared to the USEPA RSLs for the Composite Worker. Risk ratios were calculated with a cancer risk of 1E-6 and a non-cancer Hazard Quotient (HQ) of 1. The risk ratios for the carcinogens were summed to develop a screening level estimate of the baseline 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 baseline cumulative non-cancer Hazard Index (HI).

For the Construction Worker, site-specific risk-based evaluations were completed for a range of potential exposure frequencies to determine the maximum allowable exposure frequency for the site-wide EU that would result in risk ratios equivalent to a cumulative cancer risk of 1E-5 or HI of 1 for the individual target organs. This analysis indicated that the allowable exposure frequency before additional worker protections or more detailed job safety evaluations might be needed is 50 days.

There is no potential for direct 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 management 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 the site-wide 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 ALM values (ALM Version dated 6/21/2009 updated with the 5/17/2017 OLEM Directive) with inputs of 1.8 for the geometric standard deviation and a blood baseline lead level of 0.6 ug/dL. The ALM calculation generates a soil lead concentration of 1,050 mg/kg, which is the most conservative (i.e., lowest) concentration which would yield a probability of 5% of a blood lead concentration of 5 ug/dL. If the arithmetic mean concentrations for the EU were below 1,050 mg/kg, the EU was identified as requiring no further action for lead. The lead averages are presented for surface, subsurface, and pooled soils in **Table 7**. Neither surface, subsurface, nor pooled soils exceeded an average lead concentration of 800 mg/kg.

Assessment of TPH/Oil & Grease: EPCs were not calculated for TPH/Oil & Grease. Instead, the individual results were compared to the PAL set to a HQ of 1 (6,200 mg/kg). No relevant soil boring locations exceeded this threshold. Physical evidence of NAPL was identified at A8-017-SB. Contingency measures to address the potential presence of NAPL which could be encountered during construction are addressed in subsequent sections of this RADWP.

Risk Characterization Approach: Generally, if the baseline risk ratio for each non-carcinogenic COPC or cumulative target organ does not exceed 1, 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. 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. 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. For the Construction Worker, cumulative cancer risks exceeding 1E-5 (but less than or equal to 1E-4) or HI values exceeding 1 will be mitigated via site-specific health and safety requirements.

It should be noted that industrial fill including processed slag aggregate and MDE approved recycled concrete sourced from the Tradepoint Atlantic property will be used at the Site; therefore, regardless of the findings of the Composite Worker baseline assessment, Sub-Parcel A8-3 will be subject to surface engineering controls (i.e., capping) unless separate approvals are received from the MDE following appropriate laboratory testing of the industrial fill materials. The goal of the SLRA is therefore to determine whether additional response actions beyond capping may be needed due to current conditions at the Site.

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 any non-carcinogen HI 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.

3.3.2 SLRA Results and Risk Characterization

Soil data were divided into three datasets (surface, subsurface, and pooled) for Sub-Parcel A8-3 to evaluate potential exposure scenarios. Due to potential future grading activities including cut and fill which may be implemented during development at the Site, each of these potential exposure scenarios is relevant for the SLRA.

As noted above, EPCs were determined based on maximum values for each soil dataset (i.e., surface, subsurface, and pooled soils) in the site-wide EU. The EPCs for the surface, subsurface, and pooled exposure scenarios are provided in **Table 8**.

The EPCs for lead are the average (i.e., arithmetic mean) values for each dataset. A lead evaluation spreadsheet, providing the computations to determine lead averages for each dataset, is also included as an electronic attachment. The average and maximum lead concentrations are presented for each dataset in **Table 7**, which indicates that neither surface, subsurface, nor pooled soils exceeded an average lead concentration of 800 mg/kg.

Composite Worker Assessment:

Risk ratios for the estimates of potential EPCs for the Composite Worker baseline scenario prior to the placement of industrial fill at the Site are shown in **Table 9** (surface), **Table 10** (subsurface), and **Table 11** (pooled). The results are summarized as follows:

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Composite Worker	EU1 (3.36 acres)	Surface Soil	none	3E-6
		Subsurface Soil	none	9E-6
		Pooled Soil	none	9E-6

Based on the risk ratios for Sub-Parcel A8-3, capping is not necessary to be protective of future Composite Workers for the surface, subsurface, and pooled exposure scenarios. None of the cancer risk values exceeded 1E-5 and none of the non-carcinogenic HI values exceeded 1. However, MDE approved recycled concrete and slag aggregate will be used as the primary fill material and pavement subbase at the Site. Therefore, environmental capping will be required to be protective of future Composite Workers.

Construction Worker Assessment:

Ground intrusive activities which could result in potential Construction Worker exposures are expected to be limited primarily to utility and vault installation tasks performed by specific work crews. Construction Worker risks were evaluated for several different exposure scenarios to determine the maximum exposure frequency for the site-wide EU1-EXP that would result in risk ratios equivalent to a cumulative cancer risk of 1E-5 or HI of 1 for any individual target organ. Risk ratios for the Construction Worker scenario using the selected duration (50 days) are shown in **Table 12** (surface), **Table 13** (subsurface), and **Table 14** (pooled). The variables entered for calculation of the site-specific Construction Worker SSLs (EU area, input assumptions, and exposure frequency) are indicated as notes on the tables. The spreadsheet used for computation of the site-specific Construction Worker SSLs is included as **Appendix B**. The results are summarized as follows:

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Construction Worker	EU1 (3.36 acres) (50 exposure days)	Surface Soil	none	1E-7
		Subsurface Soil	none	4E-7
		Pooled Soil	none	4E-7

Using the selected exposure duration for the site-wide EU (50 days), the carcinogenic risks were all less than 1E-5, and none of the non-carcinogens caused a cumulative HI to exceed 1 for any target organ system. These findings are below the acceptable limits for no further action established by the agencies. This evaluation indicates that additional site-specific health and safety requirements (beyond standard Level D protection) would be required only if the allowable exposure duration of 50 days were to be exceeded for an individual worker.

Certain activities at the Site may exceed the allowable duration; if so, then Construction Worker risks must be mitigated to facilitate the proposed construction work. At that point additional site-specific health and safety requirements are warranted to be protective of workers. Upgraded Personal Protective Equipment (PPE) beyond standard Level D protection will be used for the entire scope of intrusive work covered by this RADWP as a protective measure to ensure that there are no unacceptable exposures for Construction Workers during project implementation. The modified Level D PPE requirements which will be applied immediately and throughout this project, including specific PPE details, planning, tracking/supervision, enforcement, and documentation, are outlined in the PPE Standard Operational Procedure (SOP) provided as **Appendix C**.

Institutional controls will be required to be established for the protection of future Construction Workers in the event of any future long-term construction projects which could include intrusive activities. The anticipated institutional controls, including notification requirements, health and safety requirements, and materials management requirements, are specified in Section 5.4.

3.3.3 Evaluation of RCRA Criteria

Tradepoint Atlantic will be using industrial fill (including processed slag aggregate and MDE approved recycled concrete) throughout the Site. Therefore, environmental capping is required within the development area to mitigate potential Composite Worker risks. The entirety of the Site (3.36 acres) will therefore require a remedy of capping with institutional controls to mitigate potential Composite Worker risks.

Site-specific health and safety controls will be implemented to mitigate Construction Worker risks within the sub-parcel. This includes using modified Level D PPE. The modified Level D PPE requirements will be implemented throughout the project duration in accordance with the PPE SOP provided as **Appendix C**. Institutional controls will also be required to be established for the protection of future Construction Workers in the event of any future long-term construction projects which could include intrusive activities.

The proposed VCP capping remedy with institutional controls was evaluated for consistency with the RCRA Threshold Criteria and Balancing Criteria. The Threshold Criteria assess the overall protection of human health and the environment, the achievement of media cleanup objectives, and the 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 potentially impacted materials in place. The capping and institutional control remedy would eliminate risk to current and future industrial workers by preventing exposure to areas of the Site where processed slag aggregate and MDE approved recycled concrete has been placed or where soil concentrations 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 objective, which is risk reduction, appropriate for the expected current and reasonably anticipated future land use. The objective is 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.

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 conditions observed at the Site. The control measures included with 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 future 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 slag aggregate, treatment residuals, and/or untreated wastes. The proposed capping remedies have been proven to be effective in the long-term at similar sites with similar conditions. The capping remedy will permanently contain the slag aggregate and other potentially contaminated media in place. In order for the cap to effectively act as a barrier, regular inspections will be performed pursuant to the Institutional Control Operations and Maintenance Plan (O&M Plan).

Institutional controls will be implemented to protect future Composite and Construction Workers against inadvertent contact with potentially impacted media. The anticipated institutional controls are specified in Section 5.4. The Tenant will be required to sign onto the Environmental Covenant with restriction in the NFA. The proposed remedy will maintain protection of human health and the environment over time by controlling exposures to the hazardous constituents potentially remaining in slag aggregate or existing on-site media. 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, land and 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 unsaturated zone from carrying contaminants to the groundwater. Thus, the mobility of contaminants will be reduced by the capping remedy.

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 risks to the Construction Worker during remedy implementation are mitigated by executing the modified Level D PPE requirements outlined in **Appendix C**. The short-term risk to site workers following these upgraded health and safety measures 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 to be protective of site visitors.

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 for the Composite Worker area will use readily available, typically acceptable, and proven technologies.

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 remedial costs would be incurred as part of the proposed site development, regardless of the findings of the SLRA.

State/Support Agency Acceptance: The 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.

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

4.0 PROPOSED SITE DEVELOPMENT PLAN

Tradepoint Atlantic is proposing to construct a truck scan station on Sub-Parcel A8-3. The proposed development will include permanent improvements on approximately 3.36 acres of land intended for occupancy. The proposed future use of Sub-Parcel A8-3 is Tier 3 – Industrial. The remainder of Parcel A8 will be addressed in separate development plans in accordance with the requirements of the ACO that will include RADWPs, if necessary. The Site will be fully paved.

Certain compounds are present in the soils located near the surface and in the subsurface at concentrations in excess of the PALs. Therefore, soil is considered a potential media of concern. Potential risks to future adult workers associated with impacts to soil and groundwater exceeding the PALs will be addressed through a remedy consisting of surface engineering controls (capping of the entire area) and institutional controls (deed restrictions). The development plan provides for a containment remedy and institutional controls that will mitigate future adult workers from contacting impacted soil at the Site. In addition, Tradepoint Atlantic has proposed the use of processed slag aggregate and MDE approved recycled concrete as the primary fill material and pavement subbase at the Site. The placement of materials other than approved clean fill, such as slag aggregate, requires the installation of surface engineering controls regardless of the existing soil conditions.

Future Construction Workers may contact impacted surface and/or subsurface soil during earth movement activities associated with construction activities, including within the temporary external construction worker areas outside of the primary development area. The findings of the Construction Worker SLRA indicated that using the site-specific 50-day exposure frequency for the site-wide EU1, the screening level estimates of Construction Worker cancer risk were less than 1E-5 and no HI values above 1 were identified for any target organ system (the acceptable thresholds for no further action).

Certain activities at the Site may exceed the allowable duration; if so, then Construction Worker risks must be mitigated to facilitate the proposed construction work. At that point additional site-specific health and safety requirements are warranted to be protective of workers. Upgraded PPE beyond standard Level D protection will be used in conjunction with the property-wide Health and Safety Plan (HASP) for the entire scope of intrusive work covered by this RADWP as a protective measure to ensure that there are no unacceptable exposures for Construction Workers during project implementation. The modified Level D PPE requirements which will be applied throughout this project, including specific PPE details, planning, tracking/supervision, enforcement, and documentation, are outlined in the PPE SOP provided as **Appendix C**.

A restriction prohibiting the use of groundwater for any purpose at the Site will be included as an institutional control in the NFA and COC issued by the MDE, and a deed restriction prohibiting the use of groundwater will be filed. The groundwater use restriction will protect future Composite Workers from potential direct exposures. Proper water management is required to prevent

unacceptable discharges or risks to Construction Workers during development. Work practices and health and safety plans governing groundwater encountered during excavation activities will provide protection for Construction Workers involved with development at the Site.

The development plan for the Site is shown included as **Appendix D**. The process of constructing the proposed scan station will involve the tasks listed below. Documentation of the outlined tasks and procedures will be provided in a Sub-Parcel A8-3 Development Completion Report.

4.1 RESPONSE PHASE – GROUNDWATER NETWORK RETENTION

Permanent groundwater monitoring wells SW-098-MWS and SW-099-MWS, shown on **Figure 6**, are located inside of the development boundary and will be retained for future long-term monitoring. No groundwater network abandonment is necessary as part of this development.

4.2 DEVELOPMENT PHASE

4.2.1 Erosion and Sediment Control Installation

Installation of erosion and sediment controls will be completed in accordance with the requirements of the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control prior to any construction at the Site.

4.2.2 Grading and Site Preparation

As indicated on the development plans in **Appendix D**, minimal grading activities are expected to occur within the Sub-Parcel A8-3 boundary. Any material generated during vault installation 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. Borrow materials will be obtained from MDE-approved sources and will be documented prior to transport to the Site. Processed slag aggregate and MDE approved recycled concrete sourced from the Tradepoint Atlantic property will be used as fill. Any fill sources shall be free of organic material, frozen material, or other deleterious material. In the case that there is excess material (not anticipated), the spoils will be stockpiled at a suitable location and dealt with in accordance with the Materials Management Plan (MMP) for the Sparrows Point Facility (Jenkins Environmental, Inc., August 17, 2021). This work will be coordinated with MDE accordingly. No excess material will leave the 3,100-acre property without prior approval from MDE.

4.2.3 Installation of Structures and Underground Utilities

The scan stations and other infrastructure associated with the development of Sub-Parcel A8-3 will be installed as shown on the drawings in **Appendix D**. Soil removed from utility trenches cannot be used as fill within the utility trenches unless such materials are approved for this use by the VCP. Additional protocols for the installation of utilities at the Site are provided in Section 5.1.2. Any water removed will be sampled (if necessary) as described in Section 5.2 and (if acceptable)

sent to the on-site Humphrey Creek Wastewater Treatment Plant (HCWWTP).

4.2.4 Paving

The entirety of the Site will be covered by paving as indicated in the development plans provided in **Appendix D** and shown on **Figure 10**. The paved areas will receive a layer of subbase material which will consist of compacted aggregate base, which may include processed slag aggregate sourced from the Tradepoint Atlantic property. The placement of processed slag aggregate or materials other than MDE approved clean fill will necessitate that the Site will be subject to surface engineering controls (i.e., capping). The required minimum thicknesses of all site-wide pavement sections which will serve as surface engineering controls are shown in the minimum capping section details provided in **Appendix E**. According to the development plans, all paved areas at the Site will be installed with a minimum of 4 inches of compacted aggregate base and a minimum of 4 inches of overlying pavement surface (asphalt or concrete), which meet these required minimum thicknesses.

4.2.5 Stormwater Management

No new stormwater infrastructure is proposed to be installed at the Site. Tradepoint Atlantic is working with the MDE Industrial & General Permits Division to renew the property-wide NPDES permit. The stormwater management systems for each parcel are reviewed and approved by Baltimore County for each individual development project.

5.0 DEVELOPMENT IMPLEMENTATION PROTOCOLS

5.1 DEVELOPMENT PHASE

This plan presents protocols for the handling of soils and fill materials in association with the development of Sub-Parcel A8-3. 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 USEPA'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 potential risks from such materials remaining on-site during the development phase. There were no locations in the proposed Site boundary with soil exceedances of the special management criteria for PCBs (50 mg/kg), lead (10,000 mg/kg), or TPH/Oil & Grease (6,200 mg/kg). As noted above, NAPL was identified at soil boring location (A8-017-SB) and was observed at NAPL monitoring points SW-098-MWS and SW-099-MWS. NAPL has not been observed at these locations since May 2020.

Following completion of the SLRA, the findings of the Construction Worker evaluation indicated that using the site-specific 50-day exposure frequency for the site-wide EU, the screening level estimates of Construction Worker cancer risk were less than 1E-5 and no HI values above 1 were identified for any target organ system (the acceptable thresholds for no further action). Certain activities at the Site may exceed the allowable duration of 50 days, and if that were the case, Construction Worker risks must be mitigated to facilitate the proposed construction. Upgraded PPE beyond standard Level D protection will be used in conjunction with the HASP for the entire scope of intrusive work covered by this RADWP as a protective measure to ensure that there are no unacceptable exposures for Construction Workers during project implementation. The modified Level D PPE requirements which will be applied throughout this project, including specific PPE details, planning, tracking/supervision, enforcement, and documentation, are outlined in the PPE SOP provided as **Appendix C**.

Based on the characterization of surface and subsurface soils and the associated SLRA findings, surface engineering controls are an acceptable remedy to be protective of future adult Composite Workers at the Site. In addition, Tradepoint Atlantic has proposed the use of processed slag aggregate and MDE approved recycled concrete as the primary fill material and pavement subbase at the Site. The placement of materials other than approved clean fill, such as slag aggregate, requires the installation of surface engineering controls (i.e., capping) regardless of the existing soil conditions. The proposed capping sections will meet the required minimum thicknesses for surface engineering controls, which are provided in **Appendix E**.

5.1.1 Erosion/Sediment Control

Erosion and sediment controls will be installed prior to commencing work in accordance with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. The erosion and sediment controls will be approved by the MDE. 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 if required.
- 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 silt fence, and sediment traps if applicable, shall be periodically removed and returned to the Site.

5.1.2 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 in potentially contaminated material. This meeting shall include the construction manager and the Environmental Professional (EP) providing oversight on the project. During the meeting, the construction manager and the EP shall review the proposed excavation/trenching locations and any associated utility invert elevations. The construction manager will be responsible for conveying all relevant information regarding excavation/grading and/or utility work to the workers who will be involved with these activities. The HASP and PPE SOP for the project shall also be reviewed and discussed.

The EP will provide oversight of soil excavation/trenching activities as described in Section 5.6. Soil excavation/trenching will occur during various phases of construction. In general, and based on the existing sampling information, all excavated materials are expected to be suitable for replacement on the Site. However, the EP will monitor the soil excavation activities for signs of significantly contaminated material which may not be suitable for reuse (as described below). The EP will also be responsible for monitoring organic vapor concentrations in the worker breathing zone within utility trenches, vaults, and excavations to determine whether any increased level of health and safety protection is required. As specified in the HASP, if organic vapor concentrations measured by the PID exceed 5 ppm above background continuously for a 3-minute period, work must cease for at least 15 minutes and the source must be investigated. If organic vapor concentrations exceed 50 ppm above background, work must stop.

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.

All utility trenches will be backfilled with bedding and backfill materials approved by the MDE for industrial use. A general utility cross section is provided as **Appendix F**. 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 G**) provides protocols to be followed if NAPL is encountered during the construction activities. Preventative measures to inhibit 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. 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 significant contamination. 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 evidence of significant contamination shall be placed in stockpiles (not to exceed 500 cubic yards) on polyethylene sheeting and covered with polyethylene sheeting to minimize potential exposures and erosion when not in use. Materials stockpiled due to evidence of contamination will be sampled in accordance with waste disposal requirements and 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 indications of possible NAPL contamination will also be containerized or placed in a stockpile (not to exceed 500 cubic yards) 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.

5.1.3 Soil Sampling and Disposal

Excavated materials that are determined by the EP to warrant sampling and analysis because of elevated PID readings or other indications of potential contamination 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.

All stockpiled soil may be considered for use as fill at this Site or on other areas of the property depending on the analytical results. A sampling Work Plan including a description of the material, estimated volume, and sampling parameters will be submitted to the MDE for approval. The resulting analytical data will be submitted to the MDE to determine the suitability of the material for reuse. If the MDE determines that the materials are unsuitable for reuse, the materials will be sampled to determine alternative disposal options.

Soil material may be taken to an appropriate non-hazardous landfill (including Greys Landfill) for proper disposal if the concentrations of excavated sampled materials indicate that the materials are not hazardous, but still are not suitable for reuse. 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. The quantities of all materials that require disposal, if any, will be recorded and identified in the Development Completion Report.

5.1.4 Fill

Processed slag aggregate and MDE approved recycled concrete sourced from the Tradepoint Atlantic property will be used as the primary fill material for this project. The placement of processed slag aggregate or materials other than approved clean fill will necessitate that the Site will be subject to surface engineering controls (i.e., capping). Soil excavated on the Sub-Parcel has been determined to be suitable for re-use at the Site below the surface engineering controls (capping), unless such materials are determined by the EP/MDE to be unsuitable for use as outlined in Section 5.1.2 and Section 5.1.3.

All over-excavated utility trenches will be backfilled with bedding and backfill approved by the MDE for industrial use. Soil removed from utility trenches cannot be used as fill within the utility trenches unless such materials are approved for this use by the VCP. As with structural fill, processed slag aggregate and other materials approved for industrial use can be used as backfill in utility trenches if the area will be covered by a VCP cap. Any utility backfill which will extend into the cap (i.e., top 2 feet of backfill in landscaped areas) must meet the VCP clean fill requirements, and a geotextile marker fabric will be placed between the VCP clean fill and any underlying material. Materials permanently placed in areas outside of the Site boundary (i.e., within the temporary external construction worker areas outside of Sub-Parcel A8-3) must meet the VCP clean fill requirements or be otherwise approved by the MDE prior to placement. A general utility detail drawing is provided as **Appendix F**. Material imported to the Site will be screened according to MDE guidance for suitability.

