ARM Group Inc.
Earth Resource Engineers and Consultants

January 24, 2018

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: Response and Development Work Plan
Sub-Parcel B6-2 (Revision 1)
Responses to Agency Comments
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

On behalf of EnviroAnalytics Group, LLC (EAG), ARM Group Inc. (ARM) is pleased to provide the following responses to comments received from the United States Environmental Protection Agency (USEPA) in an email dated November 21, 2017, and from the Maryland Department of the Environment (MDE) in emails dated November 21, 2017 and January 8, 2018. The USEPA and MDE provided comments on the Response and Development Work Plan (RADWP) for Sub-Parcel B6-2 (the Site) dated October 30, 2017 (Revision 0). The purpose of this Sub-Parcel B6-2 RADWP is to provide an estimate of the potential Construction Worker risk during grading work and utility installations, as well as estimates of overall Composite Worker and child/youth visitor risks for the final retail area which is proposed for development at the Site. Relevant updates in this letter will be applied to future RADWP documents, as applicable. Responses to specific comments are provided below; original comments are included in italics with responses following.

Revised replacement pages (full text and select attachments) are provided to the agencies along with this letter for incorporation into the RADWP for Sub-Parcel B6-2 currently in possession. This submission represents Revision 1 of the RADWP. The attachments to this letter include the complete revised text (**Attachment 1**), revised RADWP tables (**Table 1** through **Table 10**), revised RADWP figures (all except **Figure 1**), six revised RADWP appendices (**Appendix B**, **Appendix C**, **Appendix E**, **Appendix H**, **Appendix I**, and **Appendix J**) and one new appendix (**Appendix F**). This letter also includes one document for agency review (**Reference 1**) which will not be incorporated into the RADWP. Revised cover and spine cardstock sheets are also provided for insertion into the binders. In addition, a CD is provided with a compiled PDF of the full report with the replacement pages inserted along with the updated electronic attachments.

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USEPA Comments Received November 21, 2017:

1. *Section 3.5.1, Analysis Process and Figure 3 – Only A4-016, A4-014, and B6-068 sample results were excluded from the composite worker area EPCs; however, the B6-063 to B6-066 locations and B6-082 location are also outside the composite worker area, but were included. Presumably this is because they are considered proximate enough to the composite worker area to retain; however, this is not discussed in the text. Revise to include.*

   Locations A4-016-SB, A4-014-SB, and B6-068-SB were located along a utility easement to the west of the retail area, as shown on **Figure 3** of the previous submission of the RADWP. Therefore, the analytical results from these borings were considered to be relevant for evaluating potential Construction Worker risks during utility trenching, but not Composite Worker risks because this easement was not going to be developed further or occupied as part of the retail area. Based on development plans recently provided by Tradepoint Atlantic, the utility to the west of the retail area has been eliminated. Instead, the utility will be tied into a sewer system proposed to the east of the retail area (to be completed outside of the scope covered by this RADWP). This rerouting of the utility is also addressed in item #10b, below. Excluding **Figure 1**, all remaining figures in the RADWP have been revised to show the new limit of disturbance (LOD) for the Construction Worker and/or revised development drawing basemaps (provided in the revised **Appendix E**). The Composite Worker Area remains unchanged; the Construction Worker LOD and Composite Worker Area now match.

   Since the western utility easement will be eliminated, boring locations A4-016-SB, A4-014-SB, and B6-068-SB are no longer relevant for the proposed development, and were eliminated from the RADWP and all applicable figures and tables. **Table 1**, **Table 2**, **Table 5**, and **Table 6** were revised to remove the data associated with these soil samples. All figures showing these boring locations were revised. In addition, the Construction Worker Exposure Point Concentrations (EPCs) were updated in the risk assessment tables (**Table 7** through **Table 10**). The EPCs now match between the Construction Worker and Composite Worker because the same soil data is included in each scenario. **Appendix B** and the risk tables were also revised with the new Construction Worker Soil Screening Levels (SSLs) to account for the revised area of the construction LOD (50.5 acres). Since the RADWP also included a discussion of groundwater data obtained along the western utility easement (now excluded), the groundwater analytical results from A4-013-PZ and A4-014-PZ were eliminated from **Table 3** and **Table 4**, and all relevant figures were revised to remove these locations.

The electronic attachments have also been revised to exclude the ProUCL Inputs and Outputs for the former Construction Worker scenario, since the Construction Worker LOD and Composite Worker Area now match. The lead evaluation spreadsheet was revised accordingly. In addition, the laboratory Certificates of Analysis and Data Validation Reports (DVRs) containing the soil and groundwater data from Parcel A4 (ID#s 30164917, 30164303, 30164304, 30176551, and 30179476) have been eliminated because they are no longer relevant. The Laboratory Certificate of Analysis containing the non-validated data from soil boring B6-068-SB (ID# 30188385) has been retained because this certificate also provides data from several other borings within the development area.

2. *Section 3.5.1, Analysis Process – Whenever a non-worker receptor is included in a SLRA, such as the child and youth visitor for this SLRA, the screening for SLRA COPCs must use residential RSLs rather than industrial. While this revision is not necessary for this SLRA, since the entire sub-parcel already requires capping, all future SLRAs with non-worker receptors must use the residential RSLs for screening.*

   The comment is acknowledged, and future RADWPs will incorporate the residential Regional Screening Levels (RSLs) as needed.

3. *Section 3.5.2, SLRA Results and Risk Characterization and Table 6 – Since child and youth visitors are included in the B6-2 SLRA, the lead results must also be compared to the IEUBK-generated residential screening level of 400 mg/kg. Revise accordingly.*

   The requested revision to the lead screening process has been made in the RADWP text as well as in the revised **Table 6**.

4. *Section 3.5.2, SLRA Results and Risk Characterization – RSLs for the child and youth visitor were derived by inputting the child and youth exposure parameters into the RSL Calculator for the Composite Worker. While this approach is generally acceptable, it does not work for any mutagenic carcinogen, because it fails to incorporate the age-dependent adjustment factors (ADAFs). In addition, the youth visitor exposure duration of 12 years is inconsistent with applying the ADAFs, since that indicates a youth is considered to be 6 – 18 years old, but the ADAFs are applicable only to 16. Therefore, the youth visitor RSLs should be re-calculated for 10 years ED, instead of 12 years. In addition for Sub-Parcel B6-2, the child and youth visitor RSLs must be re-calculated for benzo(a)pyrene to incorporate the ADAFs. This should be summarized in a spreadsheet.*

This issue seems to be a case of a difference between USEPA practice and the default exposure parameters stated in Appendix 1 of the June 2008 MDE guidance on cleanup standards. However, the comment is acknowledged and the requested risk assessment for mutagenic carcinogens will be performed for any future commercial development areas. This exercise should not be required for Sub-Parcel B6-2 since the Site already requires a capping remedy for the entire area (as stated by the USEPA in item #2). Capping is required due to the non-cancer hazards associated with a few risk scenarios. The current carcinogenic risks for all exposure scenarios are less than the acceptable limit for no further action of 1E-5, and the revised risk assessment (reducing the exposure duration from 12 years to 10 years) would be expected to further reduce the carcinogenic risks. If required for this development area, the requested mutagenic carcinogen risk assessment can be presented in a separate RADWP Addendum. The construction covered by this RADWP (major grading and utilities) can be approved for implementation independent of this assessment.

5. *Section 4.0, Proposed Site Development Plan, Response Phase, Groundwater Network Abandonment Plan, p. 25-26 –*

    a. *The discussion summarizing the Finishing Mills Groundwater Phase II Investigation Report is confusing because all applicable values (such as the chronic criteria) are not included. This section should be revised to include all of the relevant data discussed.*

This section has been revised to include all of the relevant screening levels discussed in the text. Where referenced in the text, additional attachments have been included in the RADWP within **Appendix F-1** (Finishing Mills Groundwater Phase II Investigation Report Resources) and **Appendix F-2** (Site-Wide Groundwater Study Report Resources). All subsequent appendices have been renumbered. The attachments included in **Appendix F-1** and **Appendix F-2** provide all of the relevant tables and figures from the identified reports for easy reference. Please note: none of these attachments have been modified from the original report submissions; therefore in some cases these attachments display older reporting formats (e.g., outdated parcel boundaries). These older formats do not impact the overall conclusions given in the RADWP.

    b. *There is no salt water chronic criterion for naphthalene as referenced in this section, so it is unclear what naphthalene groundwater results were compared to. Correct and revise accordingly.*

The screening level for naphthalene (1.4 ug/L) was obtained from the Surface Water Benchmarks developed by the USEPA Biological Technical Assistance

Group (BTAG). This screening level was selected because it was used in the Phase I Offshore Investigation Report for the Sparrows Point Site, which was prepared by EA Engineering, Science, and Technology, Inc., PBC (EA) in March 2016. The RADWP text has been revised to indicate that the BTAG value was used because there was no National Recommended Water Quality Criteria (NRWQC) criterion.

c. *Delete the final sentence of the top paragraph on p. 26, and any similar statements. The determination of significant COPCs in groundwater is not solely Tradepoint's decision.*

The referenced statement has been deleted.

6. *Section 4.0, Development Phase, Grading and Site Preparation, p. 27 and Appendix C, Schedule of Intrusive Activities – Section 4 states "Cut and fill grading activities that involve disturbances of potentially impacted soil performed by Construction Workers outside of enclosed vehicle cabs represent intrusive activities and are included in the overall estimated 75-day schedule of intrusive work." This statement is both unclear and contradicts other sections. According to Appendix C, intrusive work shall not exceed 36 days (as opposed to the 75 days in the statement), and Appendix C does not include cut and fill, only earthwork import and place. In addition, the maximum allowable Construction Worker exposure according to the SLRA is 50 days. Provide an explanation and revisions, including adding cut and fill intrusive activity to Appendix C.*

The intrusive construction tasks given in the contractor schedule (**Appendix C**) will be performed by separate crews, and none of the proposed tasks will exceed an exposure duration of 36 days. The total duration of work (75 days) was based on the sum of all of the individual exposure durations prescribed for each intrusive task, but this value was misleading because each task will be performed by a separate crew. References to the total duration of 75 days have thus been removed from the revised RADWP. Please note that the exclusion of analytical data along the western utility easement (which is no longer a component of the development plan) reduced the allowable duration of intrusive work. Revisions have been made to relevant sections of the RADWP text to discuss the proposed schedule of work prior to the risk assessment results. The SLRA was recalculated for the proposed duration of intrusive work (36 days) based on the division of labor.

The statement in the text regarding the intrusive work associated with cut and fill was inaccurate, because this major grading work will be performed by heavy machinery. As demonstrated in the (updated) contractor schedule, which includes a line item for "Cut and Fill Grading Activities", there are no anticipated exposure

days associated with this work (because the work will be performed within enclosed vehicle cabs and will not include manual digging). The referenced statement in Section 4.0 has been modified as appropriate.

MDE Comment Received November 21, 2017:

7. *While MDE has not completed its review, one important note that in any portion of the report that references clean fill or prior approved fill must note that all fill material used as "clean" fill must meet commercial standards not industrial…some material previously approved for industrial may not meet commercial standards and may require additional sampling.*

   Given the proposed future use of the Site, clean fill used at the surface (as a component of a capping remedy) must meet the MDE Voluntary Cleanup Program (VCP) requirements for commercial land use. However, Composite Workers will not be exposed to structural fill below the capping remedy or used as fill within utility trenches below additional VCP caps. Therefore, the references to clean or MDE-approved fill do not need to meet the commercial standards in the context of structural fill or utility fill below a capping remedy. The industrial standards should be appropriate for these cases. For example, the statement in Section 5.1.3 that "slag aggregate can be used as structural fill under areas to be capped without any additional required testing or approvals" remains appropriate since the Site will ultimately be capped. Appropriate changes have been made in the text to clarify whether commercial or industrial standards are required in each case for the particular use of the fill material. This comment was also restated by the agencies on January 8, 2018.

MDE Comments Received January 8, 2018:

8. *The Department understands that the Response and Development Work Plan for Parcel B6-2 covers major grading and utility installation plans only and additional development work for this parcel will be submitted under separate cover. Comments on this plan were submitted by the EPA via email on November 21, 2017.*

   The statement is acknowledged.