5.1.5 Dust Control

General construction operations, including soil excavation and transport, and trenching for utilities will be performed at the Site. These activities are anticipated to be performed in areas of soil impacted with COPCs. Best management practices should be undertaken at the Sparrows Point

property as a whole to prevent the generation of dust which could impact other areas of the property outside of the immediate work zone. To limit worker exposure to contaminants borne on dust and windblown particulates, visual dust monitoring will be performed in the immediate work zone and at the upwind and downwind perimeter of the Site, and dust control measures will be implemented if warranted based on the monitoring results. The EP will be responsible for the visual dust monitoring program.

The action level proposed for the purpose of determining the need for dust suppression techniques (e.g. watering and/or misting) during the development activities at the Site will be 3.0 mg/m³. The lowest of the site-specific dust action levels, OSHA Permissible Exposure Limits (PELs), and ACGIH Threshold Limit Value (TLV) was selected as the proposed action level.

If persistent dust is observed during development activities, air monitoring will be performed using Met One Instruments, Inc. E-Sampler dust monitors or equivalent real-time air monitoring devices. The EP will conduct dust monitoring in the work area as well as in selected perimeter locations (upwind and downwind boundaries based on the prevailing wind direction predicted for that day). The prevailing wind direction will be assessed during the day, and the positions of the perimeter monitors will be adjusted if there is a substantial shift in the prevailing wind direction. When persistent visual dust is no longer observed, dust monitoring will revert to visual monitoring.

If sustained dust concentrations exceed the action level (3.0 mg/m³) at any of the monitoring locations as a result of conditions occurring at the Site, operations will be stopped temporarily until dust suppression can be implemented. Operations may be resumed once monitoring indicates that dust concentrations are below the action level. The background dust concentration will be utilized to evaluate whether Site activities are the source of the action level exceedance. The background dust concentration will be based on measurements over a minimum of a 1-hour period at the upwind Site boundary. The upwind data will be used to calculate a time weighted average background dust concentration. As noted above, the locations of the perimeter dust monitors may be adjusted periodically if there is a substantial shift in the prevailing wind direction.

As applicable, air monitoring will be conducted during development implementation activities 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 at the upwind and downwind Site boundaries to ensure contaminants are not migrating off-site. The concentration measured at the downwind perimeter shall not exceed the action level of 3.0 mg/m³, unless caused by background dust from upwind of the Site. If exceedances of the action level are identified downwind for more than five minutes, the background dust concentration shall be evaluated to determine whether the action level exceedances are attributable to Site conditions. If on-site activities are the source of the exceedances, dust control measures and additional monitoring will be implemented. The dust suppression measures may include wetting or misting using a hose connected to a water supply or a water truck stationed at the Site.

Dust control measures will be implemented as described above to address dust generated as a result of construction activities conducted at the Site. However, based on the nature of the area and/or ongoing 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 area. A pre-construction meeting will be held to discuss the potential of windblown particulates from other activities impacting the air monitoring required for this RADWP. Site contact information will be provided to address the possibility of upwind dust impacts. If sustained dust is observed above the action level (3.0 mg/m^3) and it is believed to originate from off-site (i.e., upwind) sources, this will immediately be reported to TPA and the MDE-VCP team, as well as the MDE Air and Radiation Administration (ARA).

5.2 WATER MANAGEMENT

This plan presents the protocols for handling any groundwater or surface water that needs to be removed to facilitate construction of the proposed Sub-Parcel A8-3 development.

5.2.1 Groundwater PAL Exceedances

Groundwater samples were collected during the preceding Phase II Investigation and CVOC supplemental investigation from ten temporary piezometers and monitoring wells within and surrounding the Site. Aqueous PAL exceedances in groundwater in the vicinity of the development LOD included both inorganics and organic compounds. The aqueous PAL exceedances obtained during the Investigations are summarized on **Figure 7**. NAPL was also identified at A8-017-PZ and A8-017F-PZ, as summarized on **Figure 8**.

While the concentrations of PAL exceedances are not deemed to be a significant human health hazard for future workers since there is no on-site groundwater use which could lead to direct exposures, proper water management is required during construction to prevent unacceptable discharges or risks to Construction Workers.

5.2.2 Dewatering

Dewatering may be necessary to facilitate the excavations/trenches. **Figure 9** displays the groundwater elevations underlying the Site for the shallow aquifer zone, based on prior investigation data. Groundwater at the Site is at approximately 8 feet amsl and ground surface elevation is at approximately 12 feet amsl. The truck scan station vaults are proposed to extend to a depth of approximately 8 feet bgs, so groundwater will likely be encountered during their installation. If dewatering is required during construction, it shall be done in accordance with all local, state, and federal regulations. Water that collects in excavations/trenches due to intrusion of groundwater, stormwater, and/or dust control waters will be transported to the HCWWTP via the TMC, following any pretreatment, if necessary. The water will be treated and discharged in accordance with NPDES Permit No. 90-DP-0064A; I. Special Conditions; A.4; Effluent Limitations and Monitoring Requirements.

It is the intent that any water that must be removed will be ultimately sent (via pumping or trucking) to the HCWWTP via the TMC, following any pretreatment, if necessary. Water in the TMC feeds into the HCWWTP where it is treated prior to release into Bear Creek. Dewatering fluids will be evaluated and then tested (if required) pursuant to the HCWWTP Constituent Threshold Limits for Dewatering Activities related to Remediation, Development, and Capping Protocol. If the groundwater does not meet the constituent threshold limits specified in the protocol, the groundwater will be pre-treated. Any water discharged to the TMC will be pumped through a filter bag or equivalent to remove suspended solids prior to discharge.

Note that additional analyses could be required if warranted based on field observations by the EP. The EP will inspect any water that collects in the excavations/trenches. If the water exhibits indications of significant contamination (sheen, odor, discoloration, presence of product), the water may be sampled and analyzed for some or all of the analyses listed below. In such case, the analyses run will be dependent on the suspected source of contamination and local site conditions. The EP will oversee oil/water separation and disposal of NAPL as necessary.

The results of the analyses will be reviewed by the HCWWTP operator to determine if any wastewater treatment system adjustments are necessary. If the results of the analyses are above the threshold levels listed below, the water will be further evaluated to confirm acceptable treatment at the HCWWTP, or will be evaluated to design an appropriate pre-treatment option. Alternatively, the water may be disposed of at an appropriate off-site facility.

Analysis	**Threshold Levels**
• Total metals by USEPA Method 6020A	1,000 ppm
• PCBs by USEPA Method 8082	>Non-Detect
• SVOCs by USEPA Method 8270C	1 ppm
• VOCs by USEPA Method 8260B	1 ppm
• Oil & Grease by USEPA Method 1664	200 ppm
• TPH-DRO by USEPA Method 8015B	200 ppm
• TPH-GRO by USEPA Method 8015B	200 ppm

Documentation of any water testing, as well as the selected disposal option, will be reported to the MDE in the Development Completion Report. Any permits or permit modifications related to dewatering will be provided to the agencies as addenda to this RADWP.

The concentration of 1,1-dichloroethene measured in the groundwater sample collected from piezometer A8-007F-PZ (1.44 ppm) exceeds the HCWWTP criterion for VOCs (1 ppm). If any groundwater is removed from the A8-007F-PZ investigation area it will be sampled prior to determining proper disposal methods. Additionally, MDE will be informed of the sampling results and of specific plans for handling the disposal of the groundwater.

5.3 HEALTH AND SAFETY

A property-wide HASP has been developed and is provided with this RADWP (as an electronic attachment) to present the minimum requirements for worker health and safety protection for all development projects. All contractors working on the Site must prepare their own HASP that provides a level of protection at least as much as that provided by the attached HASP. Alternately, on-site contractors may elect to adopt the HASP provided.

General health and safety controls (level D protection) are adequate to mitigate potential risk to Construction Workers conducting ground intrusive activities for a duration of up to 50 exposure days. However, certain ground intrusive activities at the Site (utility installations for specific crews) may exceed the allowable duration. Therefore, modified Level D PPE will be used for the entire scope of intrusive work covered by this RADWP as a protective measure to ensure that there are no unacceptable exposures for Construction Workers during project implementation. Health and safety controls outlined in the HASP and PPE SOP will mitigate any potential risk to Construction Workers from contacting impacted soil and groundwater during development. The modified Level D PPE requirements planned for this development project, including specific PPE details, planning, tracking/supervision, enforcement, and documentation, are outlined in the PPE SOP provided as **Appendix C**. The EP will be responsible for monitoring organic vapor concentrations in the worker breathing zone within the utility trenches, vaults, and excavations to determine whether any increased level of health and safety protection (including engineering controls and/or PPE) is required.

Prior to commencing work, the contractor must conduct an on-site safety meeting for all personnel. All personnel must be made aware of the HASP and the PPE SOP. Detailed safety information shall be provided to personnel who may be exposed to COPCs. Workers will be responsible for following established safety procedures to prevent contact with potentially contaminated material.

5.4 INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS)

Long-term conditions related to future use of the Site will be placed on the RADWP approval, NFA, and 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 the MDE if future development includes a permanent structure at the Site.
- Notice to the MDE at least 30 days prior to any future soil disturbances that are expected to breach the approved capping remedy (i.e., through the pavement cap).
- Notice to the USEPA at least 30 days prior to any future soil disturbances that are expected to breach the approved capping remedy, only if the proposed duration of ground intrusive

activity would exceed the allowable exposure duration determined in the SLRA and the contractor will not use the modified Level D PPE specified in the approved SOP.

- Requirement for a HASP in the event of any future excavations at the Site.
- Complete appropriate characterization and disposal of any material excavated/pumped at the Site in accordance with applicable local, state, and federal requirements.
- Implementation of inspection procedures and maintenance of the containment remedies.

The owner/operator will file the above deed restrictions as defined by the MDE-VCP in the NFA and COC. The Tenant will be required to sign onto the Environmental Covenant with restriction in the NFA. Tradepoint Atlantic will notify the Tenant of this requirement and will provide MDE with contact information for the Tenant prior to issuance of the NFA.

5.5 POST REMEDIATION REQUIREMENTS

Post remediation requirements will include compliance with the conditions specified in the NFA, COC, and the deed restrictions recorded for the Site. Deed restrictions will be recorded within 30 days after receipt of the final NFA. In addition, the MDE and USEPA will be provided with a written notice of any future excavations (as applicable) in accordance with the requirements given in Section 5.5. 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. Written notice may consist of email correspondence and/or hard copy correspondence.

An IC Plan will be submitted for MDE approval and will include institutional control requirements of the Site.

5.6 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 RADWP.

The EP will monitor all soil excavation and utility trenching activities for signs of contamination that may indicate materials that are not suitable for reuse. In particular, soils will be monitored with a hand-held PID for potential VOC impacts, and will also be visually inspected for staining, petroleum waste materials, or other indications of significant contamination. 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 (as described in Section 5.1.2; Soil Excavation and Utility Trenching). The EP will also perform routine periodic breathing zone monitoring and PPE spot checks during ground intrusive activities. The EP will

also inspect any water that collects in the excavations/trenches on an as-needed basis to coordinate appropriate sampling prior to disposal (as described in Section 5.2.2; Dewatering).

Daily inspections, as necessary, will be performed during general site grading and cap construction activities to verify that appropriate fill materials are being used (as described in Section 5.1.4; Fill), dust monitoring and control measures are being implemented as appropriate (as described in Section 5.1.5; Dust Control), the requirements of the HASP and the PPE SOP are being enforced by the designated Site Safety Officer (as described in Section 5.4; Health and Safety), and surface engineering controls are being installed with the appropriate thicknesses (shown on the RADWP attachments). Oversight by an EP will not be required during construction activities which do not have a significant environmental component, such as above-grade construction.

Records will be developed by the EP to document:

- Compliance with soil screening requirements
- Proper water management, including documentation of any testing and water disposal
- Observations of construction activities during site grading and cap construction
- Proper cap thickness and construction

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. Any permits or permit modifications from State or local authorities will be provided as addenda to this RADWP.

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). Based on the scope of proposed earth disturbance, a grading permit will be required as part of this development project. Erosion and Sediment Control Plans will be submitted to, and approved by, the MDE prior to initiation of land disturbance for development.

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.

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

3. Modified Level D PPE will be used for the entire scope of ground intrusive work covered by this RADWP as a protective measure to ensure that there are no unacceptable exposures for Construction Workers during project implementation. The modified Level D PPE requirements which will be applied during this project are outlined in the PPE SOP provided as **Appendix C**. If it is not possible to implement the PPE SOP as provided, the agencies will be notified and a RADWP Addendum will be submitted to detail any appropriate mitigative measures.

7.0 IMPLEMENTATION SCHEDULE

Progress reports will be submitted to the MDE on a quarterly basis. Each quarterly progress report will include, at a minimum, a discussion of the following information regarding tasks completed during the specified quarter:

- Development Progress
- Soil Management (imported materials, screening, stockpiling)
- Soil Sampling and Disposal
- Water Management
- Dust Monitoring
- Notable Occurrences (if applicable)
- Additional Associated Work (if applicable)

The proposed implementation schedule is shown below:

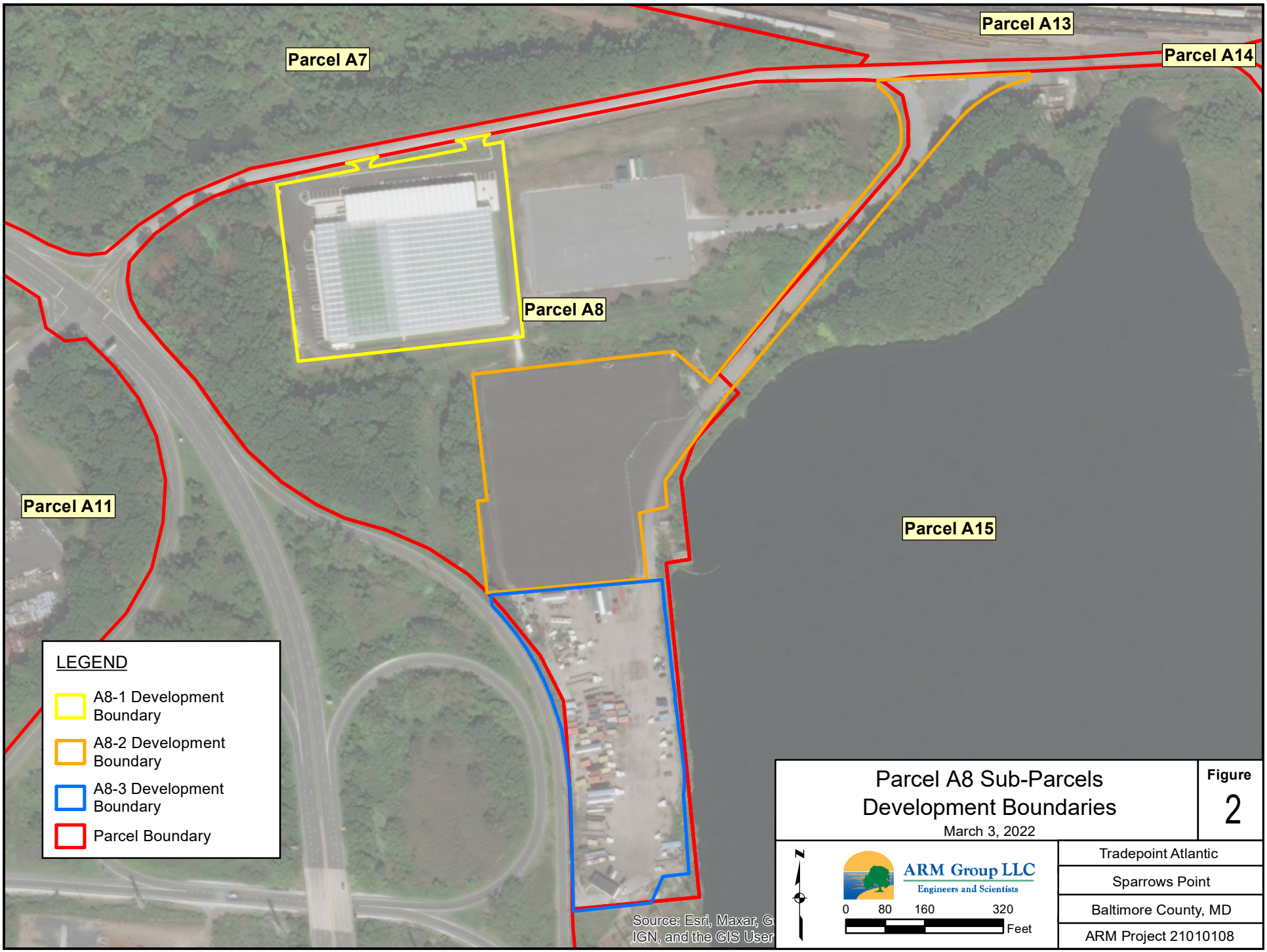
Task	**Proposed Completion Date**
Anticipated RADWP Approval	April 28, 2022
Development:	
Installation of Erosion and Sediment Controls	May 2022 (start)
Slag (or Alternative Fill) Delivery and Placement	May 2022 (start)
Grading	May 2022 (start)
Utility Installations	May 2022 (start)
Submittal of Development Completion Report/ Notice of Completion of Remedial Actions*	October 2022
Request for NFA from the MDE	November 2022
Recordation of institutional controls in the land records office of Baltimore County	Within 30 days of receiving the approval of NFA from the MDE

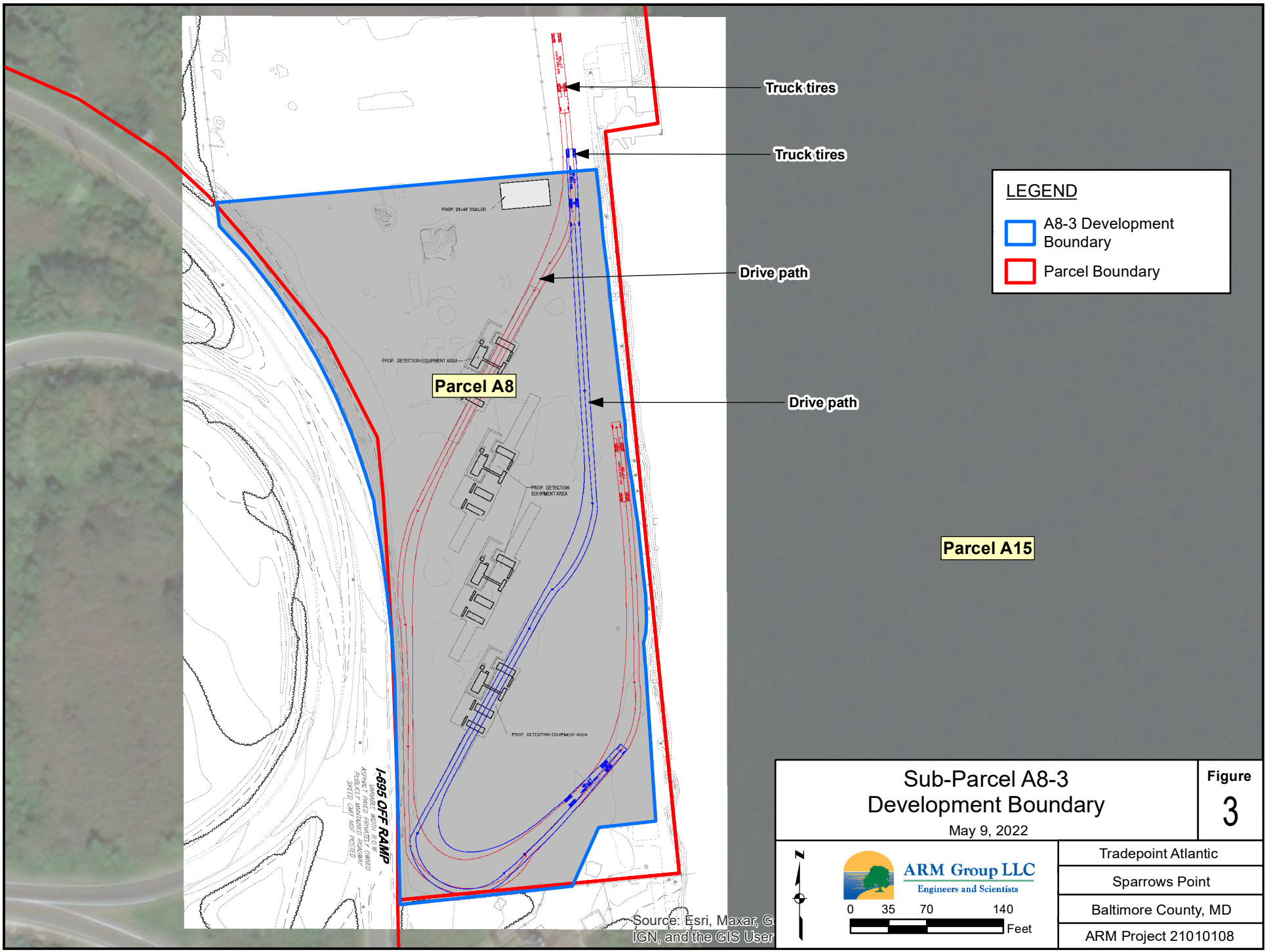
Submit proof of recordation with Baltimore County	Upon receipt from Baltimore County

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

FIGURES


A8-3 Development Boundary
Site Boundary
Parcel Boundaries
Private Property
Parcel A9
Parcel A13
Parcel A5
Parcel A7
Parcel A14
Parcel A11
Parcel A8
Parcel A12
Parcel A2
A8-3
Parcel A15
Parcel A17
Parcel A18
Parcel A16
Parcel A6
Parcel A10
Parcel A4
Parcel A3
Parcel A1
Parcel B6
Parcel B8
Parcel B14
Parcel B21
Parcel B22
Parcel B16
Parcel B24
Parcel B15
Parcel B23
Parcel B7
Parcel B25
Parcel B1
Parcel B2
Parcel B3
Parcel B17
Parcel B19
Parcel B4
Parcel B5
Parcel B9
Parcel B18
Parcel B10
Parcel B13
Parcel B20
Parcel B11
Parcel B12
Source: Esri, IGN, and the
Tradepoint Atlantic
Area A and Area B Parcels
February 17, 2022
Figure
1
ARM Group LLC
Engineers and Scientists
0 500 1,000 2,000
Feet
Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
Area A: Project 210101
Area B: Project 210102


Parcel A7
Parcel A13
Parcel A14
Parcel A8
Parcel A11
Parcel A15
LEGEND
A8-1 Development Boundary
A8-2 Development Boundary
A8-3 Development Boundary
Parcel Boundary
Source: Esri, Maxar, G
IGN, and the GIS User
Parcel A8 Sub-Parcels
Development Boundaries
March 3, 2022
Figure
2
ARM Group LLC
Engineers and Scientists
0 80 160 320
Feet
Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108
P:\EnviroAnalytics Group\160443M EAG_TPA Redevelopment\GIS\Parcel A8-3.mxd



Sub-Parcel A8-3 Development Boundary

May 9, 2022

Figure 3

ARM Group LLC
Engineers and Scientists

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108

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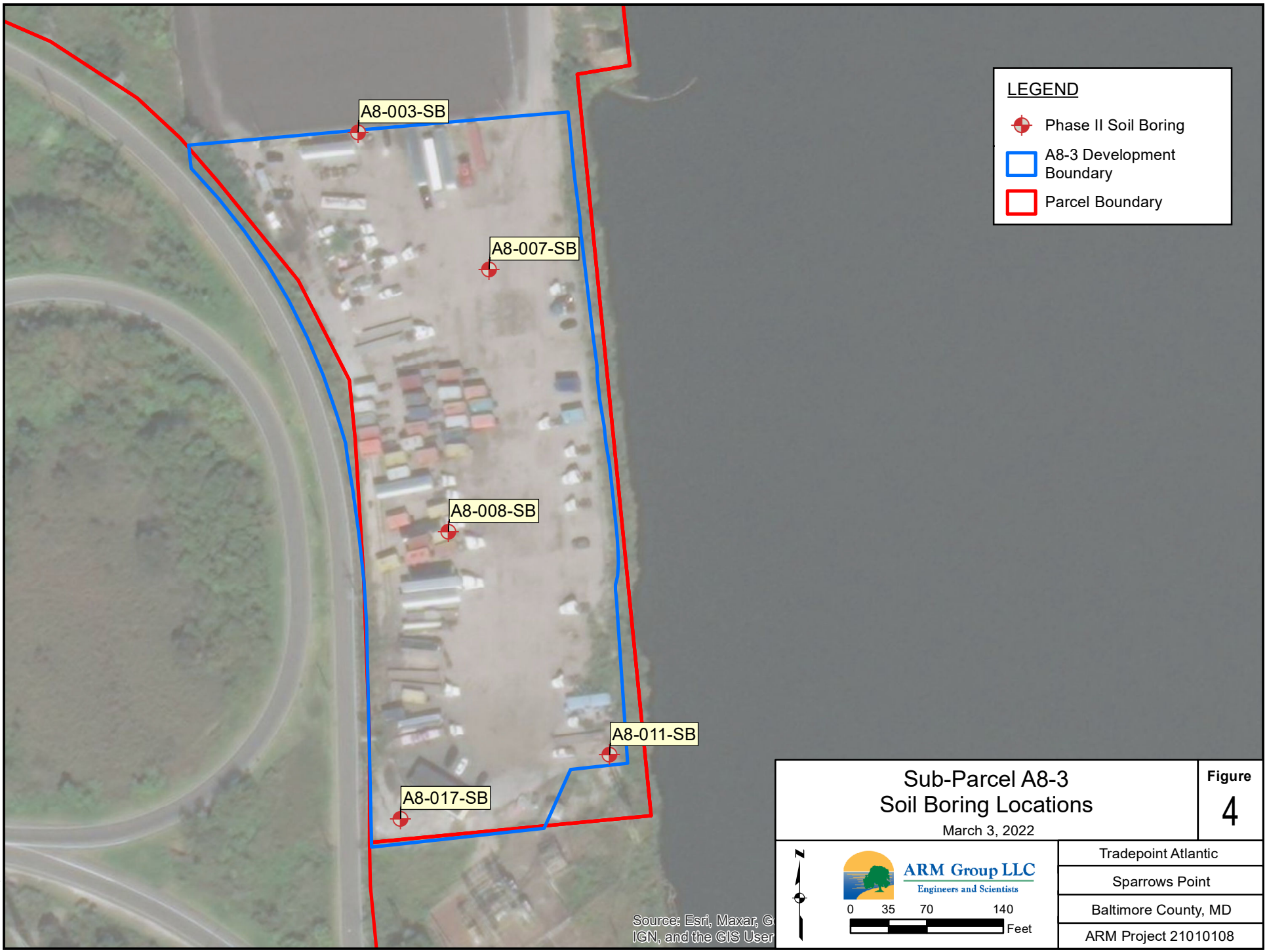


Sub-Parcel A8-3
Soil Boring Locations

March 3, 2022

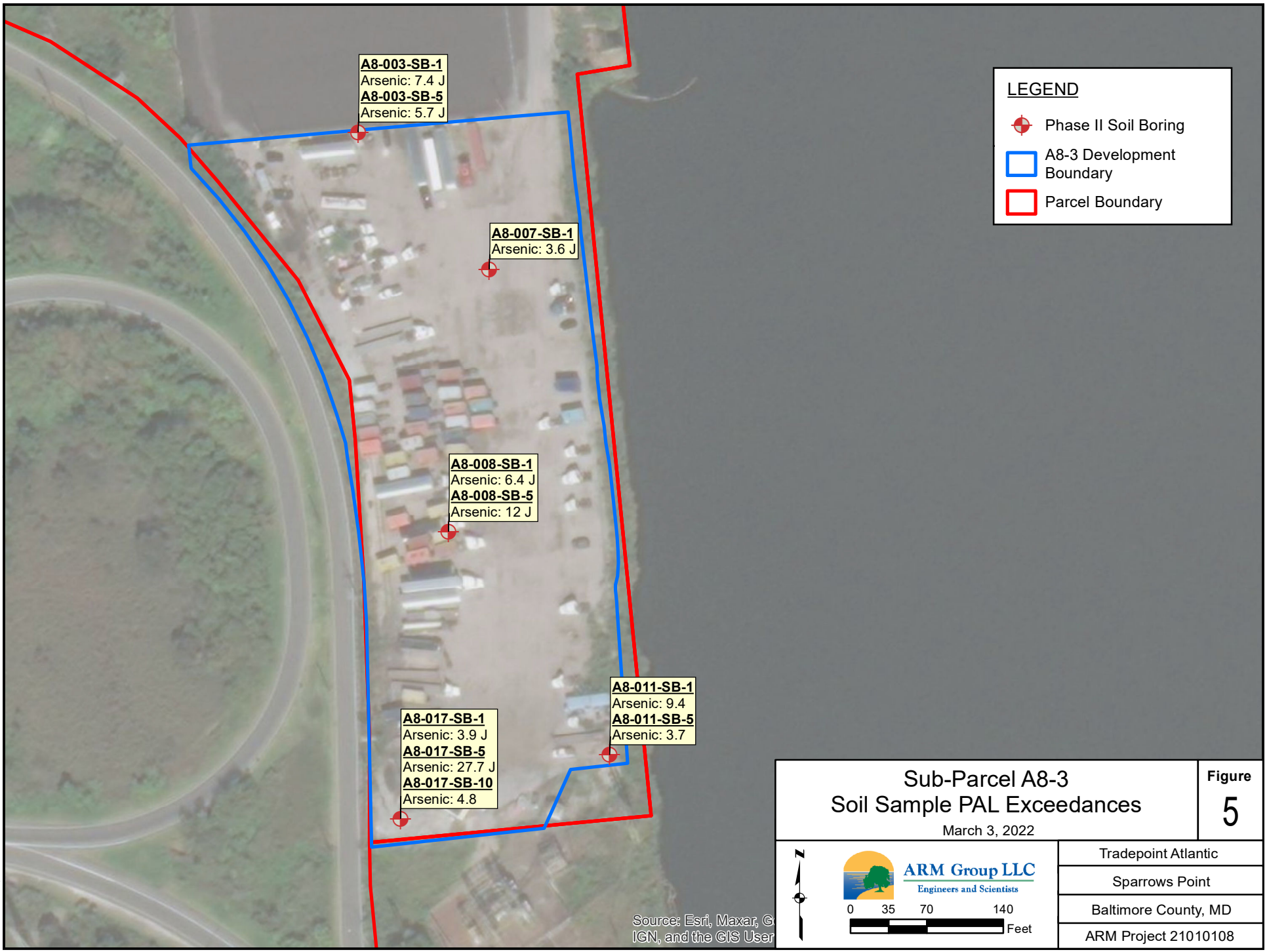
Figure 4

ARM Group LLC
Engineers and Scientists

0 35 70 140 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108

P:\EnviroAnalytics Group\160443M EAG_TPA Redevelopment\GIS\Parcel A8-3.mxd



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Sub-Parcel A8-3
Soil Sample PAL Exceedances

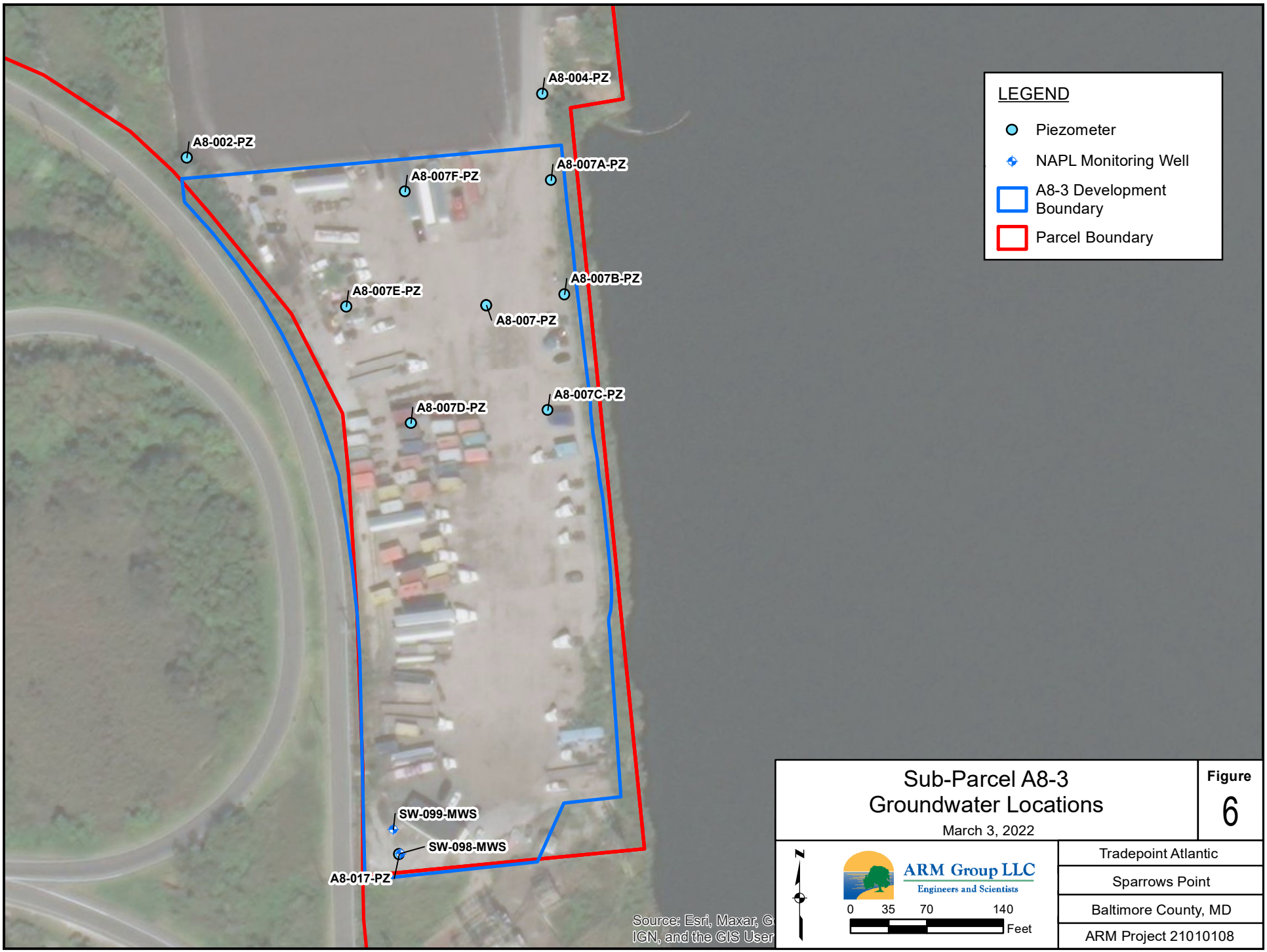
March 3, 2022

Figure 5

ARM Group LLC
Engineers and Scientists

0 35 70 140 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108



Sub-Parcel A8-3 Groundwater Locations

March 3, 2022

Figure 6

ARM Group LLC
Engineers and Scientists

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108

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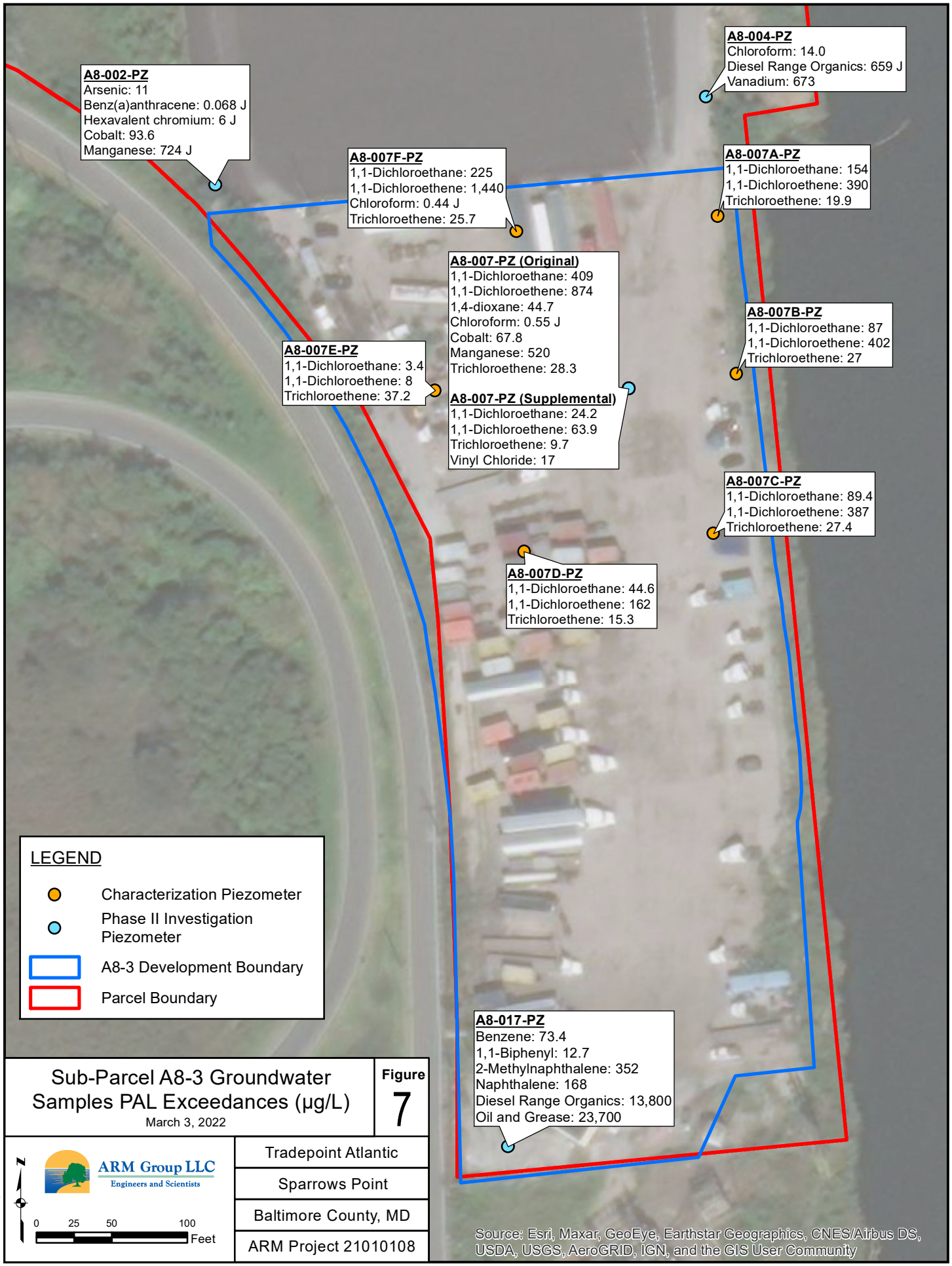

Sub-Parcel A8-3 Groundwater Samples PAL Exceedances (µg/L)

March 3, 2022

Figure 7

ARM Group LLC
Engineers and Scientists

0 25 50 100 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108

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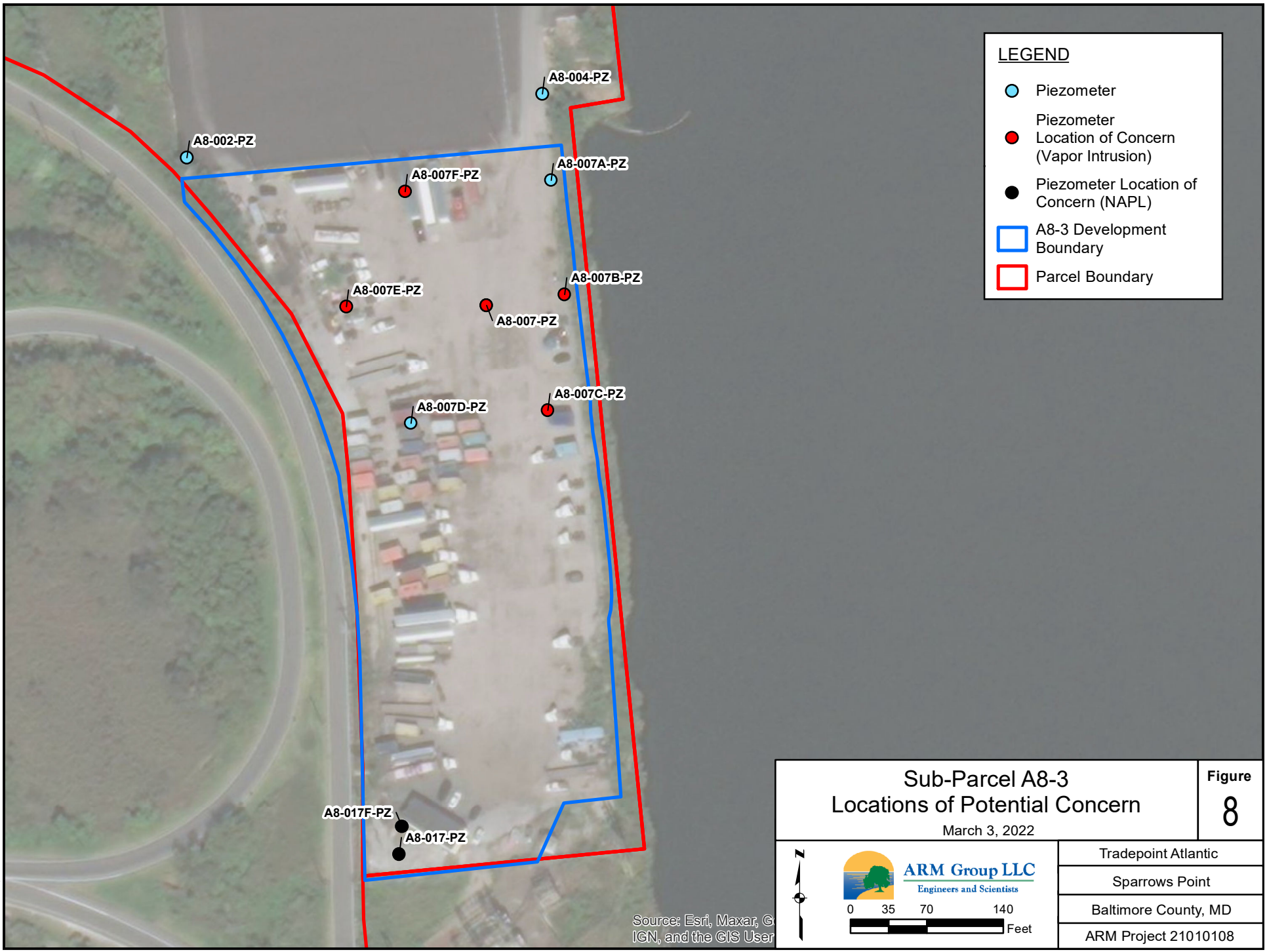