9. *Section 1.0 Introduction – Please revise and include a statement that explains that this parcel will be evaluated under the commercial land use as defined by the Voluntary Cleanup Program not retail as stated on page 1.*

   The referenced statement has been modified as requested.

10. *Section 3.3 NAPL in soil borings –*

    a. *Please provide clarification on the current status of B6-068-PZ and B6-056-PZ.*

As stated in Section 3.3, an oil-water interface probe was used to check each piezometer for the presence of NAPL immediately after installation, 48 hours after installation, and again after at least 30 days. NAPL was not detected in B6-056-PZ or B6-068-PZ during these checks, and no delineation activities were warranted. As no measureable product was identified, no significant mobile product is apparent in the soil. The piezometers B6-056-PZ and B6-068-PZ have not been abandoned at this time. Each piezometer will be gauged a final time on the abandonment date to confirm that NAPL has not accumulated in the casing. Please note that location B6-068-PZ is no longer relevant for this RADWP given the modified development boundary; therefore, discussion related to this soil boring and piezometer has been removed in the revised RADWP.

    b. *Provide a more specific timeframe for the submittal of the RADWP Addendum that will detail the rerouting of the main utility line around the delineated NAPL area.*

Tradepoint Atlantic has provided additional development information and revised development drawings which indicate that the force main is no longer proposed to pass through the NAPL delineation area. The revised development drawings are provided in **Appendix E**, and were used as the basemap drawings for the revised **Figure 2a/2b**, **Figure 4**, **Figure 5**, and **Figure 7a/7b**. Based on the realignment of the utilities and elimination of the western easements, appropriate changes have been made throughout the RADWP as documented in this letter.

    c. *Include a brief discussion of the anticipated remediation of the NAPL in the area of B6-066-PZ including whether delineation is considered complete and average depths to NAPL in relation to the depths of the proposed utility installations.*

As stated in the preceding item, the force main is no longer proposed to pass through the NAPL delineation area. The analytical results from borings B6-065-SB and B6-066-SB remain relevant for the Composite Worker SLRA (since these borings are located within reasonable proximity to the Composite Worker Area), so the discussion of NAPL has been retained in this revised RADWP. However, the remediation of NAPL in the vicinity of B6-066-SB is not required to support future use of the Site. Delineation has been deemed to be complete, and response actions to address the NAPL impacts which have been documented in this area will

be coordinated with the MDE under a Work Plan to be submitted for approval in the future. Manual product removal or additional active remediation to remove the NAPL mass in the vicinity B6-066-SB may be required depending on future development needs.

11. *Section 3.5.3 – Contains the following statement: "A small utility corridor evaluated in the Construction Worker LOD is not proposed with a paved environmental cap, but this corridor is outside of the retail area and will be backfilled with MDE-approved materials." Is this area to be permanently restricted to "industrial" land usage? More specific details regarding construction of this corridor must be provided. "Maryland approved materials" is an ambiguous reference and must be clarified.*

    As stated in item #10b, the force main is no longer proposed to the west of the main development area. Therefore, there are no special restrictions for utility fill, etc. since all utilities will be installed within the footprint of the Composite Worker Area which requires a capping remedy. As stated in item #7, references to MDE-approved materials have been clarified in this RADWP. In addition, a new typical utility cross section drawing has been prepared and is included as **Appendix H**, replacing the prior version (formerly **Appendix G**). A revised trench plug figure has also been included with this letter to be incorporated into the NAPL Contingency Plan found in **Appendix I** (formerly **Appendix H**). The revised trench plug figure includes minor formatting modifications and a new note referencing the typical utility cross section drawing.

12. *Section 4.0 Response Phase –*

    a. *This section contains the following statement: "The canal also conveys stormwater from demolition and redevelopment areas, as well as treated effluent from the City of Baltimore Back River Wastewater Treatment Plant (BRWWTP)." Please confirm whether this statement is accurate in regards to the BRWWTP effluent.*

    The Tin Mill Canal (TMC) was historically used to convey treated effluent from the BRWWTP. Although the TMC is no longer used as the primary conveyance system for this effluent (it is discharged though existing stormwater infrastructure), the TMC is still used for overflow discharges when maintenance activities restrict the use of the stormwater outfalls, or when power losses interrupt the use of pump stations at the property. This current status has been updated in the text.

b. *Please note that the Agencies may require permanent monitoring wells to be installed post-development.*

A new statement has been added to the discussion of the groundwater network abandonment plan in Section 4.0 to acknowledge that the agencies may require the installation of permanent monitoring wells in the future following development.

c. *References to fill material throughout the entire work plan must be revised to differentiate between "VCP clean fill" that may be considered part of a future cap and other types of fill material. Please note that all fill material previously evaluated under the Materials Management Plan has been for industrial land use not commercial and additional testing/evaluation may be required if such material is proposed as "VCP clean fill". A more detailed cut/fill diagram and grading schedule must be submitted with the revised RDWP.*

The comment regarding the use of "VCP clean fill" versus other types of fill materials is examined in detail in item #7 above (referencing a comment received form the MDE on November 21, 2017). Appropriate changes have been made in the text to clarify which standards are required in each case for the particular use of the fill material. The Site will be raised with net fill. Since the Site will require imported fill material, there is not expected to be a significant amount of excavated material (if any) which will need to be disposed of off-site. The target start date for grading activities is given in the revised schedule (**Appendix C**), although the actual start date may be modified based on development needs. The revised grading exhibit provided in **Appendix E** shows the current and final ground surface elevations at the Site. Cut and fill areas can be inferred from the grading plan by comparing the current elevations to the final proposed elevations.

d. *Remove the following statement found on page 26 as the Agencies have not yet determined whether this is accurate: "Sufficient analytical data exists such that no additional long-term groundwater monitoring should be needed at the Site."*

The referenced statement has been removed from the text.

e. *This section contains the following statement on page 27: "Tradepoint Atlantic plans to submit a property-wide stormwater management plan to Baltimore County." Provide a detailed status update and schedule for submittal of this plan. The Agencies must be copied as well when the plan is submitted.*

Tradepoint Atlantic will work with the MDE Industrial & General Permits Division in 2018 to renew the property-wide National Pollution Discharge Elimination System (NPDES) permit. A meeting has already been conducted for this purpose. The stormwater management systems for each parcel are reviewed and approved by Baltimore County for each individual development project. A full plan for the property will be designed once more parcels have been completed and there is a greater understanding of how the overall property will be developed. The agencies will be copied when the management plan is submitted.

13. *Section 5.5 – The O&M plan referenced must also include inspection forms for any building slabs to be considered part of the environmental cap.*

    A new statement has been added to the text to require that the building slabs, in addition to exterior pavements, will be subject to the O&M Plan provided in **Appendix J** (formerly **Appendix I**). The RADWP and O&M Plan (text) have also been updated to propose annual inspections of the paved surfaces, rather than semi-annual inspections. Annual inspections for paved capping remedies have been acceptable for other projects completed under the MDE-VCP.

14. *Section 7.0 – Provided a detailed list of information to be provided in the quarterly progress reports. Provide a revised schedule.*

    A list of components to be included in the quarterly progress reports has been added to Section 7.0. The anticipated completion dates for each development milestone have also been updated with input from Tradepoint Atlantic. The construction schedule provided in **Appendix C** has also been updated by the contractor. Although the schedule in **Appendix C** illustrates a February 2018 through May 2018 work period, the actual start date may be modified; however, the duration of intrusive activities will not change if the start date is adjusted.

Additional Revisions:

15. Section 4.0, Development Phase – The section on stormwater management was updated to allow the use of a clay liner in lieu of an impermeable PVC (or equivalent liner) in stormwater ponds. This section was updated in accordance with a previous approval received from the MDE on October 26, 2017 regarding the use of clay liners in Sub-Parcel A3-1. The revised text specifies that placement of the clay material must be performed in such a manner as to ensure that the final permeability of the liner system is demonstrated to be similar to, or better than, the impermeable liner system. If clay material is used, documentation must be provided to the MDE in the Development Completion Report(s) to demonstrate that the permeability of the clay liner is satisfactory.

16. Section 5.1.5, Dust Control – This section was revised to include a new device as an alternative option for dust monitoring (E-Sampler manufactured by Met One Instruments, Inc.). The product brochure for this device has been included as **Reference 1** attached to this letter for agency approval.

17. Section 5.4, Institutional Controls (Future Land Use Controls) – This section was revised to add an additional restriction for non-residential land use only.

If you have any questions, or if we can provide any additional information at this time, please do not hesitate to contact ARM Group Inc. at 410-290-7775.

Respectfully submitted,
ARM Group Inc.

Taylor R. Smith
Project Engineer

T. Neil Peters, P.E.
Senior Vice President

Attachment 1

RESPONSE AND DEVELOPMENT WORK PLAN

AREA B: SUB-PARCEL B6-2
TRADEPOINT ATLANTIC
SPARROWS POINT, MARYLAND

Prepared For:

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Revision 1 – January 24, 2018

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APPENDICES

ELECTRONIC ATTACHMENTS

1.0 INTRODUCTION

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared this Response and Development Work Plan (RADWP) for a portion of the Tradepoint Atlantic property that has been designated for development as Area B: Sub-Parcel B6-2 (the Site). Tradepoint Atlantic submitted a letter (**Appendix A**) requesting an expedited plan review to achieve construction deadlines for the proposed development on this Site. Parcel B6 is comprised of approximately 148.5 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

The Sub-Parcel B6-2 Development Area consists of approximately 50.5 acres within the northern portion of Parcel B6. The TMC (also designated as Parcel B16) flows through the proposed development area, roughly splitting the proposed development of Sub-Parcel B6-2 into northern and southern sections. Response work associated with the TMC is covered by several other documents submitted under separate covers.

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.

An application to enter the Tradepoint Atlantic property into the Maryland Department of the Environment Voluntary Cleanup Program (MDE-VCP) was submitted to the MDE on September 10, 2014. Plans for the property include demolition and redevelopment over the next several years. The property's current use is Tier 3 (Industrial), and the majority of the property is reasonably anticipated to continue with this use in the future. However, certain sub-parcels, including the proposed Sub-Parcel B6-2 Development Area, are proposed to be developed for Tier 2 (Commercial) use as defined by the VCP. The proposed development area is also part of the acreage that remains subject to the requirements of 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.

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 the Site and complement the statutory requirements of the Voluntary Cleanup Program (Section 7-501 of the Environment Article). Upon submission of a Site 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 this 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.

The Site consists of 50.5 acres currently slated for development into a future retail area. The 50.5 acres represents the potential exposure area for a Construction Worker performing major grading and utility installations required at the Site during initial preparatory construction. The same area has been evaluated for potential Composite Worker (and child/youth visitor) exposures following retail development. The proposed major grading and utility installation plans covered by this RADWP are shown in relation to the existing parcel boundaries in the attached **Figure 2a/2b**. Future retail development lots will be subject to individual development updates. The purpose of this RADWP is to provide an estimate of the potential Construction Worker risk during grading work and utility installations, as well as estimates of overall Composite Worker and child/youth visitor risks for the final retail area. The Composite Worker and child/youth visitor risks evaluated herein will be referenced in the future as development plans for individual retail lots are proposed.

This RADWP provides a Site description and history; summary of environmental conditions identified by the Phase I Environmental Site Assessment (ESA); summary of environmental conditions identified by subsequent Phase II Investigations including work associated with the

Parcel B6 Phase II Investigation and Finishing Mill Groundwater Investigation; a human health Screening Level Risk Assessment (SLRA) conducted for the identified conditions; and engineering and institutional controls which have been designed to facilitate the planned Sub-Parcel B6-2 development and address the impacts and potential human health exposures. The engineering and institutional controls include work practices and applicable protocols that are submitted for approval to support the development and use of the Site. Engineering and institutional controls approved and installed as part of this Site RADWP shall be described in closure certification documentation submitted to the MDE demonstrating that the exposure pathways on Sub-Parcel B6-2 are addressed in a manner that protects public health and the environment. The remaining acreage of Parcel B6 will be addressed in future work associated with completion of the obligations of the ACO and associated VCP requirements. 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 Site consists of 50.5 acres in the northern portion of Parcel B6. A narrow section of the TMC also passes through the proposed grading area. Response work associated with the TMC is covered by several other documents submitted under separate covers. The proposed major grading and utility installation plans for the Site are indicated in **Figure 2a/2b**. The Site is currently zoned Manufacturing Heavy-Industrial Major (MH-IM), and is not occupied. The development area covered by this RADWP is located to the north of the former Hot Strip Mill Area. All former buildings have been demolished. There is no groundwater use on-site or within the surrounding Tradepoint Atlantic property.

The Site is at an average elevation of approximately 10 feet above mean sea level (amsl). Existing elevations in the parcel are relatively consistent and range from roughly 7 feet amsl to 14 feet amsl across the Site. Elevations decrease rapidly at the edges of the TMC down to the waterline. Stormwater from Sub-Parcel B6-2 does not have a clear surface runoff direction, but much of the surface water ultimately discharges to the TMC. According to Figure B-2 of the Stormwater Pollution Prevention Plan (SWPPP) Revision 5 dated June 1, 2017, stormwater from the Site is directed to the TMC, which flows to the Humphrey Creek Wastewater Treatment Plant (HCWWTP) for treatment, and is ultimately discharged to Bear Creek through National Pollution Discharge Elimination System (NPDES) Outfall 014.

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 former facilities and processes in the Hot Strip Mill Area (located to the south of the Site) generally included heating and rolling hot bands of metal, and cooling and coiling of the finished products. Several railways which supported the Hot Strip Mill and larger Finishing Mills Area passed through the Site. Minor structures formerly located at the Site included service buildings, access gates, and parking lots.

A small petroleum recovery facility was previously located near the western end of the Site. The oil recovery facility was identified within Weaver Boos' Phase I ESA (dated May 19, 2014) based on historical aerial imagery as being located adjacent to the waterway formerly known as Humphrey Creek. The former recovery facility included a small rectangular surface

impoundment which was diked to separate it from the Humphrey Creek. An additional former impoundment may also have been historically present to the east of the access gate ("G" Gate) located centrally at the Site. This impoundment was identified within Weaver Boos' Phase I ESA from historical aerial imagery as an irregularly shaped image adjacent to the former Humphrey Creek. The area with the "G" Gate impoundment has since been converted into a vehicle parking lot. Both the petroleum recovery facility and the former G" Gate impoundment were classified as Recognized Environmental Conditions (RECs) within Weaver Boos' Phase I ESA. These former RECs are further described below in Section 3.1. More information regarding historical activities can also be found in the Phase II Investigation Work Plan for Parcel B6 (Revision 2 dated May 12, 2016; supplemented by a comment response letter dated November 28, 2016), as well as in the Parcel B6 Phase II Investigation Report (Revision 1 dated May 9, 2017).

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 as part of the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) prepared by A.T. Kearney, Inc. dated August 1993, for the purpose of identifying Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) on the property. This 1991 VSI is regularly cited in the Description of Current Conditions (DCC) Report prepared by Rust Environmental and Infrastructure, dated January 1998 (included with Weaver Boos' Phase I ESA).

Weaver Boos' distinction of a REC or Non-REC was based upon the findings of the DCC Report (which was prepared when the features remained on-site in 1998) or on observations of the general area during their site visit. Weaver Boos made the determination to identify a feature as a REC based on historical information, observations during the site visit, and prior knowledge and experience with similar facilities. The following two RECs were identified within the Site boundary as defined in the Phase I ESA:

Apparent Historical Surface Impoundment ("G" Gate) (REC 22, Finding 273):
According to the Phase I ESA, a small irregular shaped image which may have been a pond was visible on aerial photography, in the area just north of the TMC. The pond was located just east of the "G" Gate along the south side of Route 158, in an area converted to a vehicle parking lot. The pond appeared to discharge a dark plume to the surface waters of the remnant Humphrey Creek (now filled and replaced with the TMC). It is unclear what materials may have been present in the discharge.

TMC Oil Recovery Plant and Impoundment (REC 26, Finding 278):
According to the Phase I ESA, aerial photography indicated that a small oil recovery plant was located just north of the TMC, with a small rectangular surface impoundment located just to the southwest. The impoundment appeared to be diked to separate it from the adjoining surface waters of the Humphrey Creek (now filled and replaced with the TMC). The area may have contained petroleum products and/or potentially hazardous substances.

Relevant SWMUs and AOCs were also identified as located in 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 B6-2 boundaries based on this review.

3.2. PHASE II INVESTIGATION RESULTS (SOIL)

A Phase II Investigation of soil conditions was performed for Parcel B6 (encompassing the entire development area) in accordance with the requirements outlined in the ACO as further described in the Phase II Investigation Work Plan – Area B: Parcel B6 (Revision 2) dated May 12, 2016 (supplemented by a comment response letter dated November 28, 2016). The Work Plan was approved by the agencies on February 16, 2017. Findings from the Parcel B6 Phase II Investigation are presented in the Phase II Investigation Report – Area B: Parcel B6 (Revision 1) dated May 9, 2017, and summarized in this document.

The Phase II Investigation Work Plan was developed to target the specific features which represented a potential release of hazardous substances and/or petroleum products to the environment, including the RECs described above as well as numerous other targets defined from former operations that would have the potential for environmental contamination. Samples were also collected at Site wide locations to ensure full coverage of the parcel. A total of 198 soil samples (from 93 boring locations) were collected and analyzed to assess the presence or absence of contamination in Parcel B6. A total of 52 of these samples (from 26 boring locations) were included for the assessment of Sub-Parcel B6-2, as indicated in **Figure 3**. A few select locations (e.g., B6-063-SB, B6-066-SB, and B6-082-SB) are located outside of the development boundary but are within reasonable proximity such that the data from these borings can be considered to be representative of the sub-parcel.

Soil samples were analyzed for the USEPA Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-Volatile Organic Compounds (SVOCs), Total Petroleum Hydrocarbons (TPH) Diesel Range Organics (DRO) and Gasoline Range Organics (GRO), USEPA Target Analyte List (TAL) Metals, hexavalent chromium, and cyanide based on the parcel-specific sampling plan for Parcel B6. During the implementation of the Parcel B6 Work Plan, TPH-DRO/GRO analysis was required at every location, but Oil & Grease analysis was not required or completed (except at a few specific locations which are not relevant for this RADWP). Shallow soil samples (0 to 1 foot) were also analyzed for polychlorinated biphenyls (PCBs). The laboratory Certificates of Analysis (including Chains of Custody) and relevant Data Validation Reports (50% validated soil data) are included as electronic attachments. The laboratory and data validation reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

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

on other direct agency guidance (e.g., TPH-DRO/GRO). **Table 1** and **Table 2** provide a summary of the detected organic compounds and inorganics in the soil samples submitted for laboratory analysis. The PALs for relevant polynuclear aromatic hydrocarbons (PAHs) have been adjusted upward based on revised toxicity data for PAHs published in the USEPA Regional Screening Level (RSL) Composite Worker Soil Table dated June 2017. PAL exceedances in soil relevant to the proposed development area consisted of five inorganics (arsenic, manganese, thallium, vanadium, and lead), one SVOC (benzo[a]pyrene), total PCBs, and DRO. **Figure S-1** through **Figure S-3** present summaries of the soil sample results that exceeded the PALs for inorganics, SVOCs, and DRO, respectively. A PCB exceedance figure was determined to be unnecessary since there was only one exceedance of the applicable PALs (sample B6-056-SB-1 with a result of 1.212 mg/kg for total PCBs).

In addition, there were two boring locations within the proposed development boundary (or directly adjacent) where evidence of possible non-aqueous phase liquid (NAPL) was noted in the soil cores. These locations (B6-056-SB and B6-066-SB) along with the two exceedances of the DRO PAL (B6-054-SB and B6-066-SB) are highlighted on **Figure S-3** and are further described and evaluated in the following section. There were no locations where concentrations of lead exceeded the threshold of 10,000 mg/kg at which delineation would be required. Likewise, none of the PCB detections exceeded the mandatory excavation criterion of 50 mg/kg.

3.3. NON-AQUEOUS PHASE LIQUID IN SOIL BORINGS

There were two samples (from two individual borings) where DRO was detected above the PAL of 6,200 mg/kg: B6-054-SB-4 at 6,840 mg/kg and B6-066-SB-5 at 11,000 mg/kg. Elevated TPH-DRO/GRO concentrations could be indicative of the potential presence of NAPL which could be mobilized during construction associated with utility installations. Soil cores were screened for evidence of possible NAPL contamination during the completion of each soil boring. The field observations were noted on the boring logs (submitted with the Parcel B6 Phase II Investigation Report), and several sample locations had visible sheens or NAPL noted in the soil cores. Two boring locations relevant for the proposed development had physical evidence of possible product in the cores: B6-056-SB and B6-066-SB.

Temporary piezometers were installed at both of the soil boring locations with potential evidence of NAPL noted in the soil cores (B6-056-SB and B6-066-SB). One of the piezometer installation locations (B6-066-SB) also exhibited an elevated detection of DRO above the soil PAL as documented above. The purpose of the delineation piezometers was to assess the potential presence in and/or mobility of NAPL to groundwater. An oil-water interface probe was used to check both piezometers (B6-056-PZ and B6-066-PZ) for the presence of NAPL immediately after installation, 48 hours after installation, and again after at least 30 days.

NAPL was not detected in B6-056-PZ during these checks, and no delineation activities were warranted. As no measureable product was identified, no mobile product is apparent. The

piezometer B6-056-PZ has not been abandoned at this time, but it will be abandoned prior to development in this area. The piezometer will be gauged a final time on the abandonment date to confirm that NAPL has not accumulated in the casing. Measureable NAPL was recorded in the piezometer installed at B6-066-PZ, and the NAPL was subsequently delineated via the installation of additional temporary piezometers in the surrounding area. Delineation has been deemed to be complete, and response actions to address the NAPL impacts which have been documented in this area will be coordinated with the MDE under a Work Plan to be submitted for approval in the future. Manual product removal or additional active remediation to remove the NAPL mass in the vicinity B6-066-SB may be required depending on future development needs. No utilities are currently proposed in the vicinity of this NAPL delineation area.

No physical evidence of product was noted in the soil core of boring B6-054-SB; however, moderate odors and elevated photoionization detector (PID) readings were noted at a depth of 4 feet below ground surface (bgs). This interval was sampled, and subsequently returned a result of 6,840 mg/kg, slightly above the PAL of 6,200 mg/kg. While no physical evidence of product was noted during the Phase II Investigation, it should be acknowledged that the depth of equipment refusal (4 feet bgs) coupled with the elevated detection of DRO indicates that the possible presence of product at this location cannot be ruled out for lower soil depths.

The proximity of DRO-impacted borings (and NAPL delineation piezometers) to proposed utilities is required to be evaluated for development planning. Appropriate protocols are documented in Section 5.1.1 to prevent the mobilization of any product if future utilities are proposed in the vicinity of these impacts. The three borings with possible NAPL and/or elevated DRO are provided on **Figure 4** in relation to the proposed utility alignments. Location B6-066-SB is not located within the limit of disturbance (LOD), but the most severe NAPL contamination has been identified in the vicinity of this boring. A close-up view of this boring location in relation to the currently proposed utility plan, with all delineation piezometers, is provided on **Figure 5**. This figure indicates that the NAPL has been delineated, and there are no concerns related to the alignments of currently proposed utilities. Although free-phase product (i.e., NAPL) has not been identified in the areas of B6-056-SB and B6-054-SB, workers must also use caution if any trenching or excavation is required in the vicinity of these borings.

3.4. PHASE II INVESTIGATION RESULTS (GROUNDWATER)

Groundwater within Parcel B6 was investigated in accordance with the separate Finishing Mills Groundwater Investigation Work Plan (Revision 1) dated July 7, 2016. The Work Plan was pre-approved by the agencies via email on June 28, 2016 following review of a comment response letter on an initial draft (Revision 0). The sampling and analysis plan defined in the Finishing Mills Groundwater Investigation Work Plan was designed to provide a focused investigation of groundwater, with groundwater sample points distributed regularly throughout and along the perimeter of the Finishing Mills Area. Data from the Finishing Mills Groundwater Investigation

pertinent to this RADWP has been evaluated with respect to potential concerns associated with construction activities, with the findings discussed herein.