Sub-Parcel A8-3
Locations of Potential Concern

March 3, 2022

Figure 8

ARM Group LLC
Engineers and Scientists

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108

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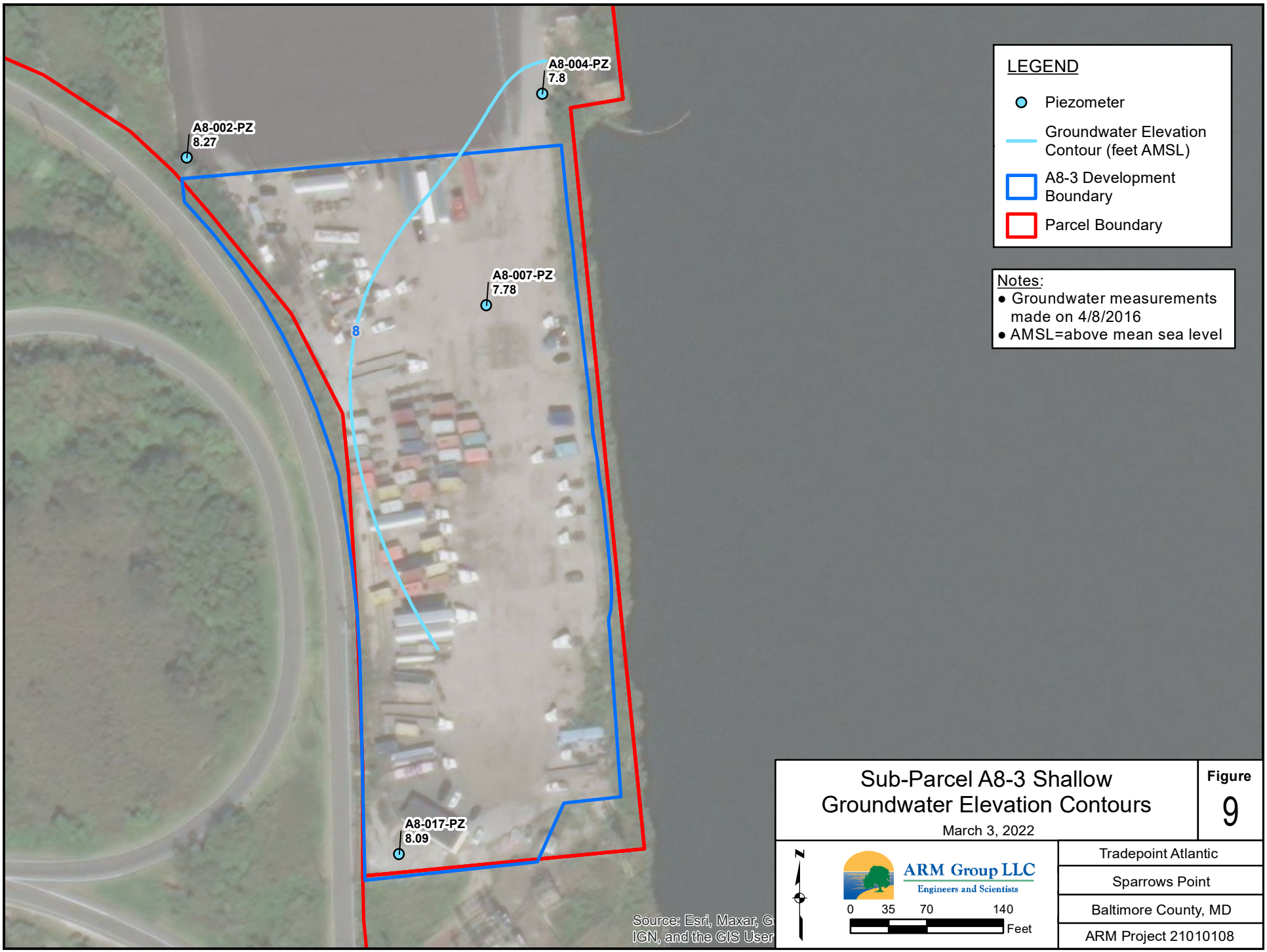

Sub-Parcel A8-3 Shallow Groundwater Elevation Contours

March 3, 2022

Figure 9

ARM Group LLC
Engineers and Scientists

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108

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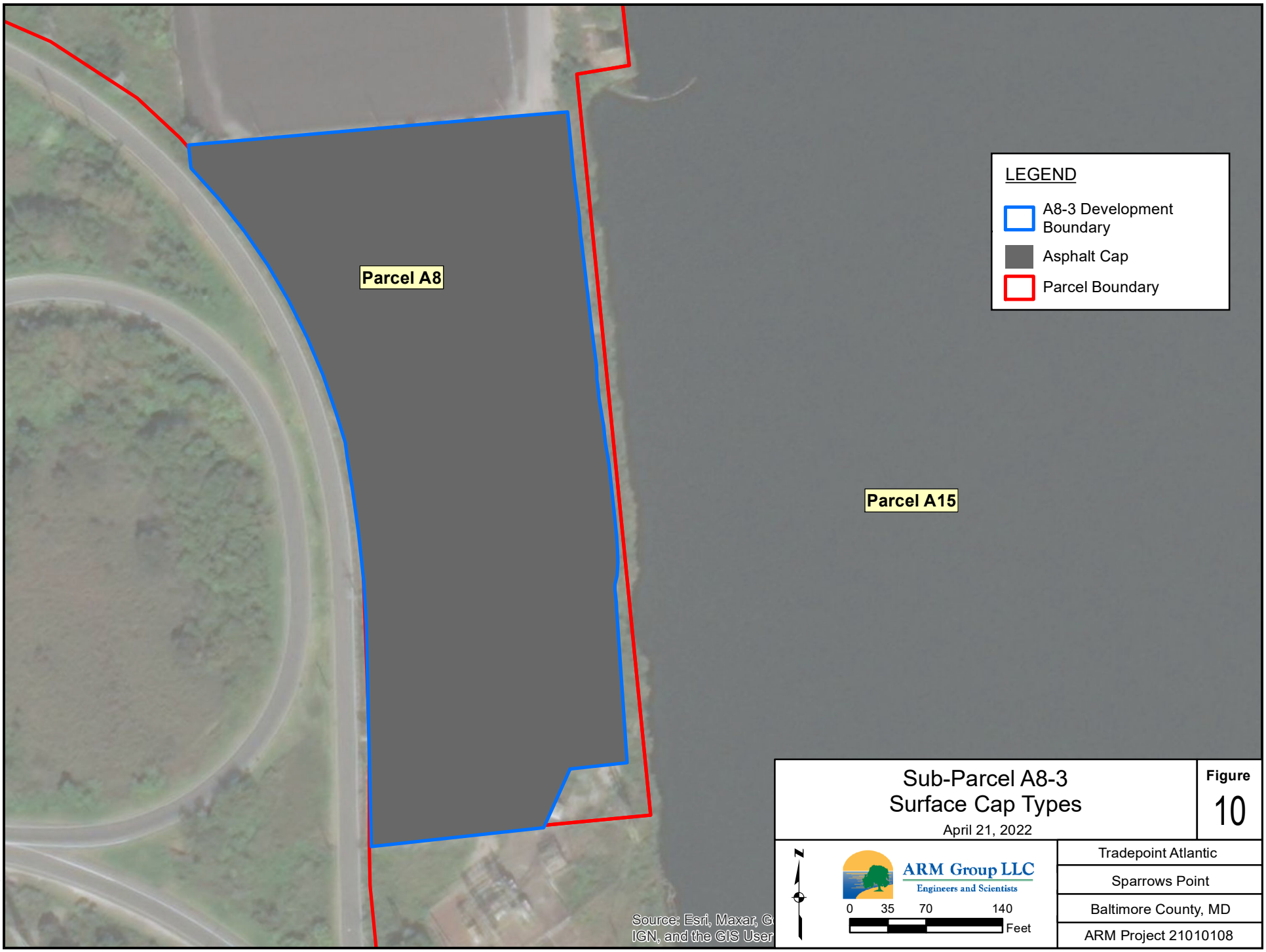

Sub-Parcel A8-3
Surface Cap Types
April 21, 2022

Figure
10

ARM Group LLC
Engineers and Scientists

0 35 70 140
Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 21010108

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TABLES

Table 1 - Sub-Parcel A8-3
Summary of Organics Detected in Soil

Parameter	Units	PAL	A8-003-SB-1 10/27/2015	A8-003-SB-1 3/18/2016	A8-003-SB-5 10/27/2015	A8-003-SB-5 3/18/2016	A8-007-SB-1 10/27/2015	A8-007-SB-1 3/17/2016	A8-007-SB-5 10/27/2015	A8-007-SB-5 3/17/2016	A8-008-SB-1 10/27/2015	A8-008-SB-1 3/18/2016
Volatile Organic Compounds												
1,1-Dichloroethane	mg/kg	16	0.0072 U	N/A	**0.0084**	N/A	0.005 U	N/A	0.0046 U	N/A	0.0049 U	N/A
2-Butanone (MEK)	mg/kg	190,000	**0.022**	N/A	0.0095 U	N/A	**0.01**	N/A	0.0092 U	N/A	0.0098 U	N/A
Acetone	mg/kg	670,000	**0.12 J**	N/A	0.0095 U	N/A	**0.057 J**	N/A	0.0092 UJ	N/A	**0.055 J**	N/A
Benzene	mg/kg	5.1	0.0072 U	N/A	0.0048 U	N/A	0.005 U	N/A	0.0046 U	N/A	0.0049 U	N/A
Methylene Chloride	mg/kg	1,000	0.0072 U	N/A	0.0048 U	N/A	0.005 U	N/A	0.0046 U	N/A	0.0049 U	N/A
Styrene	mg/kg	35,000	**0.025**	N/A	0.0048 U	N/A	0.005 U	N/A	0.0046 U	N/A	0.0049 U	N/A
Tetrachloroethene	mg/kg	100	0.0072 U	N/A	0.0048 U	N/A	0.005 U	N/A	0.0046 U	N/A	**0.005**	N/A
Toluene	mg/kg	47,000	0.0072 U	N/A	0.0048 U	N/A	0.005 U	N/A	0.0046 U	N/A	0.0049 U	N/A
Trichlorofluoromethane	mg/kg	3,100	**0.0084**	N/A	0.0048 U	N/A	**0.0085**	N/A	0.0046 U	N/A	0.0049 U	N/A
Xylenes	mg/kg	2,800	0.021 U	N/A	0.014 U	N/A	0.015 U	N/A	0.014 U	N/A	0.015 U	N/A
Semi-Volatile Organic Compounds^												
1,1-Biphenyl	mg/kg	200	N/A	**0.028 J**	N/A	0.077 U	N/A	0.072 U	N/A	0.072 U	N/A	0.072 U
2,4-Dimethylphenol	mg/kg	16,000	N/A	**0.019 J**	N/A	0.077 U	N/A	0.072 U	N/A	0.072 U	N/A	0.072 U
2-Methylnaphthalene	mg/kg	3,000	**0.015**	N/A	0.0078 U	N/A	0.15 U	N/A	0.0077 U	N/A	0.15 U	N/A
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	N/A	**0.035 J**	N/A	0.15 U	N/A	0.14 U	N/A	0.14 U	N/A	0.14 U
Acenaphthene	mg/kg	45,000	**0.11**	N/A	0.0078 U	N/A	0.15 U	N/A	0.0077 U	N/A	**0.046 J**	N/A
Acenaphthylene	mg/kg	45,000	**0.0043 J**	N/A	0.0078 U	N/A	0.15 U	N/A	0.0077 U	N/A	0.15 U	N/A
Anthracene	mg/kg	230,000	**0.048**	N/A	0.0078 U	N/A	**0.022 J**	N/A	0.0077 U	N/A	**0.13 J**	N/A
Benz[a]anthracene	mg/kg	21	**0.3**	N/A	**0.0027 J**	N/A	**0.27**	N/A	0.0077 U	N/A	**0.49**	N/A
Benzaldehyde	mg/kg	120,000	N/A	**0.056 J**	N/A	0.077 R	N/A	0.072 R	N/A	0.072 R	N/A	0.072 R
Benzo[a]pyrene	mg/kg	2.1	**0.6**	N/A	0.0078 U	N/A	**0.23**	N/A	0.0077 U	N/A	**0.43**	N/A
Benzo[b]fluoranthene	mg/kg	21	**0.9**	N/A	**0.005 J**	N/A	**0.4**	N/A	0.0077 U	N/A	**0.65**	N/A
Benzo[g,h,i]perylene	mg/kg		**0.31**	N/A	**0.0024 J**	N/A	**0.098 J**	N/A	0.0077 U	N/A	**0.21**	N/A
Benzo[k]fluoranthene	mg/kg	210	**0.65**	N/A	**0.003 J**	N/A	**0.16**	N/A	0.0077 U	N/A	**0.56**	N/A
bis(2-Ethylhexyl)phthalate	mg/kg	160	N/A	**0.025 J**	N/A	0.077 U	N/A	0.072 UJ	N/A	0.072 U	N/A	0.042 B
Carbazole	mg/kg		N/A	**0.19**	N/A	0.077 U	N/A	0.072 U	N/A	0.072 U	N/A	0.072 U
Chrysene	mg/kg	2,100	**0.31**	N/A	**0.002 J**	N/A	**0.31**	N/A	0.0077 U	N/A	**0.5**	N/A
Dibenz[a,h]anthracene	mg/kg	2.1	**0.11**	N/A	0.0078 U	N/A	0.15 U	N/A	0.0077 U	N/A	0.15 U	N/A
Di-n-butylphthalate	mg/kg	82,000	N/A	0.076 U	N/A	0.077 U	N/A	0.072 U	N/A	0.072 U	N/A	**0.11 J**
Fluoranthene	mg/kg	30,000	**0.25**	N/A	**0.0018 J**	N/A	**0.3**	N/A	**0.0011 J**	N/A	**0.82**	N/A
Fluorene	mg/kg	30,000	**0.016**	N/A	0.0078 U	N/A	0.15 U	N/A	**0.00089 J**	N/A	**0.026 J**	N/A
Indeno[1,2,3-c,d]pyrene	mg/kg	21	**0.32**	N/A	0.0078 U	N/A	0.15 U	N/A	0.0077 U	N/A	**0.2**	N/A
Naphthalene	mg/kg	8.6	**0.025**	N/A	**0.005 J**	N/A	**0.079 J**	N/A	0.0077 U	N/A	0.15 U	N/A
Phenanthrene	mg/kg		**0.12**	N/A	0.0078 U	N/A	**0.056 J**	N/A	0.0077 U	N/A	**0.33**	N/A
Phenol	mg/kg	250,000	N/A	**0.025 J**	N/A	0.077 U	N/A	0.072 U	N/A	0.072 U	N/A	0.072 U
Pyrene	mg/kg	23,000	**0.27**	N/A	**0.0018 J**	N/A	**0.33**	N/A	**0.00089 J**	N/A	**0.74**	N/A
PCBs												
Aroclor 1254	mg/kg	0.97	0.23 U	N/A	N/A	N/A	0.018 U	N/A	N/A	N/A	**0.071 J**	N/A
Aroclor 1260	mg/kg	0.99	**0.3**	N/A	N/A	N/A	**0.18**	N/A	N/A	N/A	0.019 U	N/A
PCBs (total)	mg/kg	0.97	1.6 U	N/A	N/A	N/A	**0.18**	N/A	N/A	N/A	**0.071 J**	N/A
Oil & Grease												
Oil & Grease	mg/kg	6,200	**457**	N/A	**178**	N/A	**662**	N/A	**206**	N/A	**1,120**	N/A

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

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

Table 1 - Sub-Parcel A8-3
Summary of Organics Detected in Soil

Parameter	Units	PAL	A8-008-SB-5 10/27/2015	A8-008-SB-5 3/18/2016	A8-011-SB-1 10/26/2015	A8-011-SB-1 3/17/2016	A8-011-SB-5 10/26/2015	A8-011-SB-5 3/17/2016	A8-017-SB-1 10/27/2015	A8-017-SB-1 3/17/2016	A8-017-SB-7 10/27/2015	A8-017-SB-7 3/17/2016
Volatile Organic Compounds												
1,1-Dichloroethane	mg/kg	16	0.0048 U	N/A	0.0048 U	N/A	0.0048 U	N/A	0.0065 U	N/A	0.0049 U	N/A
2-Butanone (MEK)	mg/kg	190,000	0.0096 U	N/A	**0.0075 J**	N/A	0.0096 U	N/A	**0.025 J**	N/A	0.0099 U	N/A
Acetone	mg/kg	670,000	0.0096 U	N/A	**0.049 J**	N/A	**0.025 J**	N/A	**0.18 J**	N/A	0.0099 U	N/A
Benzene	mg/kg	5.1	0.0048 U	N/A	**0.0012 J**	N/A	0.0048 U	N/A	0.0065 U	N/A	0.0049 U	N/A
Methylene Chloride	mg/kg	1,000	0.0048 U	N/A	0.0048 U	N/A	**0.0029 J**	N/A	0.0065 U	N/A	0.0049 U	N/A
Styrene	mg/kg	35,000	0.0048 U	N/A	0.0048 U	N/A	0.0048 U	N/A	0.0065 U	N/A	0.0049 U	N/A
Tetrachloroethene	mg/kg	100	0.0048 U	N/A	**0.00058 J**	N/A	0.0048 U	N/A	0.0065 U	N/A	0.0049 U	N/A
Toluene	mg/kg	47,000	0.0048 U	N/A	**0.00071 J**	N/A	0.0048 U	N/A	0.0065 U	N/A	0.0049 U	N/A
Trichlorofluoromethane	mg/kg	3,100	0.0048 U	N/A	0.0048 U	N/A	0.0048 U	N/A	0.0065 U	N/A	0.0049 U	N/A
Xylenes	mg/kg	2,800	0.014 U	N/A	0.014 U	N/A	0.014 U	N/A	0.019 U	N/A	**0.021**	N/A
Semi-Volatile Organic Compounds^												
1,1-Biphenyl	mg/kg	200	N/A	0.081 U	N/A	0.07 U	N/A	0.078 U	N/A	**0.089**	N/A	0.081 U
2,4-Dimethylphenol	mg/kg	16,000	N/A	0.081 U	N/A	0.07 UJ	N/A	0.078 U	N/A	0.076 U	N/A	0.081 U
2-Methylnaphthalene	mg/kg	3,000	0.0081 U	N/A	**0.067**	N/A	**0.0033 J**	N/A	**0.13 J**	N/A	**0.011**	N/A
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	N/A	0.16 U	N/A	0.14 UJ	N/A	0.15 U	N/A	0.15 U	N/A	0.16 U
Acenaphthene	mg/kg	45,000	0.0081 U	N/A	**0.0052 J**	N/A	0.0082 U	N/A	**0.033 J**	N/A	0.0082 U	N/A
Acenaphthylene	mg/kg	45,000	0.0081 U	N/A	**0.0019 J**	N/A	0.0082 U	N/A	**0.075 J**	N/A	0.0082 U	N/A
Anthracene	mg/kg	230,000	0.0081 U	N/A	**0.024**	N/A	**0.0021 J**	N/A	**0.4**	N/A	0.0082 U	N/A
Benz[a]anthracene	mg/kg	21	0.0081 U	N/A	**0.059**	N/A	**0.0084**	N/A	0.16 U	N/A	0.0082 U	N/A
Benzaldehyde	mg/kg	120,000	N/A	0.081 R	N/A	0.07 R	N/A	0.078 R	N/A	0.076 R	N/A	0.081 R
Benzo[a]pyrene	mg/kg	2.1	0.0081 U	N/A	**0.032**	N/A	0.0069 B	N/A	0.046 B	N/A	0.001 B	N/A
Benzo[b]fluoranthene	mg/kg	21	0.0081 U	N/A	**0.086**	N/A	**0.017**	N/A	**0.071 J**	N/A	0.0082 U	N/A
Benzo[g,h,i]perylene	mg/kg		0.0081 U	N/A	**0.022**	N/A	**0.0042 J**	N/A	**0.038 J**	N/A	0.0082 U	N/A
Benzo[k]fluoranthene	mg/kg	210	0.0081 U	N/A	**0.038**	N/A	**0.0062 J**	N/A	**0.042 J**	N/A	0.0082 U	N/A
bis(2-Ethylhexyl)phthalate	mg/kg	160	N/A	0.081 U	N/A	0.07 UJ	N/A	0.078 U	N/A	0.076 UJ	N/A	0.081 U
Carbazole	mg/kg		N/A	0.081 U	N/A	0.07 U	N/A	0.078 U	N/A	0.076 U	N/A	0.081 U
Chrysene	mg/kg	2,100	**0.001 J**	N/A	**0.1**	N/A	**0.011**	N/A	**0.082 J**	N/A	0.0082 U	N/A
Dibenz[a,h]anthracene	mg/kg	2.1	0.0081 U	N/A	**0.0084**	N/A	0.0082 U	N/A	0.16 U	N/A	0.0082 U	N/A
Di-n-butylphthalate	mg/kg	82,000	N/A	0.081 U	N/A	0.07 U	N/A	0.078 U	N/A	0.076 U	N/A	0.081 U
Fluoranthene	mg/kg	30,000	**0.0013 J**	N/A	**0.22**	N/A	**0.015**	N/A	**0.069 J**	N/A	0.0082 U	N/A
Fluorene	mg/kg	30,000	0.0081 U	N/A	**0.0032 J**	N/A	**0.0021 J**	N/A	**0.079 J**	N/A	**0.0015 J**	N/A
Indeno[1,2,3-c,d]pyrene	mg/kg	21	0.0081 U	N/A	**0.021**	N/A	**0.004 J**	N/A	0.16 U	N/A	0.0082 U	N/A
Naphthalene	mg/kg	8.6	0.0081 U	N/A	**0.43**	N/A	0.0053 B	N/A	**0.071 J**	N/A	**0.019**	N/A
Phenanthrene	mg/kg		0.0081 U	N/A	**0.14**	N/A	**0.012**	N/A	**0.57**	N/A	**0.0041 J**	N/A
Phenol	mg/kg	250,000	N/A	0.081 U	N/A	**0.035 J**	N/A	0.078 U	N/A	0.076 U	N/A	0.081 U
Pyrene	mg/kg	23,000	**0.0013 J**	N/A	**0.16**	N/A	**0.012**	N/A	**0.18**	N/A	0.0082 U	N/A
PCBs												
Aroclor 1254	mg/kg	0.97	N/A	N/A	0.018 U	N/A	N/A	N/A	0.019 U	N/A	N/A	N/A
Aroclor 1260	mg/kg	0.99	N/A	N/A	0.018 U	N/A	N/A	N/A	0.019 U	N/A	N/A	N/A
PCBs (total)	mg/kg	0.97	N/A	N/A	0.12 U	N/A	N/A	N/A	0.13 U	N/A	N/A	N/A
Oil & Grease												
Oil & Grease	mg/kg	6,200	**182**	N/A	**1,040**	N/A	**419**	N/A	**4,150**	N/A	**144**	N/A