The overall Finishing Mills Groundwater Investigation has been completed with findings reported in the Finishing Mills Groundwater Phase II Investigation Report (Revision 0) dated November 30, 2016. A total of 13 groundwater samples were collected from temporary groundwater sample collection points (commonly referred to as piezometers) and permanent monitoring wells within Sub-Parcel B6-2: FM-010-PZS, FM-011-PZS, FM-011-PZI, SW-077-MWS, SW-077-MWI, SW-078-MWS, SW-078-MWI, TM10-PZM007, TM12-PZM006, TM14-PZM005, TM16-PZM007, TM17-PZM005, and TM18-PZM005. Of these 13 groundwater sample points, 10 samples were collected from the shallow hydrogeologic zone. Since excavation and trenching activities proposed at the Site will not extend into the intermediate or lower hydrogeologic zones, the discussion of analytical data presented herein is limited to the shallow hydrogeologic zone. The locations of the 10 relevant shallow groundwater sample points are shown on **Figure 6**. Several additional wells (not pictured) were sampled nearby, but are not relevant for this RADWP because they are positioned across the TMC from the development area. Thus, these wells are not representative of groundwater conditions below the portions of the Site where intrusive work will be performed.

These 10 shallow groundwater samples were analyzed for TCL-VOCs, TCL-SVOCs, TAL-Dissolved Metals, TPH-DRO/GRO, hexavalent chromium, cyanide and/or PCBs, based on the project-specific sampling plan. The permanent groundwater wells were additionally analyzed for TAL-Metals (total). The laboratory Certificates of Analysis (including Chains of Custody) and relevant Data Validation Reports (50% validated groundwater data) from the Finishing Mills Groundwater Investigation are included as electronic attachments. The laboratory and data validation reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

Each groundwater sample collection point was inspected for evidence of NAPL using an oil-water interface probe prior to sampling. None of the piezometers or permanent wells relevant for the Site showed evidence of NAPL during these checks (excluding the delineation piezometers described in the preceding section). **Table 3** and **Table 4** present a summary of the organic compounds and inorganic compounds detected in the shallow hydrogeologic groundwater samples, and **Figure GW-1** through **Figure GW-3** present all groundwater sample results that exceeded the PALs. For simplicity, the summary **Figure GW-1** does not include duplicate exceedances of total and dissolved metals at relevant Finishing Mills Groundwater sample locations. If both total and dissolved concentrations exceeded the PAL for a specific compound, the value for total metals is displayed on the figure for each sample. The groundwater PALs for certain PAHs have been adjusted upward from the values presented in the QAPP based on revised toxicity data for PAHs published in the USEPA RSL Resident Tapwater Table dated June 2017.

Groundwater PAL exceedances in the vicinity of the Site consisted of nine inorganic compounds (arsenic, chromium, cobalt, iron, lead, manganese, nickel, thallium, and vanadium), three SVOCs (benz[a]anthracene, naphthalene, and pentachlorophenol), and DRO. While the concentrations of these PAL exceedances on-site do not present a human health hazard since there is no groundwater use, proper water management is required to prevent unacceptable discharges or risks to on-site workers.

3.5. HUMAN HEALTH SCREENING LEVEL RISK ASSESSMENT (SLRA)

A human health Screening Level Risk Assessment (SLRA) was performed for soils relevant for Sub-Parcel B6-2 to determine potential risks to Construction Workers performing the major grading and utility installation activities proposed at the Site, as well as future Composite Workers and potential child/youth visitors to the retail area. The grading and utility installation activities comprise the majority of intrusive work for the Site, and represent the scope of work covered by this RADWP. In the future, retail development lots (subject to individual development updates) will be established at the Site and occupied; child and youth visitors may also be present at the future retail facilities. The purpose of this RADWP is to provide an evaluation of the potential Construction Worker exposures during major grading work and utility installations, as well as evaluation of potential risks to the future Composite Worker and child/youth visitor for the proposed retail use. The Composite Worker and child/youth visitor risks evaluated herein will be referenced in the future as plans for the development of individual retail lots are proposed.

There is no potential for human exposures to groundwater for a Composite Worker or child/youth visitor 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 procedures shall be followed to mitigate risk.

3.5.1. Analysis Process

The SLRA has been conducted for soils to further evaluate the Site conditions in support of the design of necessary response measures. The most recent SLRA evaluation process for the Construction Worker and Composite Worker scenarios is described in the Phase II Investigation Report – Area B: Parcel B6 (Revision 1) dated May 9, 2017. Phase II Investigation soil boring locations relevant for the proposed development are shown on **Figure 7a/7b** in relation to the proposed grading and utility plans. A few select locations (e.g., B6-063-SB, B6-066-SB, and B6-082-SB) are located outside of the development boundary but are within reasonable proximity such that the data from these borings can be considered to be representative of the sub-parcel. Generally, the child and youth visitors were evaluated using the same process as the Composite Worker evaluation, except the screening levels used to determine overall cumulative cariogenic and non-carcinogenic risks were updated as appropriate (described below).

The Sub-Parcel B6-2 Development Area was evaluated for the Construction Worker and Composite Worker scenarios as a shared exposure unit (EU). The child/youth visitor scenarios were also evaluated using the same EU. This shared EU has been designated throughout the remainder of this RADWP as the "Construction Worker LOD" or the "Composite Worker Area", depending on the exposure scenario being discussed. The USEPA and MDE have approved the use of a single EU to evaluate each of these exposure scenarios, as documented in correspondence received from the USEPA on October 19, 2017. The sample locations indicated in **Figure 7a/7b** are within the EU or in close proximity such that they can be considered to be representative of the soils in the EU for risk assessment purposes.

Compounds that are present at concentrations at or above the USEPA Composite Worker RSLs set at a target cancer risk of 1E-6 or target non-cancer Hazard Quotient (HQ) of 0.1 were identified as Constituents of Potential Concern (COPCs) to be included in the SLRA. The COPC screening analysis results for the Sub-Parcel B6-2 Development Area are included in **Table 5** to identify compounds above the relevant screening levels within the site-wide dataset.

3.5.2. Sub-Parcel B6-2 SLRA Results and Risk Characterization

Soil data were divided into three datasets (surface, subsurface, and pooled) for the Sub-Parcel B6-2 Construction Worker and Composite Worker (and child/youth visitor) EU to evaluate potential current and future exposure scenarios. The Construction Worker may be exposed only to surface soils, but subsurface soils would be encountered during construction activities that involve soil disturbances such as excavations or other intrusive earth-moving activities. The pooled data may be applicable for construction work that involves disturbances through the surface soil, since workers would likely not be exposed solely to the subsurface soil. The current Composite Worker or child/youth visitor will be exposed only to surface soils. However, if construction activities were to result in the placement of subsurface material over existing surface soils, a future Composite Worker or child/youth visitor could be exposed to a mixture of surface and subsurface soils.

If the detection frequency of a COPC analyte is less than 5% in a dataset with a minimum of 20 samples, the COPC can be eliminated from the risk analysis assuming the detections are not extremely high (based on agency discretion). A single detection that is extremely high could require delineation rather than elimination. No analyte designated as a COPC in the site-wide dataset had a detection frequency less than 5%, thus no COPCs were removed due to low detection frequencies.

Exposure point concentrations (EPCs) were calculated for each COPC soil dataset (i.e., surface, subsurface, and pooled surface/subsurface) in the site-wide EU using the ProUCL software (version 5.0) developed by the USEPA. ProUCL input tables and output tables derived from the data for each COPC in soils are provided as electronic attachments, with computations presented

and EPCs calculated for COPCs within each of the three datasets (surface, subsurface, and pooled) for the site-wide EU.

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 in the site-wide EU, is also included as an electronic attachment. The average lead concentrations are presented in **Table 6**, which indicates that neither surface, subsurface, nor pooled soils in the EU exceeded an average lead value of 400 mg/kg. The screening criterion for lead was set at an arithmetic mean of 400 mg/kg based on the Integrated Exposure Uptake Biokinetic (IEUBK) model-generated residential screening level, with a secondary limit of 800 mg/kg based on the RSL, and a tertiary limit of 2,518 mg/kg based on the May 2017 updated Adult Lead Model developed by the USEPA (corresponding to a 5% probability of a blood lead level of 10 ug/dL). There were no locations where detections of lead exceeded 10,000 mg/kg.

Construction Worker Assessment:

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

- Stormwater Installation – 18 days;
- Pumping Station/Sewer Installation – 36 days; and
- Water Installation – 21 days

Each of the listed intrusive tasks will be performed by a separate work crew. A table with approximate working dates is provided as **Appendix C** to display the main construction activities covered by this RADWP. This preliminary schedule was provided by the development contractor, and states that no crew performing ground intrusive work will exceed an exposure duration of 36 days (equivalent to the longest individual task listed above). Although the provided schedule in **Appendix C** illustrates a February 2018 through May 2018 work period, the actual start date may be modified; however, the duration of intrusive activities will not change if the start date is adjusted.

The Construction Worker exposure scenario is realistically modeled with the use of a single EU for the proposed construction work, because intrusive work will be conducted throughout the development LOD. The calculated EPCs for the surface and subsurface exposure scenarios for the site-wide Construction Worker are shown in **Table 7**. The supplemental EPCs generated from the pooled surface and subsurface soils are also included in the EPC table. The EPCs generated from the site-wide LOD were evaluated using site-specific Construction Worker Soil Screening Levels (SSLs), which were calculated based on the anticipated maximum exposure duration of 36 intrusive work days.

Risk ratios for the estimates of potential EPCs for the Construction Worker scenario with the selected exposure duration (36 work days) are shown in **Table 8** (surface), **Table 9** (subsurface), and **Table 10** (pooled surface and subsurface soils). The variables entered for calculation of site-specific Construction Worker SSLs (LOD area, input assumptions, and exposure frequency) are indicated as notes on the tables. The spreadsheet used for computation of the site-specific 36-day Construction Worker SSLs is included in **Appendix B**. The SLRA results for the site-wide 36-day exposure scenario are summarized as follows:

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Construction Worker (36 days)	LOD (50.5 acres)	Surface Soil	none	6E-8
		Subsurface Soil	none	1E-7
		Pooled Soil	none	1E-7

Using the 36-day site-wide exposure scenario, the carcinogenic risks for surface, subsurface, and pooled soils were all computed to be less than 1E-5, the acceptable carcinogenic risk level for no further action. In addition, none of the non-carcinogens caused a cumulative HI to exceed 1 for any target organ system for surface, subsurface, or pooled soils using the 36-day exposure duration for the site-wide LOD. This assessment indicates that site-specific health and safety protocols or further action would not be required for the proposed construction if intrusive activities do not exceed 36 work days. Additional worker protective measures beyond standard level D protection are not necessary for the intrusive construction work planned for the Site during this initial phase of development based on the anticipated schedule provided by the contractor (**Appendix C**). If the total duration of site-wide intrusive work would exceed the specified limit of 36 days, the work would need to be completed by a separate crew, or additional health and safety protections would be required. Alternatively, an additional risk assessment would need to be provided to the agencies as an addendum to this RADWP demonstrating that the proposed schedule increase would be acceptable.

General health and safety controls used by Construction Workers (level D protection) are adequate to mitigate risk to Construction Workers for the proposed work according to the provided contractor schedule. Institutional controls will be required to be established for the protection of future Construction Workers in the event of any future development which could include intrusive activities. These institutional controls will need to include a written notice to the MDE of any future soil disturbance activities, health and safety requirements for any excavations, and proper management and characterization of any removed material.

Composite Worker (and Visitor) Assessment:

The calculated EPCs for the surface and subsurface exposure scenarios for the Composite Worker Area (also used for the child/youth visitor scenarios) are shown in **Table 11**. The supplemental EPCs generated from the pooled surface and subsurface soils are also included in the EPC table. Risk ratios for the estimates of potential EPCs for the Composite Worker scenario are shown in **Table 12** (surface), **Table 13** (subsurface), and **Table 14** (pooled soils). Risk ratios for the estimates of potential EPCs for the child visitor scenario are shown in **Table 15** (surface), **Table 16** (subsurface), and **Table 17** (pooled soils), and risk ratios for the estimates of potential EPCs for the youth visitor scenario are shown in **Table 18** (surface), **Table 19** (subsurface), and **Table 20** (pooled soils). The RSLs used for the child/youth visitor scenarios were adjusted from the default Composite Worker RSL values using the USEPA's online RSL Calculator. **Table 15** through **Table 20** display the variables entered for calculation of the adjusted child/youth visitor scenario RSLs (body weight, exposure duration, etc.). The results are summarized as follows:

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Composite Worker	Composite Worker Area (50.5 acres)	Surface Soil	Dermal = 2	2E-6
		Subsurface Soil	Nervous = 2 Dermal = 2	5E-6
		Pooled Soil	Dermal = 2	4E-6
Child Visitor		Surface Soil	Nervous = 6 Dermal = 10	3E-6
		Subsurface Soil	Nervous = 9 Dermal = 12	7E-6
		Pooled Soil	Nervous = 6 Dermal = 9	4E-6
Youth Visitor		Surface Soil	Dermal = 2	1E-6
		Subsurface Soil	Nervous = 2 Dermal = 2	3E-6
		Pooled Soil	Dermal = 2	2E-6

The current Composite Worker will be exposed only to surface soils. The risk ratios indicated that the cumulative cancer risk for the Composite Worker exposure to surface soil was below the acceptable limit for no further action (1E-5). When the non-cancer risks were segregated and summed by target organ for cumulative Hazard Index (HI), the dermal system exceeded a cumulative HI of 1 in surface soils (HI=2) due to elevated metals. Construction activities could result in the placement of subsurface material over existing surface soils exposing a future Composite Worker to a mixture of surface and subsurface soils. The risk ratios indicated that the

cumulative cancer risks for the future Composite Worker scenario were also below the no further action limit when subsurface and pooled soils were evaluated. When the non-cancer risks were segregated and summed by target organ for cumulative HI, the nervous system (HI=2) and the dermal system (HI=2) exceeded a cumulative HI of 1 due to elevated metals. The evaluation of pooled data indicated similar cancer risks and non-cancer hazards as those which were presented in the isolated surface and subsurface evaluations.

The child and youth visitor scenarios were evaluated using the same EU as the Composite Worker (50.5 acres). The calculated EPCs for each parameter identified as a COPC were identical to the values used in the Composite Worker evaluation, but adjusted RSLs were calculated using the USEPA's online RSL Calculator. None of the estimated cumulative carcinogenic risks for any scenario (child and youth visitors evaluated using the surface, subsurface, and pooled soil datasets) exceeded the acceptable level for no further action (1E-5). However, several exposure scenarios for the child/youth visitors exceeded a cumulative HI of 1 when the non-cancer hazard results were summed by target organ. The dermal system and nervous system both exceeded the HI of 1 for several exposure scenarios due to elevated metals detected in the surface and subsurface. Potential hazards caused by elevated metals can be appropriately mitigated via the installation of a physical barrier (i.e., a VCP cap).

Based on these SLRA evaluations for the Composite Worker and child/youth visitor scenarios, the retail area covered by this RADWP requires mitigation of the estimated risks associated with existing soil via a VCP capping remedy. The capping remedy would also include standard institutional controls and long term maintenance requirements. A capping remedy will be implemented for the entire Composite Worker Area indicated in **Figure 7a/7b**. Although the locations of the final retail lots have not yet been established and are subject to individual development updates, each of the retail lots will be required to be completed with a VCP cap, the minimum requirements of which are described in the trailing sections of this RADWP. If a specific area is not ultimately proposed to be completed as a retail lot, this area will also be required to be capped separately to ensure that the entire Composite Worker Area is subject to the capping remedy.

Phased Implementation of Capping Remedy – Schedule Considerations:

The final capping remedy for the Sub-Parcel B6-2 Development Area is proposed to be installed using a phased approach as individual retail lots are designed and completed. Interim measures will be installed to restrict access to uncapped portions of the Composite Worker Area, which is also applicable for the child/youth visitor scenarios, during the interim period to temporarily prevent potential exposures until the required capping remedy is fully implemented. With the temporary restrictions, the Composite Worker and child/youth visitors will not be exposed to potentially impacted soils while commercial activities are being conducted on (completed) paved or otherwise capped

portions of the Site. The proposed temporary restrictions for the uncapped portions of the Site will adequately mitigate potential risks to the Composite Worker and child/youth visitors during the phased implementation of the capping remedy.

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

Results from the SLRA indicate that a remedy of capping with institutional controls (and general health and safety protocols) will be acceptable to mitigate potential current and future Composite Worker and Construction Worker risks. The discussion of the Composite Worker in this section includes the implications for potential child/youth visitor exposure scenarios within the retail area. The proposed interim measures in the Composite Worker Area will provide adequate temporary protection for the Composite Worker while the phased capping remedy is being implemented. The proposed VCP capping remedy for the Composite Worker Area was evaluated for consistency with the CERCLA Threshold Criteria and the Balancing Criteria. The Threshold Criteria assess the overall protection of human health and the environment, as well as achievement of media cleanup objectives and control of sources of releases at the Site. The Balancing Criteria assess long-term effectiveness and permanence; reduction of toxicity, mobility or volume; short-term effectiveness; implementability; cost effectiveness; and community and State acceptance.

Threshold Criteria:

Protect Human Health and the Environment: The assessment against this criterion evaluates how the remedy, as a whole, protects and maintains protection of human health and the environment. This criterion is satisfied when response actions are complete. The purpose of this remedy is to provide a protective barrier between human site users and impacted materials, and to protect the environment by preventing surface water from contacting impacted materials in place. The capping and institutional control remedy would eliminate risk to current and future Composite Workers by preventing exposure to areas of the Site where the cumulative estimated risk to the Composite Worker could potentially 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/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. The groundwater impacts at the Site have been addressed within the Finishing Mills Groundwater Phase II Investigation Report (and will be further discussed in a future comprehensive groundwater study).

Control the Source of Releases: In its RCRA Corrective Action proposed remedies, USEPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. Controlling the sources of contamination relates to the ability of the proposed remedy to reduce or eliminate, to the maximum extent practicable, further releases. None of the soils remaining on-site were identified as exhibiting characteristics of hazardous waste. Sampling results did not indicate localized, discernible source areas associated with the soil and groundwater conditions observed at the Site, with the possible exception of NAPL at two boring locations (B6-056-SB and B6-066-SB). The potential groundwater impacts at the Site have been addressed within the Finishing Mills Groundwater Phase II Investigation Report (and will be further discussed in a future comprehensive groundwater study). The proposed capping remedy will prevent contact with soil COPCs, reducing potential risks to within acceptable levels for future industrial workers. The control measures included in the proposed remedy, such as Materials Management Plan requirements and groundwater use restrictions, provide a mechanism to control and reduce potential further releases of COPCs. This is achieved by eliminating the potential for groundwater use and requiring proper planning associated with intrusive activities.

Balancing Criteria:

Long-Term Reliability and Effectiveness: The assessment against this criterion evaluates the long-term effectiveness of the remedy in maintaining protection of human health and the environment after the response objectives have been met. The primary focus of this criterion is the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. The capping remedy for the Composite Worker Area will permanently contain the contaminated media in place. In order for the cap to effectively act as a barrier, regular inspections will be required to determine if erosion or cracks have formed that could expose workers (or child/youth visitors) to contaminated soils.

Institutional controls (deed restrictions) will be implemented to protect future Composite and Construction Workers against inadvertent contact with potentially impacted soils or groundwater. These institutional controls are anticipated to include a restriction prohibiting the use of groundwater for any purpose, a written notice to the MDE of any

future soil disturbance activities, health and safety requirements for any excavations, and proper management and characterization of any removed material. The Tenant will be required to sign onto the Environmental Covenant with restriction in the No Further Action Letter (NFA). The proposed remedy will maintain protection of human health and the environment over time by controlling exposure to the hazardous constituents potentially remaining in soils and groundwater. The long term effectiveness is high, as use restrictions are readily implementable and easily maintained. Given the historical, heavily industrial uses of the Site and the surrounding area, including the presence of landfills, 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 for the Composite Worker Area will prevent the spread of contaminants in wind-blown dust or stormwater and will prevent infiltration through the impacted unsaturated zone from carrying contaminants to the groundwater. Thus the mobility of contaminants will be reduced by the capping remedy for the Composite Worker Area. The proposed capping remedy will also avoid the short term risks associated with excavating and transporting large quantities of soil which might otherwise be removed for risk mitigation.

Short-term Effectiveness: The assessment against this criterion examines how well the proposed remedy protects human health and the environment during the construction and implementation until response objectives have been met. This criterion also includes an estimate of the time required to achieve protection for either the entire site or individual elements associated with specific site areas or threats. The capping remedy for the Composite Worker Area will be implemented using a phased approach as individual retail lots are completed. The risks to the Composite Worker during implementation will be mitigated by temporary mechanisms which will limit exposures to uncapped portions of the Site, and risks to the Construction Worker during remedy implementation are mitigated by limiting workers to less than 36 days of intrusive work. The short-term risk to site workers following general 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.

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 uses readily available capping techniques including concrete/paving technology.

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 for the Composite Worker Area remedial costs would be incurred as part of the proposed site development, regardless of the presence of impacted soil.

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

A capping remedy with institutional controls would satisfy the CERCLA Threshold Criteria and 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, although the capped areas may need to be expanded to ensure that the requirements are satisfied.

4.0 PROPOSED SITE DEVELOPMENT PLAN

Tradepoint Atlantic is proposing to perform grading and installation of major utilities at the Site, in preparation of developing the Site for future retail use. This proposed work will require construction activities on roughly 50.5 acres of Sub-Parcel B6-2. The proposed future use of the Site is Tier 2B – Restricted Commercial. The remainder of Parcel B6 will be addressed in additional separate development plans in accordance with the requirements of the ACO that will include RADWPs, if necessary.

Certain compounds (organics and inorganics) 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. Current and future adult workers could potentially contact surface or subsurface soil. Construction Workers may contact impacted surface and subsurface soil during earth movement activities associated with future construction activities. Potential risks to future adult workers and child/youth visitors associated with impacts to soil and groundwater exceeding the PALs will be addressed through a remedy consisting of engineering controls (capping of the Composite Worker Area) and institutional controls (deed restrictions). The proposed site development plan provides for a containment remedy and institutional controls that will mitigate future adult workers or child/youth visitors from contacting potentially impacted soil at the Site.

While the concentrations of COPCs in groundwater on-site are not deemed to be a human health hazard since there is no groundwater use, proper water management is required to prevent unacceptable discharges or risks to Construction Workers. Work practices and health and safety procedures governing groundwater encountered during excavation activities will provide protection for Construction Workers associated with excavations or trenching at the Site. Additionally, a restriction prohibiting the use of groundwater for any purpose at the Site will be included as an institutional control in the No Further Action Letter (NFA) and Certificate of Completion (COC) issued by the MDE and a deed restriction prohibiting the use of groundwater will be filed.

General health and safety controls (level D protection) outlined in the site-specific Health and Safety Plan (HASP provided in **Appendix D**) will mitigate any potential risk to Construction Workers from contacting impacted soil and groundwater during development at the Site. The findings of the SLRA indicated that the screening level estimates of Construction Worker cancer risk for the site-specific 36-day exposure frequency were all less than 1E-5 (the acceptable level for no further action). Furthermore, no potential non-cancer hazards above the HI of 1 were identified for any target organ in the development area using the 36-day exposure frequency. If the schedule of site-wide intrusive activities exceeds 36 days, additional site-specific health and safety requirements or additional risk assessment will be warranted.

Drawings for the proposed development in the sub-parcel (grading and utility installations), are provided in **Appendix E**. Clean fill used at the surface as a component of a capping remedy must meet the VCP requirements for commercial land use. Some material previously approved by the MDE for industrial use may require additional sampling to demonstrate that it meets the requirements for commercial use. Processed slag aggregate sourced from the Tradepoint Atlantic property or other materials approved by the MDE for industrial use may be used as structural fill material under areas to be capped. Future Composite Workers (and visitors) will not be exposed to structural backfill or utility trench backfill which is placed at the Site to be covered by a VCP cap.