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

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

Table 2- Sub-Parcel A8-3
Summary of Inorganics Detected in Soil

Parameter	Units	PAL	A8-003-SB-1 10/27/2015	A8-003-SB-5 10/27/2015	A8-003-SB-10 10/27/2015	A8-007-SB-1 10/27/2015	A8-007-SB-5 10/27/2015	A8-008-SB-1 10/27/2015	A8-008-SB-5 10/27/2015	A8-008-SB-10 10/27/2015	A8-011-SB-1 10/26/2015	A8-011-SB-5 10/26/2015	A8-011-SB-10 10/26/2015	A8-017-SB-1 10/27/2015	A8-017-SB-7 10/27/2015	A8-017-SB-10 10/27/2015
Metal																
Aluminum	mg/kg	1,100,000	**20,200**	**17,200**	N/A	**58,300**	**12,600**	**22,900**	**16,400**	N/A	**11,700**	**10,800**	N/A	**34,400**	**16,400**	N/A
Antimony	mg/kg	470	4 UJ	3.3 UJ	N/A	**5.5 J**	3.1 UJ	3.3 UJ	3.6 UJ	N/A	2.9 B	2.9 U	N/A	1.9 UJ	2.7 UJ	N/A
Arsenic	mg/kg	3	**7.4 J**	**5.7 J**	1.8 U	**3.6 J**	**2.9 J**	**6.4 J**	**12 J**	2.4 U	**9.4**	**3.7**	**2.4 J**	**3.9 J**	**27.7 J**	**4.8**
Barium	mg/kg	220,000	**203**	**85.6**	N/A	**199**	**36**	**329**	**78.2**	N/A	**195**	**62.2**	N/A	**341**	**30.7**	N/A
Beryllium	mg/kg	2,300	**2**	**0.81 J**	N/A	**1.8**	**0.31 J**	**3.6**	**1.4**	N/A	**0.48 J**	**0.42 J**	N/A	**4.2**	**0.94**	N/A
Cadmium	mg/kg	980	**1.1 J**	1.6 U	N/A	**1 J**	1.6 U	**1.4 J**	**0.27 J**	N/A	**7**	0.44 B	N/A	**0.33 J**	**0.16 J**	N/A
Chromium	mg/kg	120,000	**81.3**	**20.5**	N/A	**600**	**20.4**	**380**	**45**	N/A	**1,200**	**25.2**	N/A	**178**	**35.8**	N/A
Chromium VI	mg/kg	6.3	1.4 UJ	1.2 UJ	N/A	1.1 UJ	1.2 UJ	1.1 UJ	**0.54 J-**	N/A	1.1 UJ	1.2 UJ	N/A	1.2 UJ	1.2 UJ	N/A
Cobalt	mg/kg	350	3.9 B	4.9 B	N/A	4.2 B	2.9 B	**5.6**	**6.5**	N/A	**9.8**	**8.6**	N/A	2.8 B	**5.2**	N/A
Copper	mg/kg	47,000	**130**	**8.6**	N/A	**68**	**6.7**	**409**	**17**	N/A	**98.8**	**21.2**	N/A	**16.6**	**15.9**	N/A
Iron	mg/kg	820,000	**19,900**	**13,900**	N/A	**77,800**	**10,200**	**77,100**	**30,000**	N/A	**128,000**	**17,600**	N/A	**25,900**	**30,100**	N/A
Lead	mg/kg	800	**103**	**10.5**	N/A	**110**	**7.4**	**221**	**14.6**	N/A	**457**	**54**	N/A	**17**	**15.5**	N/A
Manganese	mg/kg	26,000	**2,140**	**44.1**	N/A	**20,800**	**243**	**15,100**	**601**	N/A	**23,200**	**354**	N/A	**9,360**	**51.3**	N/A
Mercury	mg/kg	350	**0.066 J**	**0.0067 J**	N/A	**0.081 J**	**0.044 J**	**0.0035 J**	**0.01 J**	N/A	**0.028 J**	**0.055 J**	N/A	0.11 U	**0.0062 J**	N/A
Nickel	mg/kg	22,000	**16.3**	**14.5**	N/A	**19.4**	7.8 B	**28.5**	**16.3**	N/A	**90.5**	**16**	N/A	**8.4**	**14.9**	N/A
Selenium	mg/kg	5,800	5.3 U	4.4 U	N/A	4.3 U	4.1 U	3.5 B	4.8 U	N/A	4.3 U	3.9 U	N/A	2.2 B	3.6 U	N/A
Thallium	mg/kg	12	13.3 U	11 U	N/A	10.7 U	10.3 U	11 U	11.9 U	N/A	2.6 B	9.7 U	N/A	6.3 U	9.1 U	N/A
Vanadium	mg/kg	5,800	**105 J**	**35.2 J**	N/A	**1,360 J**	**32.9 J**	**1,380 J**	**98.4 J**	N/A	**2,020**	**73.1**	N/A	**722 J**	**66.3 J**	N/A
Zinc	mg/kg	350,000	**315 J**	**23.6 J**	N/A	**447 J**	**33.9 J**	**356 J**	**62.3 J**	N/A	**600**	**178**	N/A	**73.9 J**	**48.1 J**	N/A
Other																
Cyanide	mg/kg	150	**1.8**	0.58 U	N/A	**0.31 J**	0.57 U	**0.48 J**	0.62 U	N/A	**0.95**	0.59 U	N/A	**0.23 J**	0.67 U	N/A

Detections in bold
Values in red indicate an exceedance of the Project Action Limit (PAL)
N/A indicates that the parameter was not analyzed for this sample
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
J-: The positive result reported for this analyte is a quantitative estimate, but may be biased low.
B: This analyte was not detected substantially above the level of the associated method or field blank.

Table 3 - Sub-Parcel A8-3
Summary of Organics Detected in Groundwater

Parameter	Units	PAL	A8-002-PZ 11/4/2015	A8-004-PZ 11/4/2015	A8-007A-PZ* 9/27/2019	A8-007B-PZ* 9/27/2019	A8-007C-PZ* 9/27/2019	A8-007D-PZ* 9/27/2019	A8-007E-PZ* 9/27/2019	A8-007F-PZ* 9/27/2019	A8-007-PZ 11/5/2015	A8-007-PZ* 9/27/2019	A8-017-PZ 11/5/2015
Volatile Organic Compounds													
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	**3.6**	1 U	1 U	1 U	1 U	**104**	**41.4**	1 U	1 U
1,1-Dichloroethane	µg/L	2.7	**1.3**	**2**	**154**	**87**	**89.4**	**44.6**	**3.4**	**225**	**409**	**24.2**	1 U
1,1-Dichloroethene	µg/L	7	**0.94 J**	1 U	**390**	**402**	**387**	**162**	**8**	**1,440**	**874**	**63.9**	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	**0.88 J**	**0.91 J**	1 U	1 U	**2.5**	**2.4**	1 U	1 U
1,2-Dichloroethene (Total)	µg/L	70	2 U	2 U	**6.4**	**6.3**	**5.7**	**2.7**	**7.4**	**3.9**	**4.1**	**52.3**	2 U
Acetone	µg/L	14,000	10 R	10 R	10 U	**5.6 J**	10 U	10 U	10 U	10 U	10 R	10 U	10 R
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**0.74 J**	**0.61 J**	1 U	**73.4**
Carbon disulfide	µg/L	810	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**1.2**	1 U	1 U
Chloroform	µg/L	0.22	1 U	**14**	1 U	1 U	1 U	1 U	1 U	**0.44 J**	**0.55 J**	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	1 U	1 U	**5.2**	**4.9**	**3.6**	**1.9**	**7.4**	**2.6**	**3.4**	**50.3**	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	**15.4**
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**50.9**
Isopropylbenzene	µg/L	450	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**12.8**
Tetrachloroethene	µg/L	5	1 U	**3.3**	**0.74 J**	1 U	1 U	1 U	1 U	**1.1**	**0.99 J**	1 U	1 U
Toluene	µg/L	1,000	1 U	**0.38 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**160**
trans-1,2-Dichloroethene	µg/L	100	1 U	1 U	**1.1**	**1.4**	**2.2**	**0.78 J**	1 U	**1.3**	**0.69 J**	**2**	1 U
Trichloroethene	µg/L	5	**0.76 J**	**1.3**	**19.9**	**27**	**27.4**	**15.3**	**37.2**	**25.7**	**28.3**	**9.7**	1 U
Trichlorofluoromethane	µg/L	1,100	1 U	**2.2**	1 U	1 U	1 U	1 U	1 U	1 U	**0.71 J**	1 U	1 U
Vinyl chloride	µg/L	2	1 U	1 U	**1.7**	**1.7**	**1.2**	**0.59 J**	**0.86 J**	**1.2**	**1.7**	**17**	1 U
Xylenes	µg/L	10,000	3 U	**1.6 J**	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	**241**
Semi-Volatile Organic Compounds^													
1,1-Biphenyl	µg/L	0.83	1 U	1 U	N/A	N/A	N/A	N/A	N/A	N/A	1 U	N/A	**12.7**
1,4-Dioxane	µg/L	0.46	**0.39**	**0.39**	N/A	N/A	N/A	N/A	N/A	N/A	**44.7**	N/A	0.1 U
2-Methylnaphthalene	µg/L	36	0.1 U	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	**352**
2-Methylphenol	µg/L	930	1 U	1 U	N/A	N/A	N/A	N/A	N/A	N/A	1 U	N/A	**0.36 J**
Acenaphthene	µg/L	530	0.1 U	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	**11.5**
Acenaphthylene	µg/L	530	0.1 U	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	**1.5 J**
Acetophenone	µg/L	1,900	1 U	1 U	N/A	N/A	N/A	N/A	N/A	N/A	1 U	N/A	**16**
Anthracene	µg/L	1,800	0.1 U	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	**0.014 J**	N/A	**0.91 J**
Benz[a]anthracene	µg/L	0.03	**0.068 J**	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	5.1 U
Benzo[a]pyrene	µg/L	0.2	**0.15 J**	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	**0.044 J**	N/A	5.1 U
Benzo[b]fluoranthene	µg/L	0.25	**0.15**	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	5.1 U
Benzo[g,h,i]perylene	µg/L		**0.17**	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	**0.026 J**	N/A	5.1 U
Benzo[k]fluoranthene	µg/L	2.5	**0.1**	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	5.1 U
bis(2-Ethylhexyl)phthalate	µg/L	6	0.29 B	0.25 B	N/A	N/A	N/A	N/A	N/A	N/A	1 U	N/A	**0.32 J**
Carbazole	µg/L		1 U	1 U	N/A	N/A	N/A	N/A	N/A	N/A	1 U	N/A	**10.8**
Chrysene	µg/L	25	**0.062 J**	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	5.1 U
Di-n-butylphthalate	µg/L	900	1 U	1 U	N/A	N/A	N/A	N/A	N/A	N/A	1 U	N/A	**0.54 J**
Fluoranthene	µg/L	800	0.1 U	**0.079 J**	N/A	N/A	N/A	N/A	N/A	N/A	**0.074 J**	N/A	5.1 U
Fluorene	µg/L	290	0.1 U	**0.017 J**	N/A	N/A	N/A	N/A	N/A	N/A	**0.097 J**	N/A	**16**
Indeno[1,2,3-c,d]pyrene	µg/L	0.25	**0.13**	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	0.1 U	N/A	5.1 U
Naphthalene	µg/L	0.12	0.1 U	**0.11**	N/A	N/A	N/A	N/A	N/A	N/A	**0.1**	N/A	**168**
Pentachlorophenol	µg/L	1	2.6 U	**0.65 J**	N/A	N/A	N/A	N/A	N/A	N/A	2.6 U	N/A	2.6 U
Phenanthrene	µg/L		0.1 U	0.1 U	N/A	N/A	N/A	N/A	N/A	N/A	**0.076 J**	N/A	**23.4**
Pyrene	µg/L	120	0.1 U	**0.077 J**	N/A	N/A	N/A	N/A	N/A	N/A	**0.069 J**	N/A	5.1 U
TPH/Oil & Grease													
Diesel Range Organics	µg/L	47	N/A	**659 J**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**13,800**
Oil & Grease	µg/L	47	4,800 U	4,800 U	N/A	N/A	N/A	N/A	N/A	N/A	4,850 U	N/A	**23,700**

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

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the associated method or field blank.
R: The result for this analyte is unreliable. Additional data is needed to confirm or disprove the presence of this analyte in the sample.

Table 4 - Sub-Parcel A8-3
Summary of Inorganics Detected in Groundwater

Parameter	Units	PAL	A8-002-PZ 11/4/2015	A8-004-PZ 11/4/2015	A8-007-PZ 11/5/2015	A8-017-PZ 11/5/2015
Dissovled Metals						
Aluminum, Dissolved	µg/L	20,000	33.6 B	**362**	**19.3 J**	**823**
Arsenic, Dissolved	µg/L	10	**11**	5 U	5 U	**8.5**
Barium, Dissolved	µg/L	2,000	**56.9**	**20.6**	**29.6**	**39.3**
Beryllium, Dissolved	µg/L	4	0.57 B	1 U	0.45 B	1 U
Cadmium, Dissolved	µg/L	5	1.6 B	3 U	0.69 B	3 U
Chromium, Dissolved	µg/L	100	1.1 B	1.4 B	1.6 B	5 U
Chromium VI, Dissolved	µg/L	0.035	**6 J**	10 U	10 UJ	10 UJ
Cobalt, Dissolved	µg/L	6	**93.6**	5 U	**67.8**	5 U
Copper, Dissolved	µg/L	1,300	5 U	**1.6 J**	5 U	5 U
Iron, Dissolved	µg/L	14,000	**11,200**	44.8 B	**4,090**	**15.7 J**
Manganese, Dissolved	µg/L	430	**724 J**	**5.5 J**	**520**	5 U
Mercury, Dissolved	µg/L	2	0.04 B	0.05 B	0.07 B	0.07 B
Nickel, Dissolved	µg/L	390	**129**	1.3 B	**102**	1.4 B
Selenium, Dissolved	µg/L	50	8 U	6.3 B	8 U	8 U
Thallium, Dissolved	µg/L	2	10 U	5.1 B	10 U	10 U
Vanadium, Dissolved	µg/L	86	0.76 B	**673**	1.4 B	**40.3**
Zinc, Dissolved	µg/L	6,000	**153**	0.86 B	**58.2**	10 U

Detections in bold

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

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

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

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

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

Table 5 - Sub-Parcel A8-3
Cumulative Vapor Intrusion Comparison

				A8-002-PZ 11/4/2015		A8-004-PZ 11/4/2015		A8-007A-PZ 9/27/2019		A8-007B-PZ 9/27/2019		A8-007C-PZ 9/27/2019		A8-007D-PZ 9/27/2019	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard
Cancer Risk															
1,4-Dioxane	SVOC		130,000	0.39	3.0E-11	0.39	3.0E-11	N/A	0	N/A	0	N/A	0	N/A	0
Naphthalene	SVOC		200	0.1 U	0	0.11	5.5E-09	N/A	0	N/A	0	N/A	0	N/A	0
1,1-Dichloroethane	VOC		330	1.3	3.9E-08	2	6.1E-08	154	4.7E-06	87	2.6E-06	89.4	2.7E-06	44.6	1.4E-06
1,2-Dichloroethane	VOC		98	1 U	0	1 U	0	1 U	0	0.88 J	9.0E-08	0.91 J	9.3E-08	1 U	0
Benzene	VOC		69	1 U	0	1 U	0	1 U	0	1 U	0	1 U	0	1 U	0
Chloroform	VOC		36	1 U	0	14	3.9E-06	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	1 U	0	1 U	0
Trichloroethene	VOC		74	0.76 J	1.0E-07	1.3	1.8E-07	19.9	2.7E-06	27	3.6E-06	27.4	3.7E-06	15.3	2.1E-06
Vinyl chloride	VOC		25	1 U	0	1 U	0	1.7	6.8E-07	1.7	6.8E-07	1.2	4.8E-07	0.59 J	2.4E-07
Cumulative Vapor Intrusion Risk					1E-07		4E-06		8E-06		7E-06		7E-06		4E-06
Non-Cancer Hazard															
1,1-Dichloroethene	VOC	Hepatic	820	0.94 J	0.001	1 U	0	390	0.48	402	0.49	387	0.47	162	0.20
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	0.76 J	0.03	1.3	0.06	19.9	0.90	27	1.23	27.4	1.25	15.3	0.70
Xylenes	VOC	Nervous	1,600	3 U	0	1.6 J	0.001	3 U	0	3 U	0	3 U	0	3 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		1		2		2		1

				A8-007E-PZ 9/27/2019		A8-007F-PZ 9/27/2019		A8-007-PZ 11/5/2015		A8-007-PZ 9/27/2019		A8-017-PZ 11/5/2015	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard
Cancer Risk													
1,4-Dioxane	SVOC		130,000	N/A	0	N/A	0	44.7	3.4E-09	N/A	0	0.1 U	0
Naphthalene	SVOC		200	N/A	0	N/A	0	0.1	5.0E-09	N/A	0	168	8.4E-06
1,1-Dichloroethane	VOC		330	3.4	1.0E-07	225	6.8E-06	409	1.2E-05	24.2	7.3E-07	1 U	0
1,2-Dichloroethane	VOC		98	1 U	0	2.5	2.6E-07	2.4	2.4E-07	1 U	0	1 U	0
Benzene	VOC		69	1 U	0	0.74 J	1.1E-07	0.61 J	8.8E-08	1 U	0	73.4	1.1E-05
Chloroform	VOC		36	1 U	0	0.44 J	1.2E-07	0.55 J	1.5E-07	1 U	0	1 U	0
Ethylbenzene	VOC		150	1 U	0	1 U	0	1 U	0	1 U	0	50.9	3.4E-06
Trichloroethene	VOC		74	37.2	5.0E-06	25.7	3.5E-06	28.3	3.8E-06	9.7	1.3E-06	1 U	0
Vinyl chloride	VOC		25	0.86 J	3.4E-07	1.2	4.8E-07	1.7	6.8E-07	17	6.8E-06	1 U	0
Cumulative Vapor Intrusion Risk					5E-06		1E-05		2E-05		9E-06		2E-05
Non-Cancer Hazard													
1,1-Dichloroethene	VOC	Hepatic	820	8	0.01	1,440	1.76	874	1.07	63.9	0.08	1 U	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	37.2	1.69	25.7	1.17	28.3	1.29	9.7	0.44	1 U	0
Xylenes	VOC	Nervous	1,600	3 U	0	3 U	0	3 U	0	3 U	0	241	0.15
Cumulative Vapor Intrusion Non-Cancer Hazard					2		3		2		1		0

Yellow highlighted values indicate exceedances of the cumulative vapor intrusion criteria: TCR>1E-05 or THI>1
Conc. = Concentration
U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.
J: The positive result reported for this analyte is a quantitative estimate.