The exact layout of the retail area has not yet been finalized. Ultimately, the entire Composite Worker Area, which was also evaluated for the child/youth visitor scenarios, will need to be capped in accordance with the VCP capping requirements established in several previous RADWPs. The minimum requirements for the various capping sections are provided below. Once plans for each retail lot are finalized, the MDE and USEPA will be provided with a brief RADWP Addendum detailing the site plan for the retail lot, along with an indication of the proposed final capping remedy, and a discussion of any concerns related to the intrusive work schedule (if any) associated with the construction of the applicable retail lot. Multiple retail lots may be combined into the same addendum if the sequencing of development is conducive to a single submission. The SLRA presented herein will serve as the primary reference document for any future development associated with Sub-Parcel B6-2, and addenda will be prepared and submitted to the agencies as necessary.

The development protocols outlined in the remainder of this document are applicable to the major grading and utility installations at the Site, as well as any supplemental construction activities to be completed after this preparatory work.

The process of completing the proposed construction activities at the Site involves the tasks listed below. As-built and regulatory documentation for the outlined tasks and procedures related to site grading and major utility installations will be provided in a Sub-Parcel B6-2 Interim Completion Report. Development Completion Report(s) will be necessary following the construction of each retail lot embedded within Sub-Parcel B6-2, to ensure that the required capping remedy has been installed in each area.

- **Response Phase**

1. Groundwater network abandonment plan.

Temporary groundwater sample collection points installed during the Finishing Mills Groundwater Investigation have already been properly abandoned in accordance with COMAR 26.04.04.34 through 36. The NAPL screening piezometer B6-056-PZ has not been abandoned at this time, but it will be abandoned prior to development in this area. The

piezometer will be gauged a final time on the abandonment date to confirm that NAPL has not accumulated in the casing. The existing permanent monitoring wells SW-077-MWS, SW-077-MWI, SW-078-MWS, SW-078-MWI, TM10-PZM007, TM12-PZM006, TM14-PZM005, TM16-PZM007, TM17-PZM005, and TM18-PZM005 sampled during the Finishing Mills Groundwater Investigation are also proposed for abandonment under this RADWP. These abandonments should be completed prior to development activities in the vicinity of the wells to ensure that the above-ground casings are not damaged and the wells can be properly abandoned. If the permanent wells cannot be abandoned prior to the start of development, temporary protective measures (flagging, barriers, etc.) may also be installed as necessary to protect the integrity of these wells during grading.

Abandonment Rationale:

Each of the monitoring wells listed above was sampled during the Finishing Mills Groundwater Investigation, with the results presented in the Finishing Mills Groundwater Phase II Investigation Report (Revision 0) dated November 30, 2016. The shallow groundwater results are restated in **Table 3** and **Table 4** of this RADWP. The Finishing Mills Groundwater Investigation also included numerous permanent wells and temporary groundwater sample collection points throughout the Finishing Mills Area which are not relevant to this particular RADWP. As described in the Phase II Investigation Report, these wells provided analytical data to help characterize potential exposure risks to future occupants of the parcel based on the vapor intrusion to indoor air pathway, as well as the potential for surface water quality impacts as indicated by comparison to the USEPA National Recommended Water Quality Criteria (NRWQC) (USEPA 2009) for ecological risk (Saltwater Aquatic Life Continuous Criterion Concentration) and human health risk (Consumption of Organism Only). In some cases, appropriate replacement criteria were used in lieu of the NRWQC if no NRWQC screening level was available for a specific compound (e.g., naphthalene).

The results of the vapor intrusion screening for the Finishing Mills Groundwater Investigation were presented in *Table 11* and *Table 12* of the Phase II Investigation Report which are included in **Appendix F-1**. These results were also presented graphically in *Figure GW-10* of the Phase II Investigation Report, which is reproduced in **Appendix F-1** of this RADWP. These resources showed that the only potential risks from the vapor intrusion to indoor air pathway were due to elevated total cyanide. As stated in the Phase II Investigation Report, the vapor intrusion risks were conservatively screened using total cyanide rather than free cyanide or cyanide amenable to chlorination, and therefore may not be representative of actual vapor intrusion potential. The vapor intrusion screening level for available cyanide is 3.5 mg/L. The Phase II Investigation Report recommended that additional sampling should be completed to determine the

extent to which cyanide in the groundwater is present as free cyanide that could contribute to potential vapor intrusion risks.

Subsequently, a total of 13 representative locations were selected for additional sample collection for available cyanide. Several of these locations were present within the Finishing Mills Area, although none of the 10 permanent wells covered by this RADWP were sampled. The results of the supplemental sampling were discussed in the Site-Wide Groundwater Study Report (Revision 0) dated August 11, 2017, and were presented in *Table 2* and *Figure 13* of this separate report. The table and figure are both reproduced in **Appendix F-2** of this RADWP. The Site-Wide Groundwater Study Report concluded that only a very small fraction of the total cyanide present in groundwater exists as available cyanide. As a result, cyanide does not appear to be a significant COPC when evaluating indoor air vapor intrusion concerns, particularly since the maximum detection of total cyanide in groundwater below Sub-Parcel B6-2 was only 28.8 ug/L, which is a lower concentration than any of the locations selected for supplemental sampling.

As stated above, the NRWQC (or appropriate replacement criteria) were also evaluated to determine potential concerns with respect to ecological risk (Saltwater Aquatic Life Continuous Criterion Concentration) and human health risk (Consumption of Organism Only). Shallow groundwater in most of the Finishing Mills Area appears to discharge to the TMC, which ultimately discharges through the NPDES Outfall 014 after being pumped through the HCWWTP for treatment. The TMC is the focus of future response actions with the ultimate goal of eliminating the need to use the HCWWTP for stormwater runoff management after demolition and redevelopment are complete at the Tradepoint Atlantic property. The canal would still serve to convey runoff from commercial and industrial areas prior to discharge. The groundwater screening results should not be considered an indication of effluent quality at the point of discharge to Bear Creek following treatment in the HCWWTP (or in any stormwater management facility that may be constructed in place of the HCWWTP), or of the surface water quality in Bear Creek following discharge.

Results from the well and piezometer locations adjacent to the TMC were averaged to develop arithmetic mean concentrations for the groundwater discharging to the canal. These average values (for each of the individual compounds which exceeded the NRWQC or alternative criteria) were used for screening purposes since they would be more representative of potential surface water discharges due to mixing. The canal also conveys stormwater from demolition and redevelopment areas. The canal was historically used to convey treated effluent from the City of Baltimore Back River Wastewater Treatment Plant (BRWWTP), and although the canal is no longer used as the primary conveyance system for this effluent it is still used for overflow discharges under certain conditions (due to maintenance activities or pump station power losses). Based on these downstream considerations, the evaluation of groundwater samples against the

surface water standards is a highly conservative assessment of the potential for groundwater impacts at the discharge point to Bear Creek. The results of the surface water screening were presented in *Table 13* of the Finishing Mills Groundwater Phase II Investigation Report. This table has also been reproduced in **Appendix F-1**. These results were also presented graphically in *Figure GW-11* of the Phase II Investigation Report, which is reproduced in **Appendix F-1**. This screening identified parameters that may present a concern with respect to discharges of groundwater to surface water.

The NRWQC Aquatic Life screening level for available cyanide is 1 mg/L, as shown in *Table 13* included in **Appendix F-1**. The screening level for naphthalene (1.4 ug/L) was obtained from the Surface Water Benchmarks developed by the USEPA Biological Technical Assistance Group (BTAG). This screening level was selected because it was used in the Phase I Offshore Investigation Report for the Sparrows Point Site, which was prepared by EA Engineering, Science, and Technology, Inc., PBC (EA) in March 2016. Cyanide (conservatively screened using the reported total cyanide data as discussed above) and naphthalene were identified in the Finishing Mills Groundwater Phase II Investigation Report as the only analytes in shallow groundwater that exceeded the water quality criteria by a factor of more than 10 using the averaged data. As demonstrated above, the fraction of cyanide which exists as available cyanide is expected to be significantly lower than the reported concentrations of total cyanide. Furthermore, the average concentration of total cyanide (121.5 ug/L) used for screening against the NRWQC was primarily influenced by one groundwater point located outside of the development area (SW-081-MWS) with a concentration of 1,350 ug/L. The average naphthalene concentration used for screening against the BTAG criterion exceeded this screening level by less than a factor of 11. Therefore, naphthalene is not considered to be a major concern for potential discharges to Bear Creek. In addition, the maximum concentration of naphthalene reported at the Site covered by this RADWP (12.9 ug/L) was less than the average concentration for shallow groundwater discharges used for screening (14.9 ug/L).

There is no potential for direct human exposure to groundwater for a future 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 work associated with development leads to a potential Construction Worker direct exposure to groundwater, health and safety plans and procedures shall be followed to limit exposure risk. Since the risks associated with vapor intrusion and surface water discharges have been shown to be negligible, the abandonment of the permanent wells in the groundwater monitoring network at the Site is appropriate. The abandonment of these wells will also support the remedial response work associated with the TMC (covered by other documents) by ensuring that the wells are properly abandoned before excavation activities occur along

the canal. It is understood that the agencies may require the installation of additional permanent wells in the future for additional monitoring following site development.

Figure 8 shows the permanent wells and temporary groundwater sample collection points relevant for Sub-Parcel B6-2, and indicates the wells that are proposed to be abandoned. The NAPL screening piezometer B6-056-PZ will also be abandoned (and gauged a final time on the abandonment date). As stated above, the temporary groundwater sample collection points in the Finishing Mills Area have already been abandoned.

- **Development Phase**

1. Erosion and sediment control installation for development.

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. Any soils which are disturbed during the installation of erosion and sediment controls will be replaced on-site and compacted (i.e., may be placed at or near the surface but must be managed to prevent erosion). Any soils replaced at the Site will be capped in the future in accordance with this RADWP.

2. Grading and site preparation.

As indicated on the grading plan in **Appendix E**, grading will include cut and fill which will ultimately raise the elevation at the Site. The current and final (proposed) ground surface elevations are indicated on the grading plan. The Site will be raised with net fill. Since the Site will require imported fill material, there is not expected to be a significant amount of excavated material (if any) which will need to be disposed of off-site. According to the design engineer, on-site grading will involve the excavation (cut) of approximately 47,200 cubic yards of material and the placement (fill) of approximately 321,140 cubic yards of material. (These estimates include a possible expansion of the retail area to the south of the TMC and west of the Composite Worker Area, which is not covered under this RADWP; therefore, the exact quantifies of cut and fill material will differ from these estimates.) Cut and fill grading activities will be performed by Construction Workers inside enclosed vehicle cabs and will not include manual digging. Therefore, cut and fill grading activities will not include any intrusive exposure days since activities performed within vehicle cabs do not represent an exposure risk. As noted in the SLRA, due to the division of labor, no individual crew is scheduled to perform intrusive work for more than 36 work days.

Any material that is not suitable for compaction will be excavated and replaced with subbase material, although it is not anticipated that poor soils will be encountered. Borrow materials will be obtained from MDE-approved sources. Clean fill used at the surface as a component of a capping remedy must meet the VCP requirements for commercial land use. Some

material previously approved by the MDE for industrial use may require additional sampling to demonstrate that it meets the requirements for commercial use. Processed slag aggregate sourced from the Tradepoint Atlantic property or other materials approved by the MDE for industrial use may be used as structural fill material under areas to be capped. Fill sources shall be free of organic material, frozen material, or other deleterious material. In the case that there is excess material, the spoils will be stockpiled at a suitable location in accordance with the Materials Management Plan (MMP) for the Sparrows Point Facility (Papadopulos & Associates, et al., June 17, 2015). This work will be coordinated with MDE accordingly. No excess material will leave the 3,100 acre property without prior approval from MDE.

3. Installation of underground utilities.

Underground utilities will be installed at the approximate locations shown on the plans provided in **Appendix E**. Soil removed from the utility trenches may be replaced on-site and compacted. Any soils replaced at the Site will be capped in the future in accordance with this RADWP. Soil removed from utility trenches cannot be used as fill within the utility trenches unless such material have been approved for such use by the VCP. Additional protocols for the installation of utilities at the Site are provided in Section 5.1.1. Any water removed will be collected to be sampled as described in Section 5.2 and, if acceptable, taken to the on-site wastewater treatment plant. If analytical results indicate the presence of levels of contaminants exceeding levels that are acceptable for treatment at the wastewater treatment plant (as defined in Section 5.2), the water will either be pre-treated through an on-site treatment system and retested prior to pumping to the wastewater treatment plant or will be disposed of at an appropriate off-site facility.