Table 6 - Sub-Parcel A8-3
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-Biphenyl	92-52-4	A8-017-SB-1	0.089		0.028	0.06	10	20.00	410	20	no
1,1-Dichloroethane	75-34-3	A8-003-SB-5	0.0084		0.0084	0.008	10	10.00	16	23,000	no
2,4-Dimethylphenol	105-67-9	A8-003-SB-1	0.019	J	0.019	0.019	10	10.00		1,600	no
2-Butanone (MEK)	78-93-3	A8-017-SB-1	0.025	J	0.0075	0.02	10	40.00		19,000	no
2-Methylnaphthalene	91-57-6	A8-017-SB-1	0.13	J	0.0033	0.045	10	50.00		300	no
Acenaphthene	83-32-9	A8-003-SB-1	0.11		0.0052	0.049	10	40.00		4,500	no
Acenaphthylene	208-96-8	A8-017-SB-1	0.075	J	0.0019	0.03	10	30.00			no
Acetone	67-64-1	A8-017-SB-1	0.18	J	0.025	0.08	10	60.00		67,000	no
Aluminum	7429-90-5	A8-007-SB-1	58,300		10,800	22,090	10	100.00		110,000	no
Anthracene	120-12-7	A8-017-SB-1	0.40		0.0021	0.104	10	60.00		23,000	no
Antimony	7440-36-0	A8-007-SB-1	5.50	J	5.50	5.50	10	10.00		47	no
Aroclor 1254	11097-69-1	A8-008-SB-1	0.071	J	0.071	0.07	5	20.00	0.97	1.5	no
Aroclor 1260	11096-82-5	A8-003-SB-1	0.30		0.18	0.24	5	40.00	0.99		no
Arsenic	7440-38-2	A8-017-SB-7	27.7	J	2.4	7.49	14	85.71	3	48	YES (C)
Barium	7440-39-3	A8-017-SB-1	341		30.7	156	10	100.00		22,000	no
Benz[a]anthracene	56-55-3	A8-008-SB-1	0.49		0.0027	0.19	10	60.00	21		no
Benzaldehyde	100-52-7	A8-003-SB-1	0.056	J	0.056	0.06	1	100.00	820	12,000	no
Benzene	71-43-2	A8-011-SB-1	0.001	J	0.001	0.001	10	10.00	5.1	42	no
Benzo[a]pyrene	50-32-8	A8-003-SB-1	0.60		0.032	0.32	10	40.00	2.1	22	no
Benzo[b]fluoranthene	205-99-2	A8-003-SB-1	0.90		0.005	0.30	10	70.00	21		no
Benzo[g,h,i]perylene	191-24-2	A8-003-SB-1	0.31		0.0024	0.10	10	70.00			no
Benzo[k]fluoranthene	207-08-9	A8-003-SB-1	0.65		0.003	0.21	10	70.00	210		no
Beryllium	7440-41-7	A8-017-SB-1	4.20		0.31	1.60	10	100.00	6,900	230	no
bis(2-Ethylhexyl)phthalate	117-81-7	A8-003-SB-1	0.025	J	0.025	0.03	10	10.00	160	1,600	no
Cadmium	7440-43-9	A8-011-SB-1	7.00		0.16	1.61	10	70.00	9300	98	no
Carbazole	86-74-8	A8-003-SB-1	0.19		0.19	0.19	10	10.00			no
Chromium	7440-47-3	A8-011-SB-1	1,200		20.4	259	10	100.00		180,000	no
Chromium VI	18540-29-9	A8-008-SB-5	0.54	J-	0.54	0.54	10	10.00	6.3	350	no

Table 6 - Sub-Parcel A8-3
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?
Chrysene	218-01-9	A8-008-SB-1	0.50		0.001	0.16	10	80.00	2,100		no
Cobalt	7440-48-4	A8-011-SB-1	9.80		5.2	7.14	10	50.00	1,900	35	no
Copper	7440-50-8	A8-008-SB-1	409		6.7	79.2	10	100.00		4,700	no
Cyanide	57-12-5	A8-003-SB-1	1.80		0.23	0.75	10	50.00		120	no
Dibenz[a,h]anthracene	53-70-3	A8-003-SB-1	0.11		0.0084	0.06	10	20.00	2		no
Di-n-butylphthalate	84-74-2	A8-008-SB-1	0.11	J	0.11	0.11	10	10.00		8,200	no
Fluoranthene	206-44-0	A8-008-SB-1	0.82		0.0011	0.19	10	90.00		3,000	no
Fluorene	86-73-7	A8-017-SB-1	0.079	J	0.00089	0.02	10	70.00		3,000	no
Indeno[1,2,3-c,d]pyrene	193-39-5	A8-003-SB-1	0.32		0.004	0.14	10	40.00	21		no
Iron	7439-89-6	A8-011-SB-1	128,000		10,200	43,050	10	100.00		82,000	YES (NC)
Lead^	7439-92-1	A8-011-SB-1	457		7.4	101	10	100.00		800	no
Manganese	7439-96-5	A8-011-SB-1	23,200		44.1	7,189	10	100.00		2,600	YES (NC)
Mercury	7439-97-6	A8-007-SB-1	0.081	J	0.0035	0.03	10	90.00		35	no
Methylene Chloride	75-09-2	A8-011-SB-5	0.0029	J	0.0029	0.0	10	10.00	1,000	320	no
Naphthalene	91-20-3	A8-011-SB-1	0.43		0.005	0	10	60.00	8.6	59	no
Nickel	7440-02-0	A8-011-SB-1	90.5		8.4	25.0	10	90.00	64000	2,200	no
PCBs (total)*	1336-36-3	A8-007-SB-1	0.18		0.071	0.13	5	40.00	0.94		no
Phenanthrene	85-01-8	A8-017-SB-1	0.57		0.0041	0.18	10	70.00			no
Phenol	108-95-2	A8-011-SB-1	0.035	J	0.025	0.03	10	20.00		25,000	no
Pyrene	129-00-0	A8-008-SB-1	0.74		0.00089	0.19	10	90.00		2,300	no
Styrene	100-42-5	A8-003-SB-1	0.025		0.025	0.03	10	10.00		3,500	no
Tetrachloroethene	127-18-4	A8-008-SB-1	0.005		0.0006	0.003	10	20.00	100	39	no
Toluene	108-88-3	A8-011-SB-1	0.0007	J	0.0007	0.001	10	10.00		4,700	no
Trichlorofluoromethane	75-69-4	A8-007-SB-1	0.01		0.01	0.01	10	20.00		35,000	no
Vanadium	7440-62-2	A8-011-SB-1	2,020		32.9	589.3	10	100.00		580	YES (NC)
Xylenes	1330-20-7	A8-017-SB-7	0.02		0.02	0.02	10	10.00		250	no
Zinc	7440-66-6	A8-011-SB-1	600		23.6	214	10	100.00		35,000	no

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.

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

*PCBs (total) include the sum of all detected aroclor mixtures, including those without RSLs (e.g. Aroclor 1262, Aroclor 1268) which are not displayed.
^Lead is assessed separately through the ALM and IEUBK models.

Table 7 - Sub-Parcel A8-3
Assessment of Lead

Exposure Unit	Surface/Sub-Surface	Maximum Concentration (mg/kg)	Arithmetic Mean (mg/kg)
EU1 (3.36 ac.)	Surface	457	182
	Sub-Surface	54.0	20.4
	Pooled	457	101

Table 8 - Sub-Parcel A8-3
Soil Exposure Point Concentrations

	EU1 (3.36 ac.)					
	EPCs - Surface Soils		**EPCs - Sub-Surface Soils**		**EPCs - Pooled Soils**	
Parameter	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)
Arsenic	**Maximum Value**	9.40	**Maximum Value**	27.7	**Maximum Value**	27.7
Iron	**Maximum Value**	128,000	**Maximum Value**	30,100	**Maximum Value**	128,000
Manganese	**Maximum Value**	23,200	**Maximum Value**	601	**Maximum Value**	23,200
Vanadium	**Maximum Value**	2,020	**Maximum Value**	98.4	**Maximum Value**	2,020

Bold indicates maximum value used as the EPC

Table 9 - Sub-Parcel A8-3
Surface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU1 (3.36 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	**9.40**	3.00	480	3.1E-06	0.02
Iron	**Gastrointestinal**	**128,000**		820,000		0.2
Manganese	**Nervous**	**23,200**		26,000		0.9
Vanadium	**Dermal**	**2,020**		5,800		0.3
					3E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
Bold indicates maximum value
EPC: Exposure Point Concentration
HQ: Hazard Quotient
HI: Hazard Index

Total HI	Cardiovascular	0
	Dermal	0
	Gastrointestinal	0
	Nervous	1

Table 10 - Sub-Parcel A8-3
Subsurface Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU1 (3.36 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	**27.7**	3.00	480	9.2E-06	0.06
Iron	**Gastrointestinal**	**30,100**		820,000		0.04
Manganese	**Nervous**	**601**		26,000		0.02
Vanadium	**Dermal**	**98.4**		5,800		0.02
					9E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
Bold indicates maximum value
EPC: Exposure Point Concentration
HQ: Hazard Quotient
HI: Hazard Index

Total HI	Cardiovascular	0
	Dermal	0
	Gastrointestinal	0
	Nervous	0

Table 11 - Sub-Parcel A8-3
Pooled Soils
Composite Worker Risk Ratios

Parameter	Target Organs	EU1 (3.36 ac.)				
			Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	**27.7**	3.00	480	9.2E-06	0.06
Iron	**Gastrointestinal**	**128,000**		820,000		0.2
Manganese	**Nervous**	**23,200**		26,000		0.9
Vanadium	**Dermal**	**2,020**		5,800		0.3
					9E-06	↓

RSLs were obtained from the EPA Regional Screening Levels at
https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
Bold indicates maximum value
EPC: Exposure Point Concentration
HQ: Hazard Quotient
HI: Hazard Index

Total HI	Cardiovascular	0
	Dermal	0
	Gastrointestinal	0
	Nervous	1

Table 12 - Sub-Parcel A8-3
Surface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	EPC (mg/kg)	EU1 (3.36 ac.)			
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
			Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	**9.40**	75.5	474	1.2E-07	0.02
Iron	**Gastrointestinal**	**128,000**		1,202,707		0.1
Manganese	**Nervous**	**23,200**		17,007		1
Vanadium	**Dermal**	**2,020**		7,662		0.3
					1E-07	↓

Bold indicates maximum
SSLs calculated using equations in 2002 EPA Supplemental Guidance
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
EPC: Exposure Point Concentration
HQ: Hazard Quotient
HI: Hazard Index

Total HI	Cardiovascular	0
	Dermal	0
	Gastrointestinal	0
	Nervous	1

Table 13 - Sub-Parcel A8-3
Subsurface Soils
Construction Worker Risk Ratios

Parameter	Target Organs	EU1 (3.36 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	**27.7**	75.5	474	3.7E-07	0.06
Iron	**Gastrointestinal**	**30,100**		1,202,707		0.03
Manganese	**Nervous**	**601**		17,007		0.04
Vanadium	**Dermal**	**98.4**		7,662		0.01
					4E-07	↓

Bold indicates maximum
SSLs calculated using equations in 2002 EPA Supplemental Guidance
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
EPC: Exposure Point Concentration
HQ: Hazard Quotient
HI: Hazard Index

Total HI	Cardiovascular	0
	Dermal	0
	Gastrointestinal	0
	Nervous	0

Table 14 - Sub-Parcel A8-3
Pooled Soils
Construction Worker Risk Ratios

Parameter	Target Organs	EU1 (3.36 ac.)				
			Construction Worker			
			SSLs (mg/kg)		Risk Ratios	
		EPC (mg/kg)	Cancer	Non-Cancer	Risk	HQ
Arsenic	**Cardiovascular; Dermal**	**27.7**	75.5	474	3.7E-07	0.06
Iron	**Gastrointestinal**	**128,000**		1,202,707		0.1
Manganese	**Nervous**	**23,200**		17,007		1
Vanadium	**Dermal**	**2,020**		7,662		0.3
					4E-07	↓

Bold indicates maximum
SSLs calculated using equations in 2002 EPA Supplemental Guidance
Guidance Equation Input Assumptions:
5 cars/day (2 tons/car)
5 trucks/day (20 tons/truck)
3 meter source depth thickness
EPC: Exposure Point Concentration
HQ: Hazard Quotient
HI: Hazard Index

Total HI	Cardiovascular	0
	Dermal	0
	Gastrointestinal	0
	Nervous	1

APPENDIX A

TRADEPOINT
ATLANTIC
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219

February 17, 2022

Maryland Department of Environment
1800 Washington Boulevard
Baltimore MD, 21230

Attention: Ms. Barbara Brown

Subject: Request to Enter Temporary CHS Review
Tradepoint Atlantic Parcel A8-3

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).

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 A8-3 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 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

TRADEPOINT
ATLANTIC
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219

submitted information it shall issue a COC for the entire parcel described in Tradepoint Atlantic's VCP application.

Alternatively, Tradepoint Atlantic, or another 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,

Peter Haid

Vice President Environmental
TRADEPOINT ATLANTIC
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219
T 443.649.5055 C 732.841.7935
phaid@tradepointatlantic.com

APPENDIX B

Construction Worker Soil Screening Levels
Maximum Allowable Work Day Exposure
Calculation Spreadsheet - Sub-Parcel A8-3

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
Maximum Allowable Work Day Exposure
Calculation Spreadsheet - Sub-Parcel A8-3

Area of site (ac)	Ac	3.36	→ Site-Wide EU
Overall duration of construction (wk/yr)	EW	10	
Exposure frequency (day/yr)	EF	**50**	
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	**17.2**	
Overall duration of construction (hr)	tc	**1,680**	
Overall duration of traffic (s)	Tt	**1,440,000**	
Surface area (m2)	AR	**13,597**	
Length (m)	LR	**117**	
Distance traveled (km)	ΣVKT	**58**	
Particulate emission factor (m3/kg)	PEFsc	**51,896,195**	
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	**10.10**	
Total time of construction (s)	Tcv	**1,440,000**	

Input
Calculation

Chemical	RfD & RfC Sources	^Ingestion SF (mg/kg-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				75.8	18,502	75.5	487	17,048	474
Iron	P	-	-	7.00E-01	-	1	7.00E-01	0.01	1			-	2.50E+01							1,202,707		1,202,707
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	0.01	1			-	6.50E+01							24,270	56,826	17,007
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	0.01	1			-	1.00E+03							8,216	113,653	7,662

*chemical specific parameters found in Chemical Specific Parameters Spreadsheet at https://www.epa.gov/risk/regional-screening-levels-rsls
^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
C: chemical specific parameters found in Cal EPA at https://www.dtsc.ca.gov/AssessingRisk
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

APPENDIX C

Sparrows Point Development - PPE Standard Operational Procedure, Revision 3

Planning, Tracking/Supervision, Enforcement, and Documentation

Planning

- Response and Development Work Plan (RDWP) for each individual redevelopment sub-parcel identifies and documents site conditions.
- RDWP is reviewed and approved by regulators.
- Contractor HASP to address site-specific conditions and PPE requirements:
    - Contractor H&S professional to sign-off on PPE requirements for site workers;
    - Job Safety Analysis (JSA) to be performed for ground intrusive work.
- Project Environmental Professional (EP) assigned to each construction project – monitors project during environmentally sensitive project phases and is available to construction contractor on an as needed basis. EP responsibilities include the following:
    - Dust monitoring
    - Routine ground intrusive breathing space air monitoring
    - Soil tracking
    - Water handling oversight
    - Ground intrusive work observation
    - Notification for unexpected conditions
- Pre-construction meeting identifies EP roles and responsibilities and reviews site conditions.
- Contractor to perform job-site HazCom. HazCom to be addressed in Contractor HASP and include:
    - PPE requirements,
    - Exposure time limits,
    - Identification of chemicals of concern and potential effects of over-exposure (adverse reactions),
    - Methods and routes of potential exposure.
- All personnel that will be performing ground intrusive work within impacted soils shall sign-off on HazCom.
- If, based on a thorough review of Site conditions, it is expected that construction workers will have the potential to encounter materials considered hazardous waste under RCRA or DOT regulations, HAZWOPER-trained personnel will be utilized.

Tracking/Supervision

- Contractor to record any day that there is ground intrusive work and confirm that proper PPE is being worn.
- EP will note ground intrusive work on daily work sheets and perform at least one spot check per day.
- EP will log on daily work sheets PPE compliance for all intrusive work areas at least once per day.

- EP to take example photos of Exclusion Zones/Contamination Reduction Zones periodically.

Work Zones Delineation

- Exclusion Zone – The Exclusion Zones will include the areas proposed for excavation or with active trenches, excavations, or ground intrusive work, at a minimum. Personnel working within the exclusion zone will be required to wear Modified Level D PPE as described in this SOP. EP to take example photos of Exclusion Zones/Contamination Reduction Zones periodically. The Exclusion Zones will be identified each work day.
- Contamination Reduction Zone – This work zone is located outside of the exclusion zone, but inside of the limits of development (LOD). The Contamination Reduction Zone will be located adjacent to the Exclusion Zone, and all personal decontamination including removal of all disposable PPE/removal of soil from boots will be completed in the Contamination Reduction Zone.

Documentation

- Contractor HASP and HazCom.
- Contractor ground intrusive tracking record.
- HASP and HazCom sign-in sheets.
- EP pre-con memos.
- EP daily work sheets.
- Records documenting intrusive work and proper PPE use to be provided in completion report.

Enforcement

- Non-compliance of PPE requirements will result in disciplinary action up to and including prohibition from working on Sparrows Point.

Unknown and/or Unexpected Conditions

If unknown and/or unexpected conditions are encountered during the project that the EP determines to have a reasonable potential to significantly impact construction worker health and safety, the following will be initiated:

1. Job stoppage,
2. TPA and MDE notification,
3. Re-assessment of conditions.

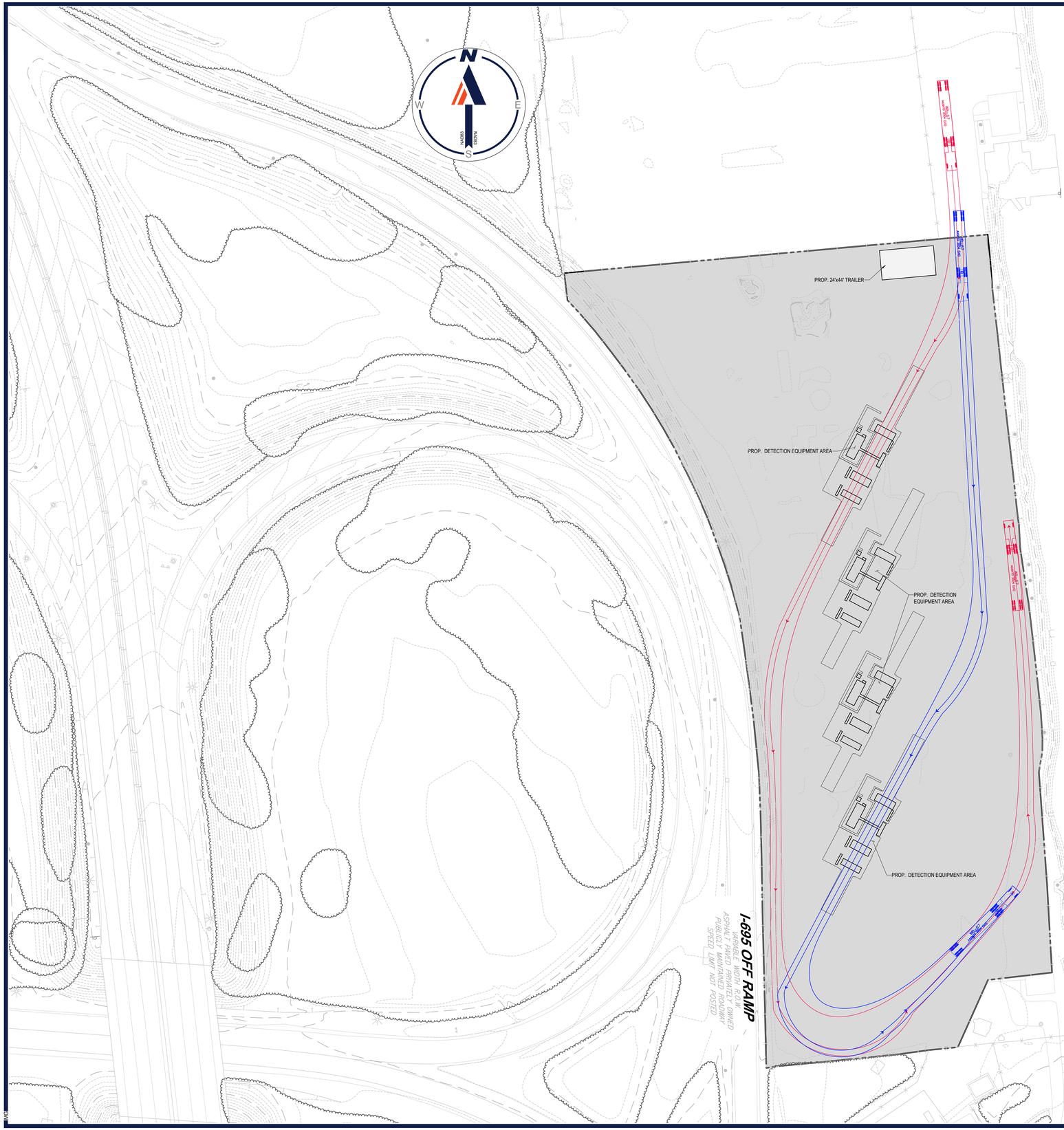
Work will not continue until EP has cleared the area. If hazardous waste is identified, a HAZWOPER contractor will be brought in to address. The approved contingency plan will be implemented, where appropriate.

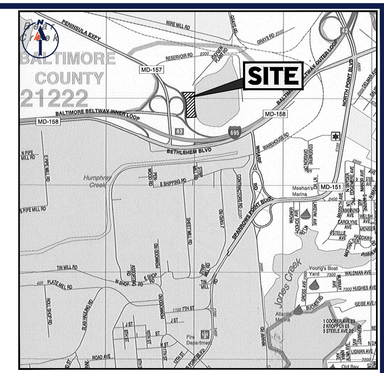
Modified Level D PPE

Modified Level D PPE will include, at a minimum, overalls such as polyethylene-coated Tyvek or clean washable cloth overalls, latex (or similar) disposable gloves (when working in wet/chemical surroundings) or work gloves, steel-toe/steel-shank high ankle work boots with taped chemical-protective over-boots (as necessary), dust mask, hard hat, safety glasses with

side shields, and hearing protection (as necessary). If chemical-protective over-boots create increased slip/trip/fall hazardous, then standard leather or rubber work boots could be used, but visible soils from the sides and bottoms of the boots must be removed upon exiting the Exclusion Zone.

APPENDIX D





LOCATION MAP

SCALE: 1"=2000'

40 20 10 0 40

1"= 40'

H:\2022\MDA220010.00\CAD\DRAWINGS\CONCEPTS\MDA220010.00-CPA-0-----LAYOUT: 1 - CONCEPT PLAN

MJG

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY

811 Know what's below. Call before you dig.

ALWAYS CALL 811

It's fast. It's free. It's the law.

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	MDA220010.00
DRAWN BY:	MJG
CHECKED BY:	MJG
DATE:	02/26/2022
CAD I.D.:	MDA220010.00-CPA-0

PROJECT:

SMITH DETECTION

FOR

TRADEPOINT ATLANTIC

RESERVOIR ROAD
BALTIMORE, MD 21219
TM 111, GRID 14, PARCEL 318
ELECTION DISTRICT 15
COUNCILMANIC DISTRICT 7
BALTIMORE COUNTY

BOHLER

901 DULANEY VALLEY ROAD, SUITE 801
TOWSON, MARYLAND 21204
Phone: (410) 821-7900
Fax: (410) 821-7987
MD@BohlerEng.com

M.J. GESELL

PROFESSIONAL ENGINEER
MARYLAND LICENSE No. 44097
PROFESSIONAL CERTIFICATION
I, MICHAEL J. GESELL, 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. 44097, EXPIRATION DATE: 6/9/23

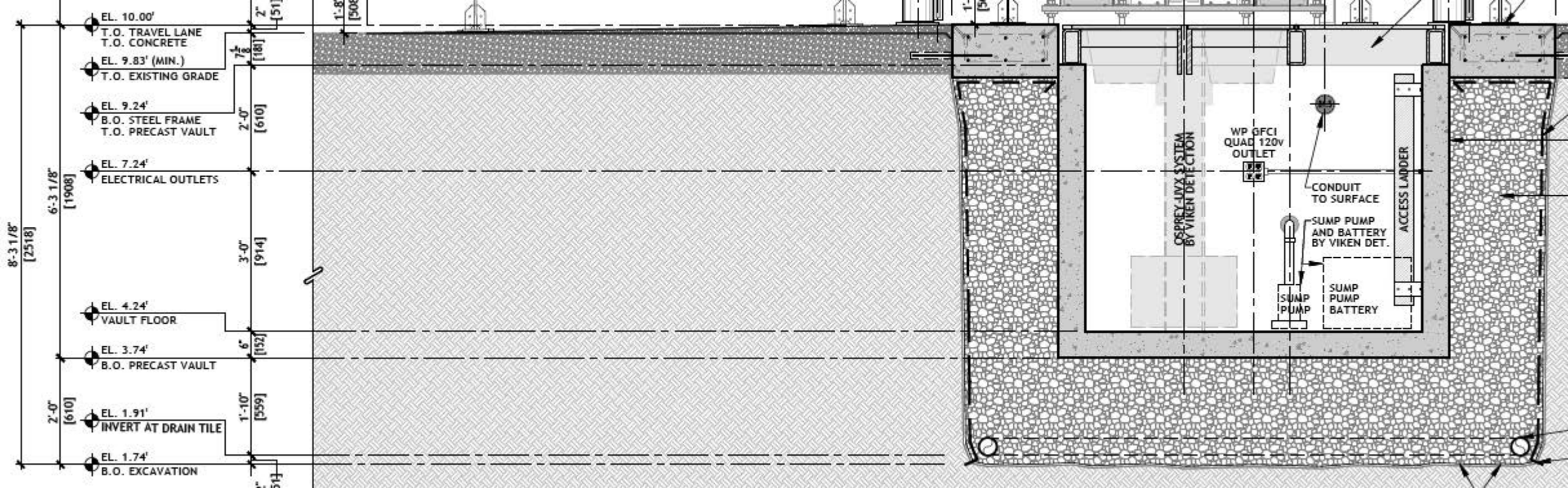
SHEET TITLE:

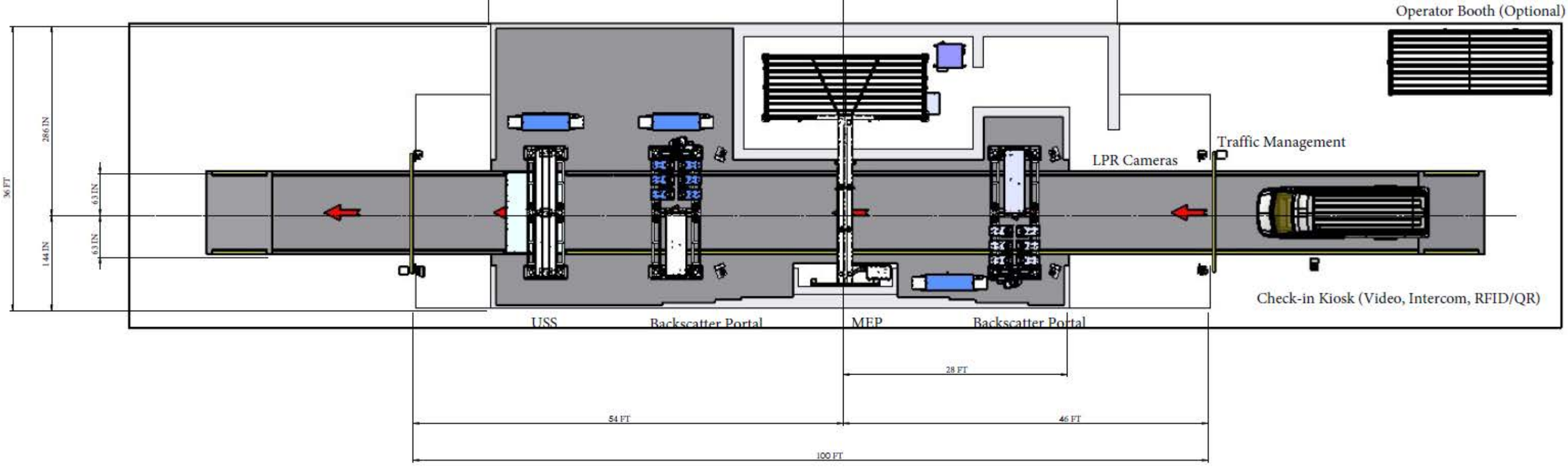
CONCEPT PLAN

SHEET NUMBER:

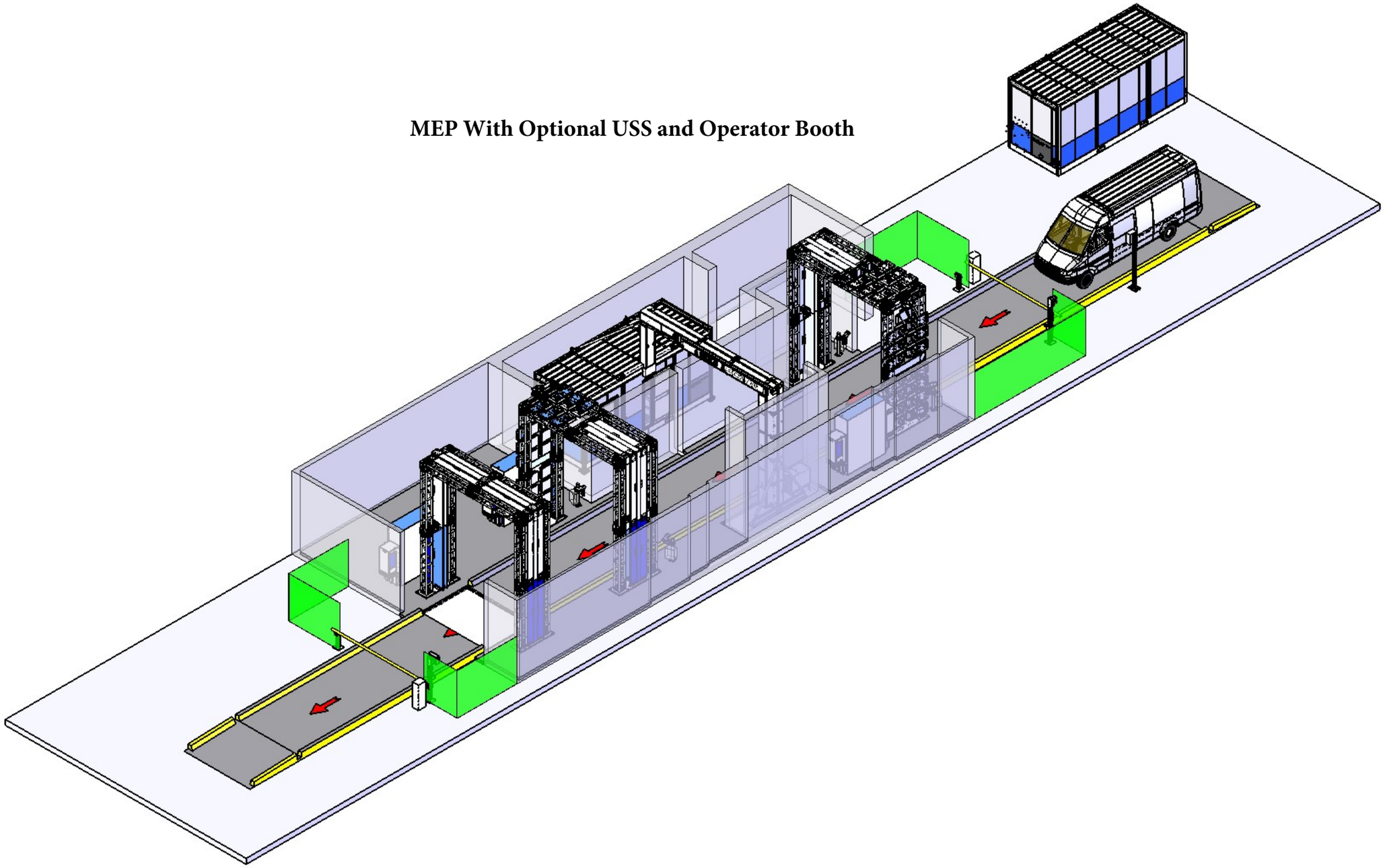
C-301

ORG. DATE - 02/26/2022


EL. 10.00'
T.O. TRAVEL LANE
T.O. CONCRETE
2" [51]
EL. 9.83' (MIN.)
T.O. EXISTING GRADE
7 1/8" [181]
EL. 9.24'
B.O. STEEL FRAME
T.O. PRECAST VAULT
2'-0" [610]
EL. 7.24'
ELECTRICAL OUTLETS
6'-3 1/8" [1908]
3'-0" [914]
EL. 4.24'
VAULT FLOOR
6" [152]
EL. 3.74'
B.O. PRECAST VAULT
2'-0" [610]
1'-10" [559]
EL. 1.91'
INVERT AT DRAIN TILE
EL. 1.74'
B.O. EXCAVATION
8'-3 1/8" [2518]
WP GFCI QUAD 120v OUTLET
CONDUIT TO SURFACE
OSPREY-UVX SYSTEM BY VIKEN DETECTION
SUMP PUMP AND BATTERY BY VIKEN DET.
ACCESS LADDER
SUMP PUMP
SUMP PUMP BATTERY


Operator Booth (Optional)
Traffic Management
LPR Cameras
Check-in Kiosk (Video, Intercom, RFID/QR)
USS
Backscatter Portal
MEP
Backscatter Portal
36 FT
286 IN
144 IN
63 IN
63 IN
28 FT
54 FT
46 FT
100 FT

MEP With Optional USS and Operator Booth



A	MORSBY	MENIVAL	29/04/2021	FIRST ISSUE
Rev.	Drawned by	Checked by	Date	Description

REVISIONS

Material: - Treatement: - Ral color: - Weight: - Kg

Size: A0 Scale: 1:50

SMITHS DETECTION FRANCE S.A.S.

smiths detection
bringing technology to life

System: HCVP 2 SERIES

Subsystem:

Designation: HCVP MEP 3 FACES

Folio 1 / 2

General tolerance :

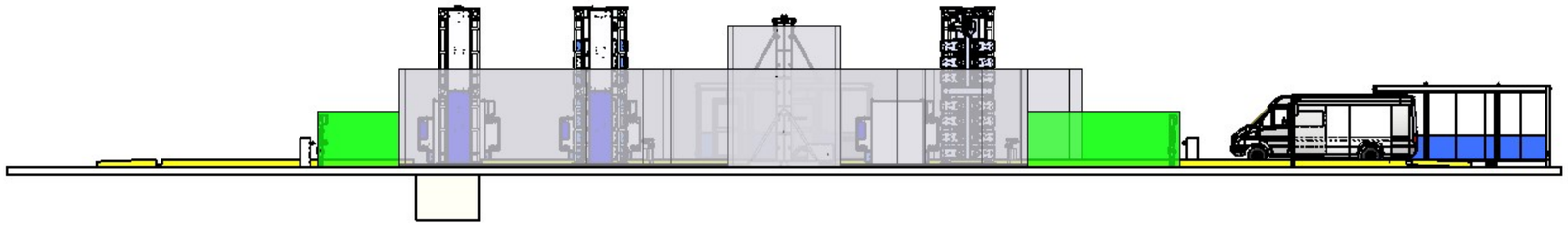
Break sharp corners :

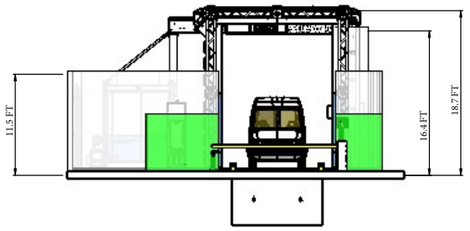
Drawned by: CEM

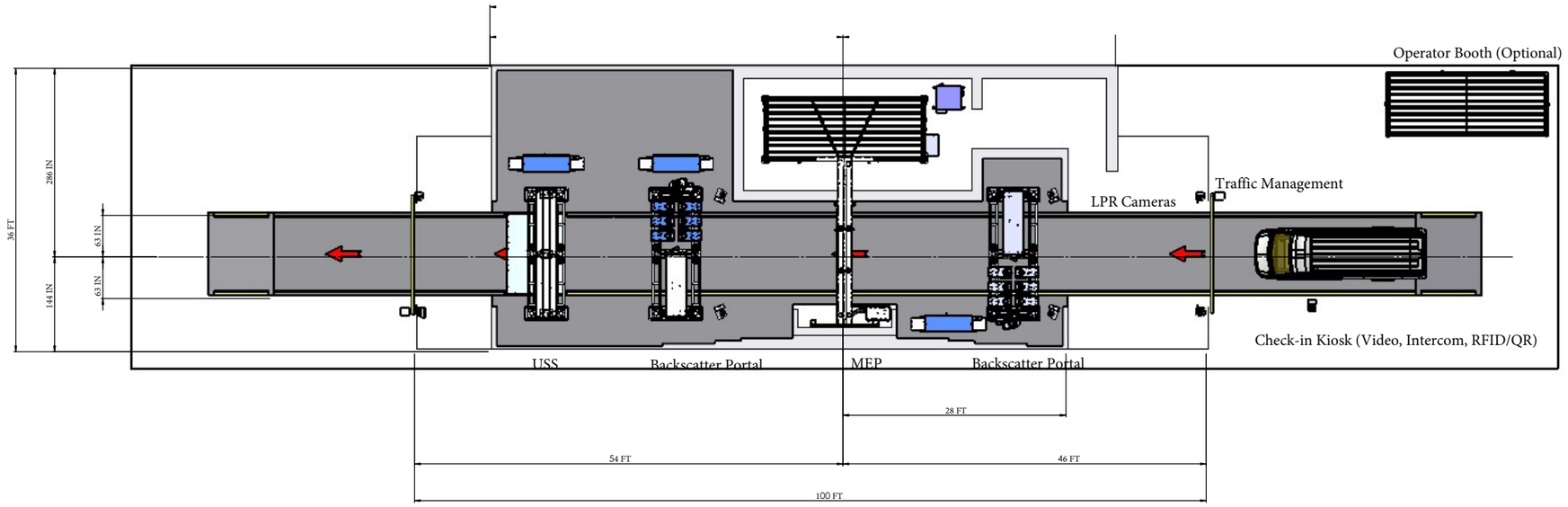
Checked by: WIM

N° MEP Vers. 3

Rev: A
29/06/2021



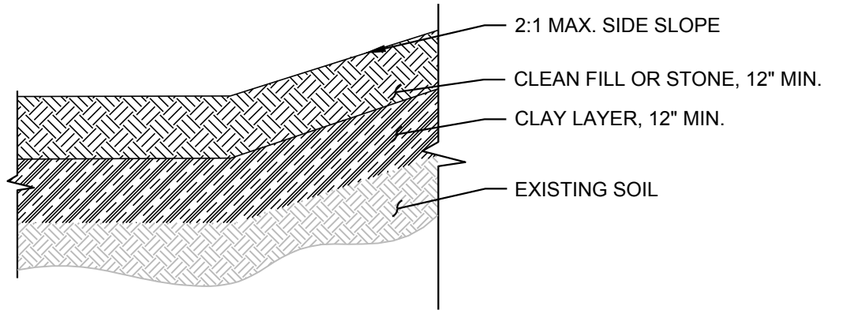


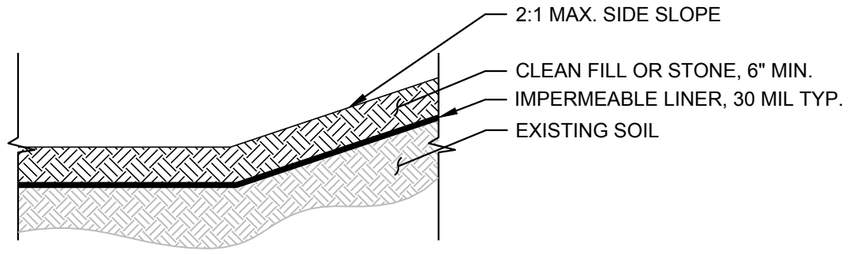


Total Traffic Management Footprint- Configurable by Site

Material: -	Treatment: -	Ral color: -	Weight: - Kg
Size: A0 Scale: 1:75	SMITHS DETECTION FRANCE S.A.S.	smiths detection bringing technology to life	
System: HCVP 2 SERIES	Subsystem:		
Designation: HCVP MEP 3 FACES			Folio 2 / 2
General tolerance :	Break sharp corners :	Drawned by: CEM Checked by: WIM	N° MEP Vers. 3 — Rev: A 29/06/2021