4. Stormwater management.

Stormwater will be conveyed by new piping and inlet connections to stormwater management facilities on the Tradepoint Atlantic property. Tradepoint Atlantic will work with the MDE Industrial & General Permits Division in 2018 to renew the property-wide NPDES permit. A meeting has already been conducted for this purpose. The stormwater management systems for each parcel are reviewed and approved by Baltimore County for each individual development project. A full plan for the property will be designed once more parcels have been completed and there is a greater understanding of how the overall property will be developed. The agencies will be copied when the management plan is submitted.

Minimum stormwater pond section details are indicated in the general capping sections provided in **Appendix G**. An impervious PVC or equivalent liner covered by clean fill (meeting VCP requirements for commercial land use) will be placed in the stormwater pond areas. As an alternative, 2-feet of clay material meeting the VCP clean fill requirements can be used in lieu of an impervious liner, but placement of the clay material must be performed in such a manner as to ensure that the final permeability of the liner system is demonstrated

to be similar to, or better than, the impermeable liner system. If clay material is used, documentation must be provided to the MDE in the Development Completion Report(s) to demonstrate that the permeability of the clay liner is satisfactory. Since a capping remedy is required for the Composite Worker Area, the minimum stormwater pond section thicknesses are applicable to the entire retail area.

5. Floor slabs and paving (future development protocols).

Much of the Site will be covered with floor slabs or paving as the future retail lots are designed and completed. The paved areas will receive a layer of subbase material which will consist of compacted aggregate base. The required minimum thicknesses of all site-wide pavement sections to be placed over the existing soils are indicated in the general capping sections provided in **Appendix G**. All paved areas will be installed with a minimum of 4 inches of compacted aggregate based and a minimum of 4 inches of overlying pavement (asphalt or concrete) surface. Since a capping remedy is required for the Composite Worker Area, the minimum paving section thicknesses are applicable to the entire retail area.

6. Landscaping (future development protocols).

Some areas of the Site may be completed with landscaped caps as the future retail lots are designed and completed. Minimum landscaping section details are indicated in the general capping sections provided in **Appendix G**. Landscaped areas will consist of a minimum of 2 feet of clean fill (meeting VCP requirements for commercial land use) prior to being planted. Trees will be installed with a minimum of 2 feet of clean fill (meeting VCP requirements for commercial land use) around the root ball. A geotextile marker fabric will be placed between the clean backfill and underlying soils. Since a capping remedy is required for the Composite Worker Area, the minimum landscaped section thicknesses are applicable to the entire retail area.

5.0 DEVELOPMENT IMPLEMENTATION PROTOCOLS

5.1. DEVELOPMENT PHASE

This plan specifically discusses protocols for the handling of soils and fill materials in association with grading and major utility installations for the planned Sub-Parcel B6-2 development. The development protocols outlined in the remainder of this document are also appropriate for any supplemental construction activities to be completed after this preparatory work, such as final cap construction (which would need to be separately approved by the agencies prior to implementation). 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 such potential risks for material remaining on-site during the development phase. No soils contaminated with total PCBs in excess of 50 mg/kg have been identified in Sub-Parcel B6-2. There were no samples where detections of lead were identified in excess of 10,000 mg/kg. There were three locations within, or adjacent to, the proposed development area with soil exceedances of the DRO PAL (6,200 mg/kg) and/or potential indications of NAPL in the soil core (B6-054-SB, B6-056-SB, and B6-066-SB). These borings are pictured with the current utility plan in **Figure 4** and **Figure 5**, and should be considered with respect to the utility alignments and inverts prior to trenching in these areas.

Following completion of the SLRA, the screening level estimates of Construction Worker cancer risk for the site-specific 36-day exposure frequency were all less than 1E-5 (the acceptable level for no further action). Furthermore, none of the potential non-cancer hazards were elevated above the HI of 1 for any exposure scenario when the schedule for intrusive construction activities was limited to 36 days in the site-wide LOD. According to the risk assessment performed for the proposed maximum exposure duration of 36 days (equivalent to the longest individual task listed in the construction schedule; **Appendix C**), general worker protective controls (Level D) and health and safety measures will be sufficient for the proposed development, with no additional site-specific requirements.

The screening level estimates of risk for future Composite Workers and child/youth visitors identified several elevated non-cancer hazards for both surface and subsurface soils in the Composite Worker Area. Non-cancer HI values were identified above the no further action limit of 1 for the nervous system and the dermal system due to elevated metals. The proposed capping remedy for the Site is appropriate to mitigate potential hazards related to metals present in the existing soils. The capping remedy will be implemented using a phased approach as individual

retail lots are designed and completed. This remedy will mitigate any potential risks to Composite Workers and child/youth visitors at the Site. As individual retail lots are completed, interim measures will be used to prevent exposures to uncapped areas of the Composite Worker Area while development is ongoing.

5.1.1. Soil Excavation and Utility Trenching

A pre-excavation meeting shall be held to address proper operating procedures for working on-site and monitoring excavations and utility trenching in potentially contaminated material. This meeting shall consist of the construction manager and any workers involved with excavation and/or utility work. During the pre-excavation meeting, all workers shall review the proposed excavation and trenching locations and associated utility inverts in conjunction with existing boring locations to identify areas of potentially elevated petroleum concentrations that may be mobilized by the utility installation. These areas will include screening piezometers impacted with measureable NAPL located to the west of the proposed development (B6-066-PZ and delineation piezometers) and borings which had evidence of free-phase NAPL in the soil cores and/or elevated analytical detections of DRO above the PAL (B6-054-SB, B6-056-SB, and B6-066-SB). **Figure 4** presents the proposed utility plan for the Sub-Parcel B6-2 Development Area, along with the three listed boring locations which may be indicative of areas with potential NAPL contamination. A close-up view of boring location B6-066-SB (with all delineation piezometers) is provided on **Figure 5**. The site-specific HASP for the project shall also be reviewed and discussed during the meeting.

Key soil excavation and backfill activities will be monitored through daily inspections by the environmental professional (EP). Soil excavation and removal activities will occur during utility trenching and grading. 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 all soil excavation activities for signs of potential contamination that may not have been previously identified (as described below).

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

Utility trenches are to be over-excavated to a minimum of one foot on all sides of the proposed utility. All utility trenches will be backfilled with bedding and backfill materials approved by the MDE. Clean fill used at the surface as a component of a capping remedy must meet the VCP

requirements for commercial land use. Some material previously approved by the MDE for industrial use may require additional sampling to demonstrate that it meets the requirements for commercial use if it is to be placed at or near the surface. Processed slag aggregate sourced from the Tradepoint Atlantic property or other materials approved by the MDE for industrial use may be used as utility backfill under areas to be capped. A general utility detail drawing is provided as **Appendix H**. 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 I**) 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 that may not have been previously identified. In particular, soils will be monitored with a hand-held PID for potential VOCs, and will also be visually inspected for the presence of staining, petroleum waste materials, or other indications of contamination that may be different than what was already characterized. If screening of excavated materials by the EP indicates the presence of conditions of potential concern (i.e., sustained PID readings greater than 10 ppm, visual staining, unsuitable waste materials, etc.), such materials shall be segregated for additional sampling and special management. Excavated material exhibiting possible evidence of contamination should be placed in stockpiles (not to exceed 500 cubic yards) on polyethylene sheeting and covered with polyethylene sheeting to minimize potential exposures and erosion when not in use. Stockpiled materials will be sampled in accordance with waste disposal requirements, and properly transported to an appropriate permitted disposal facility. Plans for analysis of segregated soils for any use other than disposal must be submitted to the MDE for approval.

Excavated material that is visibly impacted by NAPL will be segregated and managed in accordance with the requirements specified in the Utility Excavation NAPL Contingency Plan. Excavated material with indicators of possible NAPL contamination will also be containerized or placed in a stockpile (not to exceed 500 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.

5.1.2. Soil Sampling and Disposal

Excavated materials that are determined by the EP to warrant sampling and analysis because of elevated PID readings or other indicators of potential contamination that has not previously been characterized shall be sampled and analyzed to determine how the materials should be managed.

If excavated and stockpiled, such materials should be covered with a polyethylene tarp to minimize potential exposures and erosion. All stockpiled soil may be considered for use as fill at this Site or on other areas of the Tradepoint Atlantic 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. All analytical data for the stockpiled material will be evaluated according to the standard Composite Worker SLRA analysis process. Following calculation of Composite Worker risk ratios for the stockpiled materials, if the cancer risks are less than 1E-4, and the non-cancer hazards (evaluated in terms of the magnitude of the exceedances and other factors such as bioavailability of COPCs) are acceptable, the stockpiled soil will be suitable for use as fill at the Tradepoint Atlantic property under areas to be capped. Otherwise, the materials will be sampled to determine if they are classified as hazardous waste.

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

5.1.3. **Fill**

Processed slag aggregate can be used as structural fill under areas to be capped without any additional required testing or approvals. Other materials approved by the MDE for industrial use may also be used as structural fill under areas to be capped. Material used at the surface as a component of a capping remedy must meet the VCP clean fill requirements for commercial land use. Some material previously approved by the MDE for industrial use may require additional sampling to demonstrate that it meets the requirements for commercial use if it is to be used as a component of the cap. All over-excavated utility trenches will be backfilled with bedding and backfill approved by the MDE. 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 for commercial land use, and a geotextile marker fabric will be placed between the VCP clean fill and any underlying material. A general utility detail drawing is provided as **Appendix H**. Material imported to the Site will be screened according to MDE guidance for suitability.

As described in the SLRA, the risk ratios for COPCs in the Sub-Parcel B6-2 Development Area indicated that soil contaminant concentrations do not exceed acceptable cancer risks and/or non-cancer hazards for future Composite Workers (or child/youth visitors) in capped areas of the Site. Soil excavated on the sub-parcel has been deemed to be suitable for re-use as fill at the Site since the entire Composite Worker Area is to be capped.

5.1.4. **Erosion/Sediment Control**

Erosion and sediment controls will be installed prior to commencing work in accordance with 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. The erosion and sediment controls will be approved by the Baltimore County Soil Conservation District. In addition, the following measures will be taken to prevent contaminated soil from exiting the Site:

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

5.1.5. **Dust Control**

General construction operations, including soil excavation and transport, soil grading, and trenching for utilities will be performed at the Site. In the future, cap installation and final development construction will be performed. 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, dust control measures will be implemented, if warranted when the above activities are performed in areas with potentially impacted soil. The action level proposed for the purpose of determining the need for dust suppression techniques (e.g. watering and/or misting) and/or continuous monitoring during the development activities at the Site will be 3.0 mg/m^3. The lowest of the site-specific dust action levels, OSHA PELs, and ACGIH TLV was selected as the proposed action level.

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

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

Air monitoring will be performed using a ThermoElectron Corporation Personal Data RAM 1000AN dust monitor, a Met One Instruments, Inc. E-Sampler dust monitor, or another equivalent real-time air monitoring device. If the action level (3.0 mg/m³) is exceeded as a result of conditions occurring at the Site, operations will be stopped and dust suppression implemented. The background dust concentration will be utilized to evaluate whether Site activities are the source of the action level exceedance. Background concentrations will be based on measurements over a minimum of a 1-hour period at the upwind Site boundary. This upwind data will be used to calculate a time weighted average background dust concentration. The background dust concentration may need to be recalculated periodically during the work day, based on changed upwind conditions. Operations may be resumed once monitoring indicates that dust concentrations are below the action level.