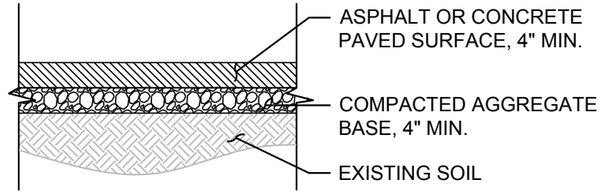
APPENDIX E





TYPICAL POND SECTIONS
NOT TO SCALE

TYPICAL LANDSCAPE SECTION
NOT TO SCALE



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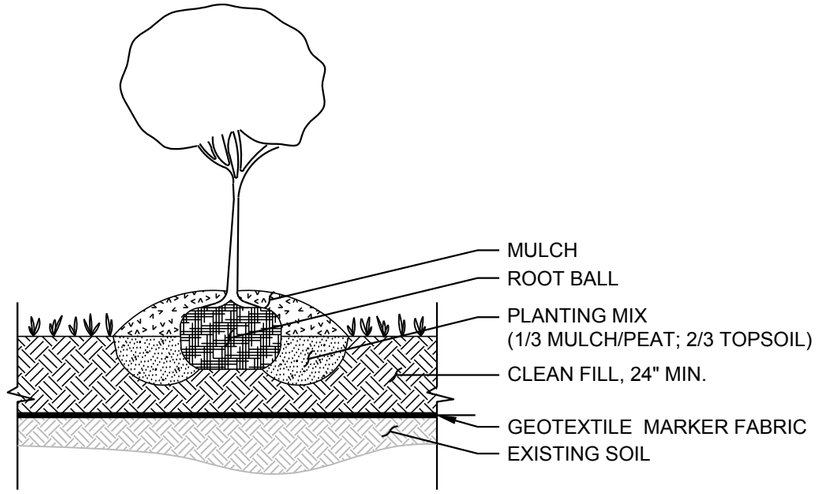
NOT TO SCALE



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 ULTRAVIOLET 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 REQUIREMENTS 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

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	120 (534)	120 (534)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	50 (223)	50 (223)
CBR Puncture Strength	ASTM D6241	lbs (N)	310 (1380)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	1.7	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	135 (5500)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

ARM Group LLC
Engineers and Scientists

designed RJC
checked TNP
drawn RJC
scale N/A
date 9/8/2020
project no. 160443M

drawing title: MINIMUM CAPPING SECTION DETAILS

project title: SPARROWS POINT TRADEPOINT ATLANTIC

SPARROWS POINT
BALT. COUNTY, MARYLAND

Sheet 1

APPENDIX F

GENERAL NOTES:

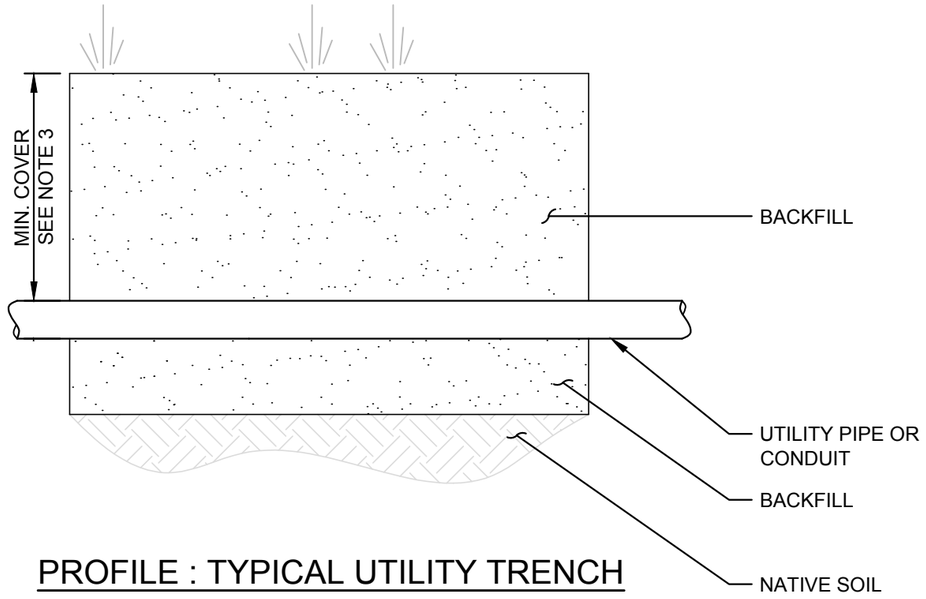
1. ALL PIPES OR CONDUIT SHALL BE LEAK-PROOF AND WATERTIGHT. ALL JOINTS SHALL BE SEALED OR GASKETED.

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.

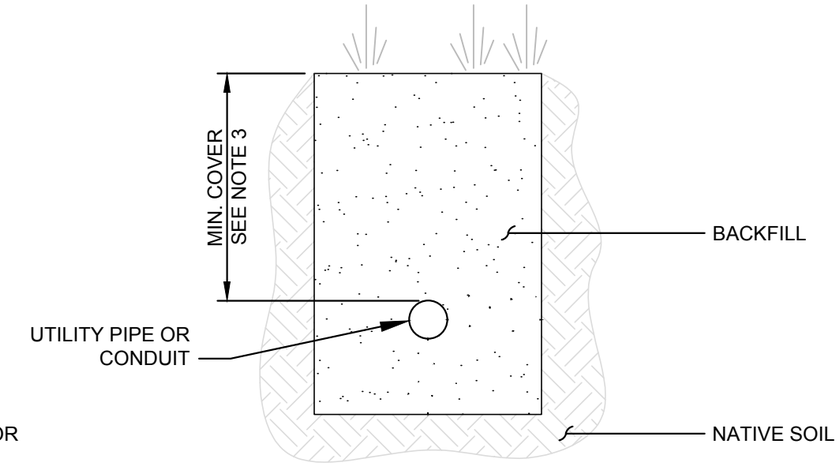
3. MINIMUM COVER ABOVE UTILITY SHALL BE BASED ON SPECIFIC UTILITY REQUIREMENTS.

4. TRENCHES SHALL BE BACKFILLED WITH BEDDING AND MATERIALS APPROVED BY MDE.

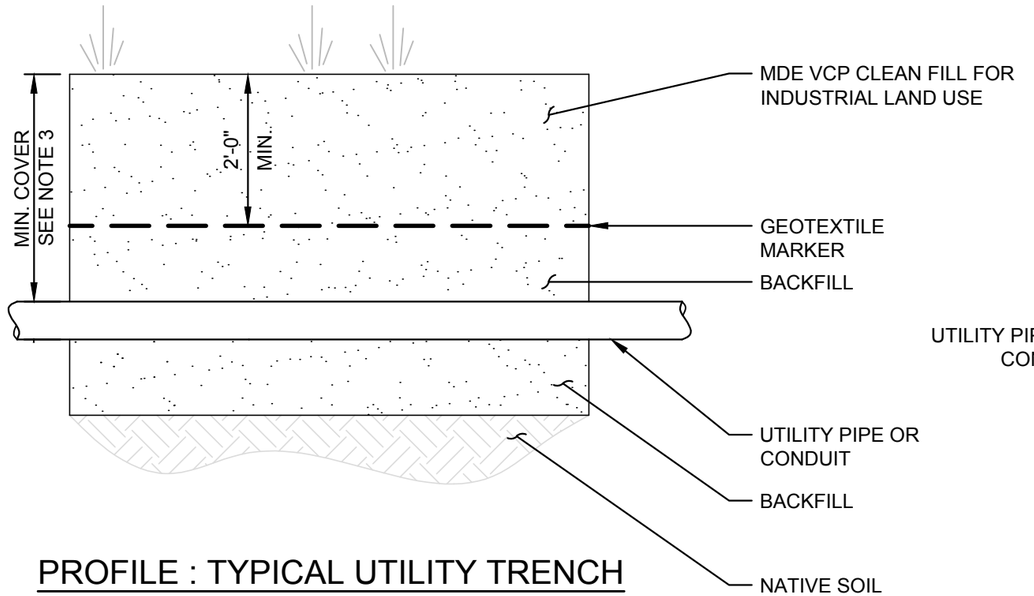
5. FOR ANY UTILITY SEGMENT WHICH GOES THROUGH AN AREA WHICH IS DESIGNATED TO RECEIVE A LANDSCAPED CAP, THE UPPER 2 FEET OF BACKFILL MUST MEET THE REQUIREMENTS OF MDE VCP CLEAN FILL FOR INDUSTRIAL LAND USE. IN THIS CASE THE MDE VCP CLEAN FILL WILL BE UNDERLAIN BY A GEOTEXTILE MARKER FABRIC. UTILITY SEGMENTS WHICH GO THROUGH AREAS WHICH DO NOT REQUIRE CAPPING OR ARE DESIGNATED TO RECEIVED A PAVED CAP WILL BE BACKFILLED WITH MATERIALS APPROVED BY MDE FOR THIS USE.



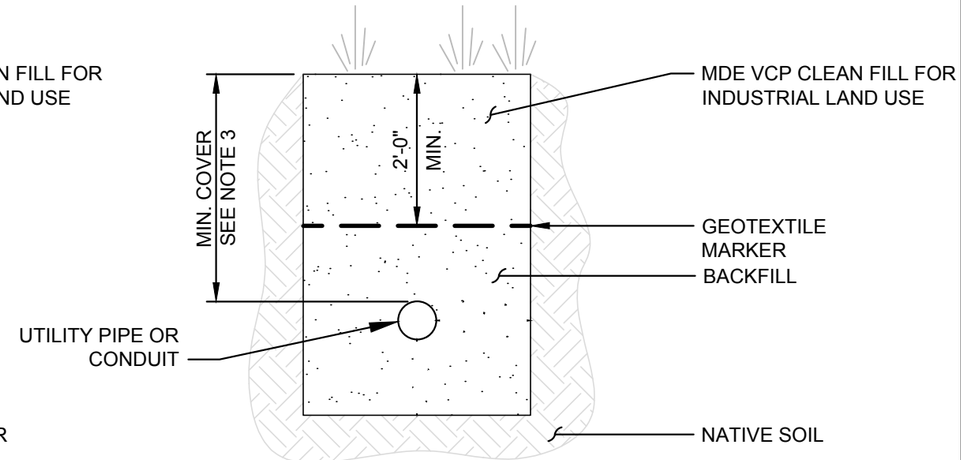
PROFILE : TYPICAL UTILITY TRENCH



SECTION : TYPICAL UTILITY



PROFILE : TYPICAL UTILITY TRENCH
(SEE NOTE 5)



SECTION : TYPICAL UTILITY
(SEE NOTE 5)

ARM Group LLC
Engineers and Scientists

TYPICAL UTILITY
CROSS SECTIONS
Sparrows Point Site
Tradepoint Atlantic

September 2020
1/2" = 1'-0"
160443M

Figure
1

APPENDIX G

Utility Excavation NAPL Contingency Plan

Revision 4 – June 19, 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 NAPL (i.e., containing a sheen or free oil 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™ test kit to characterize the material for appropriate disposal. If a PetroFLAG™ test kit is not available to the contractor, or if the contractor prefers to use fixed laboratory analysis, samples may be characterized via submittal to a laboratory for TPH/Oil & Grease analysis. However, any excavated material containing NAPL (i.e., containing free oil) cannot be characterized for waste disposal using the PetroFLAG™ test kit and must instead be characterized via fixed laboratory analysis, as described in the final paragraph of this section. In addition, any hydrocarbon contaminated soil 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) or an off-site facility 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 (since the Oil Sticks™ method is not quantitative) or via fixed laboratory analysis for TPH/Oil & Grease (if preferred by the contractor or if the PetroFLAG™ test kit is unavailable to the contractor).

Any recovered NAPL will be collected for off-site disposal. As required by the appropriate and MDE approved facility, samples impacted by NAPL (i.e., containing free oil) will be collected for profiling/waste characterization and submitted to a fixed laboratory, as mentioned above, for the following analyses: metals, VOCs, TPH-DRO/GRO, and/or additional analysis required by the selected disposal facility. Upon receipt of any additional characterization analytical results, the MDE will be notified of the proposed disposal facility. Non-impacted material with no 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 as long as all other requirements specified in the Response and Development Work Plan (or similar governing document) are met.

Initial Reporting:

If evidence of NAPL in soil or groundwater is encountered during excavation, it will be reported to the MDE 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, or otherwise be approved by the MDE. 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, flowable fill, or concrete 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. 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 TPA.

4. MINIMUM COVER ABOVE UTILITY SHALL BE BASED ON SPECIFIC UTILITY REQUIREMENTS.

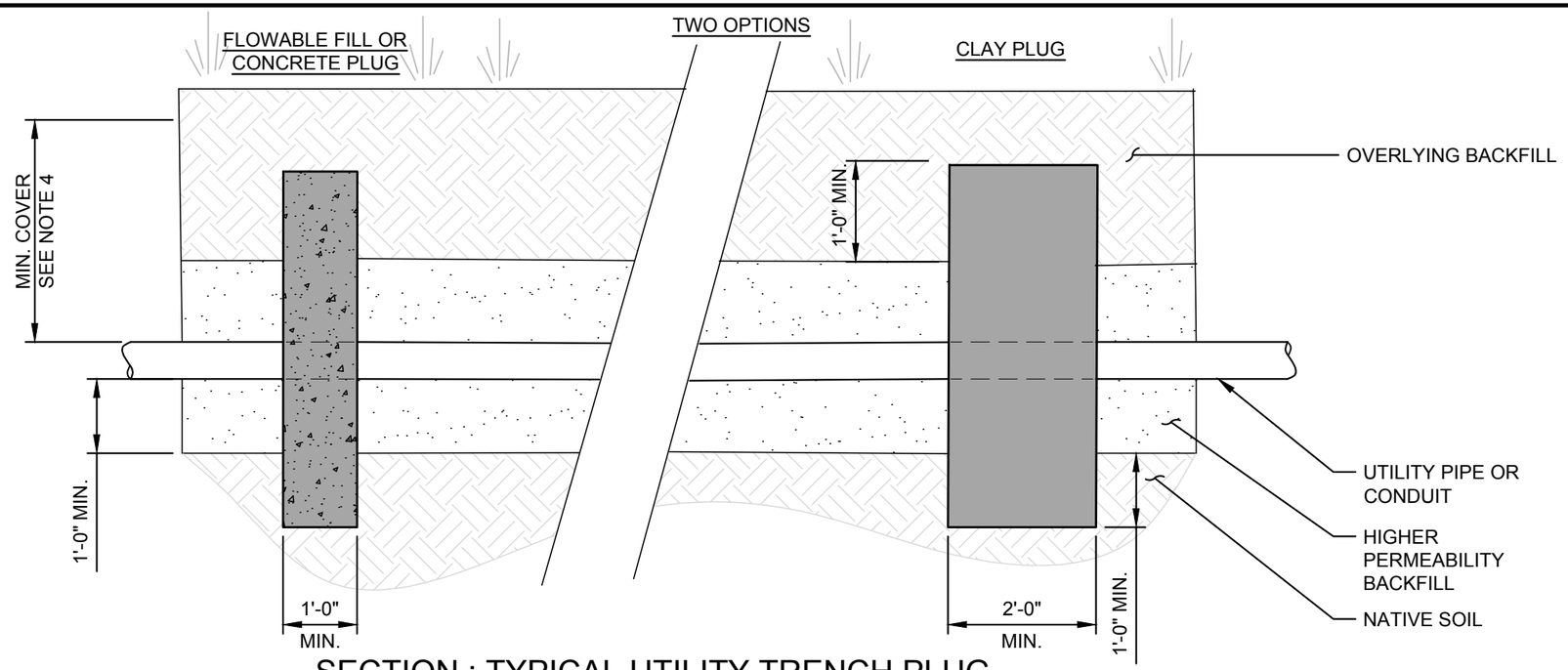
5. TRENCHES SHALL BE BACKFILLED WITH BEDDING AND MATERIALS APPROVED BY MDE.

6. FOR ADDITIONAL REQUIREMENTS, INCLUDING THE USE OF MDE VCP CLEAN FILL FOR INDUSTRIAL LAND USE AND INSTALLATION OF GEOTEXTILE MARKER FABRIC, REFER TO NOTE 5 ON THE TYPICAL UTILITY CROSS SECTIONS.

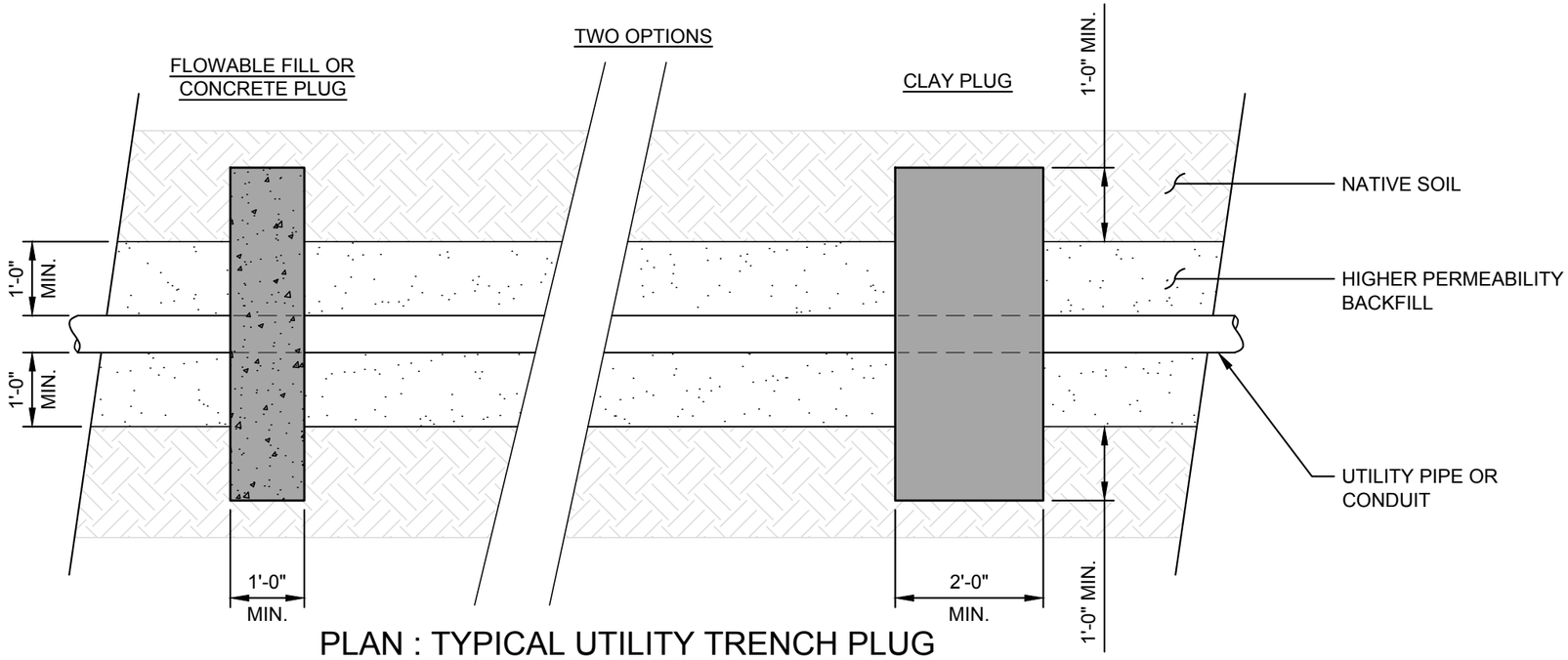
7. ALL UTILITIES INSTALLED THROUGH AREAS CONTAINING NAPL OR ELEVATED CHEMICAL IMPACTS WITH THE POTENTIAL TO TRANSMIT VAPORS ALONG PREFERENTIAL FLOW PATHWAYS SHALL BE EITHER 1) BACKFILLED WITH LOW PERMEABILITY BACKFILL MATERIAL (LESS THAN OR EQUAL TO THE PERMEABILITY OF THE EXISTING SUBGRADE), OR 2) INSTALLED WITH TRENCH PLUGS ALONG THE ALIGNMENT IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS PLAN AND THE FOLLOWING NOTES:

   A.) UTILITY TRENCH PLUGS SHALL BE INSTALLED AT 100-FOOT (MAX.) INTERVALS THROUGH ALL AREAS OF NAPL CONTAMINATION.

   B.) UTILITY TRENCH PLUGS SHALL EXTEND A MINIMUM OF 1-FOOT IN ALL DIRECTIONS BEYOND ANY HIGHER PERMEABILITY BACKFILL MATERIALS (I.E., MATERIALS EXCEEDING THE PERMEABILITY OF THE EXISTING SUBGRADE).



SECTION : TYPICAL UTILITY TRENCH PLUG



PLAN : TYPICAL UTILITY TRENCH PLUG

ARM Group LLC
Engineers and Scientists

UTILITY TRENCH PLUG
Sparrows Point Site
Tradepoint Atlantic

September 2020	Figure
Not to Scale	1
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