As applicable, air monitoring will be conducted during development implementation activities in the immediate work zones and surrounding areas to assess levels of exposure to Site workers, establish that the work zone designations are valid, and verify that respiratory protection being worn by personnel, if needed, is adequate. Concurrent with the work zone air monitoring, perimeter air monitoring will also be performed to ensure contaminants are not migrating off-site. Perimeter monitoring will include monitoring along the perimeter of the Site, including both the downwind and upwind portions of the Site. The concentration measured in the downwind portion of the Site shall not exceed the concentration in the upwind portion. If exceedances attributable to Site conditions are identified downwind for more than five minutes, dust control measures and additional monitoring will be implemented. The dust suppression measures may include wetting or misting through the use of a hose connected to an available 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 on-going activities surrounding the Site, it is possible that windblown particulates may come from surrounding areas. As discussed above, the dust concentration in the upwind portion of the Site will be considered when monitoring dust levels in the work zone. A pre-construction meeting will be held to discuss the potential of windblown particulates from other activities impacting the air monitoring required for this response plan. Site contact information will be provided to address the possibility of upwind dust impacts. If dust is observed above the action level (3.0 mg/m³) and it is believed to originate from off-site (i.e., upwind) sources, this will immediately be reported to the MDE-VCP project team, as well as the MDE Air and Radiation Management Administration (ARMA).

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 B6-2 Development Area. While it

is not anticipated that groundwater will be encountered during the proposed development, the following measures are provided as contingencies.

5.2.1. **Groundwater PAL Exceedances**

A total of 10 shallow groundwater samples (FM-010-PZS, FM-011-PZS, SW-077-MWS, SW-078-MWS, TM10-PZM007, TM12-PZM006, TM14-PZM005, TM16-PZM007, TM17-PZM005, and TM18-PZM005) were collected from temporary groundwater sample collection points and permanent monitoring wells within and surrounding the Site. None of the temporary groundwater sample collection points or permanent wells utilized for groundwater sampling showed evidence of NAPL during mandatory checks with an oil-water interface probe. The delineation piezometers installed in the vicinity of B6-066-PZ to the west of the development area did exhibit detections of measurable NAPL, as described in Section 3.3.

PAL exceedances in groundwater in the vicinity of Sub-Parcel B6-2 consisted of nine inorganic compounds (arsenic, chromium, cobalt, iron, lead, manganese, nickel, thallium, and vanadium), three SVOCs (benz[a]anthracene, naphthalene, and pentachlorophenol), and DRO. While the concentrations of these PAL exceedances are not deemed to be a human health hazard since there is no on-site groundwater use, proper water management is required to prevent unacceptable discharges or risks to on-site workers.

5.2.2. **Dewatering**

Dewatering during construction may be necessary for underground utility work (trenches/excavations) and stormwater pond installation. If dewatering is required, 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 pumped to the HCWWTP. The water pumped to the HCWWTP will be treated and discharged in accordance with NPDES Permit No. 90-DP-0064A; I. Special Conditions; A.4; Effluent Limitations and Monitoring Requirements.

The EP will inspect the water that collects in the excavations/trenches. If the water exhibits indications of significant contamination (sheen, odor, discoloration, presence of product), or if the excavation/trench is within a known area of significant groundwater contamination (if groundwater is the source of the intrusive water) or a significant Phase II Investigation target, the water may be sampled and analyzed for some or all of the analyses listed below. The analyses run will be dependent on the suspected source of contamination and local site conditions.

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

Documentation of any water testing, as well as the selected disposal option, will be reported to the MDE in the Interim Completion Report (and any subsequent Development Completion Report(s), as applicable).

5.3. HEALTH AND SAFETY

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

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

5.4. INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS)

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

- A restriction prohibiting the use of groundwater for any purpose at the Site and a requirement to characterize, containerize, and properly dispose of groundwater in the event of deep excavations encountering groundwater.
- Restriction for non-residential land use only.
- Notice to MDE prior to any future soil disturbance activities at the Site. This written notice will be required at least 30 days prior to any planned excavation activities.

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

Ultimately, the responsible party will file any required deed restrictions as defined by the MDE VCP in the NFA and COC. The VCP capping sections to be installed in the Composite Worker Area will be subject to long-term maintenance requirements for the containment remedy, as outlined in the following section. The entire Site will be subject to the groundwater use restriction.

The Tenant will be required to sign onto the Environmental Covenant with restriction in the NFA. 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.

Maintenance requirements will include maintenance of the capped areas in the Composite Worker Area to minimize degradation of the cap which could lead to exposures to the underlying soil. An Operations and Maintenance Plan (O&M Plan) for the capped areas in the Composite Worker Area is included in **Appendix J**. The O&M Plan will be applied to both exterior pavements (parking lots and roads) and interior pavements (building slabs), as well as any landscaped areas. The O&M Plan includes the inspection protocols for paved and landscaped areas, and specifies that annual inspections will be completed to evaluate the condition of the capping remedies. Inspection forms are provided in the O&M Plan for paved areas (both interior and exterior) and landscaped areas. Since the proposed capping remedy will be phased as individual retail lots are designed and completed, the capped areas will become subject to the requirements of the O&M Plan as they are completed.

The responsible party will perform cap maintenance inspections, perform maintenance of the cap, and retain cap inspection records. Areas of the pavement cap in the Composite Worker Area that have degraded to a Pavement Condition Index (PCI) of 4.0 will be repaired within 30 days of discovery. The MDE shall be notified within 10 business days of any repairs that are the result of a PCI of 4.0 or greater. The notification will include documentation of the conditions being repaired and the location of the repair.

In addition, MDE will be provided with a written notice at least 30 days prior to any planned excavation activities at the Site. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation, health and safety protocols (as required), clean fill source (as required), and proposed characterization and disposal requirements.

5.6. TEMPORARY ACCESS RESTRICTIONS FOR COMPOSITE WORKERS AND VISITORS

As stated above in the SLRA, the capping remedy for the Composite Worker Area is proposed to be installed using a phased approach as the individual retail lots are designed and completed. This capping remedy will be protective of potential exposures for both the Composite Worker and child/youth visitors. The retail lots will not cover the entire area of the Composite Worker Area. Paving, landscaping, and/or stormwater management areas will ultimately cap the ground surface in the areas between the retail buildings.

Depending on occupancy opportunities prior to the completion of all retail development phases, access restrictions or other mechanisms will be used to prevent potential exposures to uncapped portions of the Composite Worker Area during the interim period to temporarily prevent potential exposures until the required capping remedy is fully implemented. With these temporary restrictions, the Composite Worker and child/youth visitors will not be exposed to potentially impacted soils while commercial activities are being conducted on (completed) capped portions of the Site. If occupancy of the Site is proposed prior to full implementation of the capping remedy for the Composite Worker Area, a detailed RADWP Addendum must be submitted to the agencies and approved prior to use. The RADWP Addendum would need to include details of the proposed interim measures including locations and protocols for the installation and maintenance of the proposed remedy. The interim measures could include temporary access restrictions (e.g., fencing) and/or temporary capping mechanisms (e.g., crushed concrete), among other possible responses.

5.7. CONSTRUCTION OVERSIGHT

Construction Oversight by an EP will ensure and document that the project is completed as designed and appropriate environmental and safety protocols are followed. Upon completion, the EP will certify that the project grading and utility installations were completed in accordance with this RADWP. Records shall be provided to document:

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

As stated previously, the MDE and USEPA will be provided with a brief RADWP Addendum detailing the site plan for each retail lot once the design has been finalized for construction. Each

addendum will include an indication of the proposed final capping remedy, and a discussion of any concerns related to the intrusive work schedule (if any) associated with the final construction of the applicable retail lot. In addition to the required records listed above, the EP will also certify that the capping remedy for each retail lot has been properly constructed with the required minimum thicknesses (given in **Appendix G**).

6.0 PERMITS, NOTIFICATIONS AND CONTINGENCIES

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

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

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

Contingency measures will include the following:

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

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

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

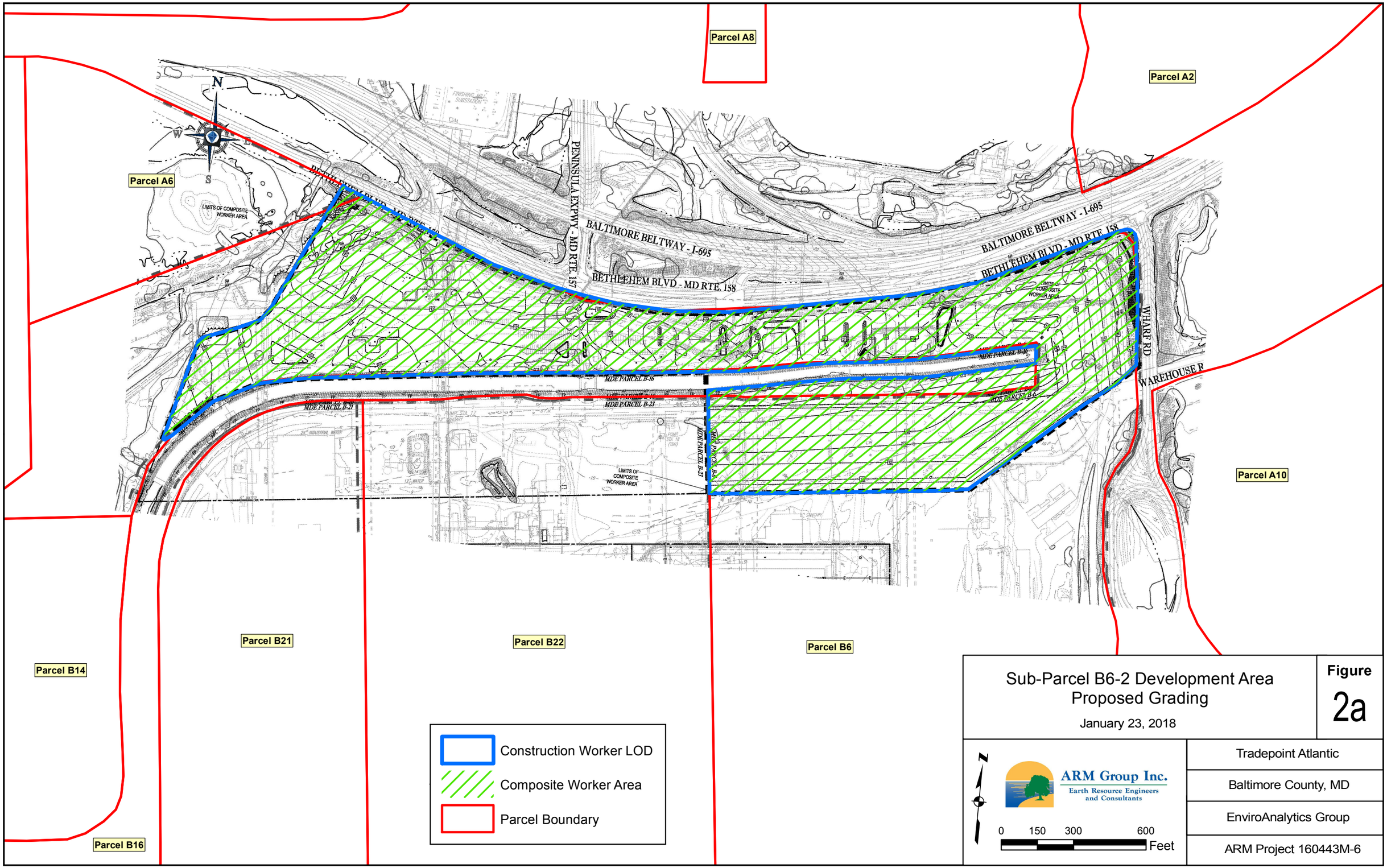
The proposed implementation schedule is shown below:

Task	**Proposed Completion Date**
Anticipated Plan Approval	February 9, 2018
Response Phase	**Proposed Completion Date**
Groundwater Well Abandonment	March 1, 2018
Development Phase	**Proposed Completion Date**
Erosion and Sediment Control Installation	March 1, 2018
Slag (or Alternative Fill) Delivery and Placement	April 30, 2018
Stormwater Installation	June 15, 2018
Pumping Station/Sewer Installation	August 1, 2018
Water Installation	July 15, 2018
VCP Cap Construction and Associated Retail Lot Construction	Varies by Individual Retail Lot
Submittal of Completion Report/Notice of Readiness for Use*	Varies by Individual Retail Lot

Request for a NFA from the MDE	After Final Capping is Complete
Recordation of institutional controls in the land records office of Baltimore County	Within thirty days of receiving the approval of NFA from the MDE
Submit proof of recordation with Baltimore County	Upon receipt from Baltimore County

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

FIGURES



Sub-Parcel B6-2 Development Area
Proposed Grading

January 23, 2018

Figure 2a

ARM Group Inc.
Earth Resource Engineers and Consultants

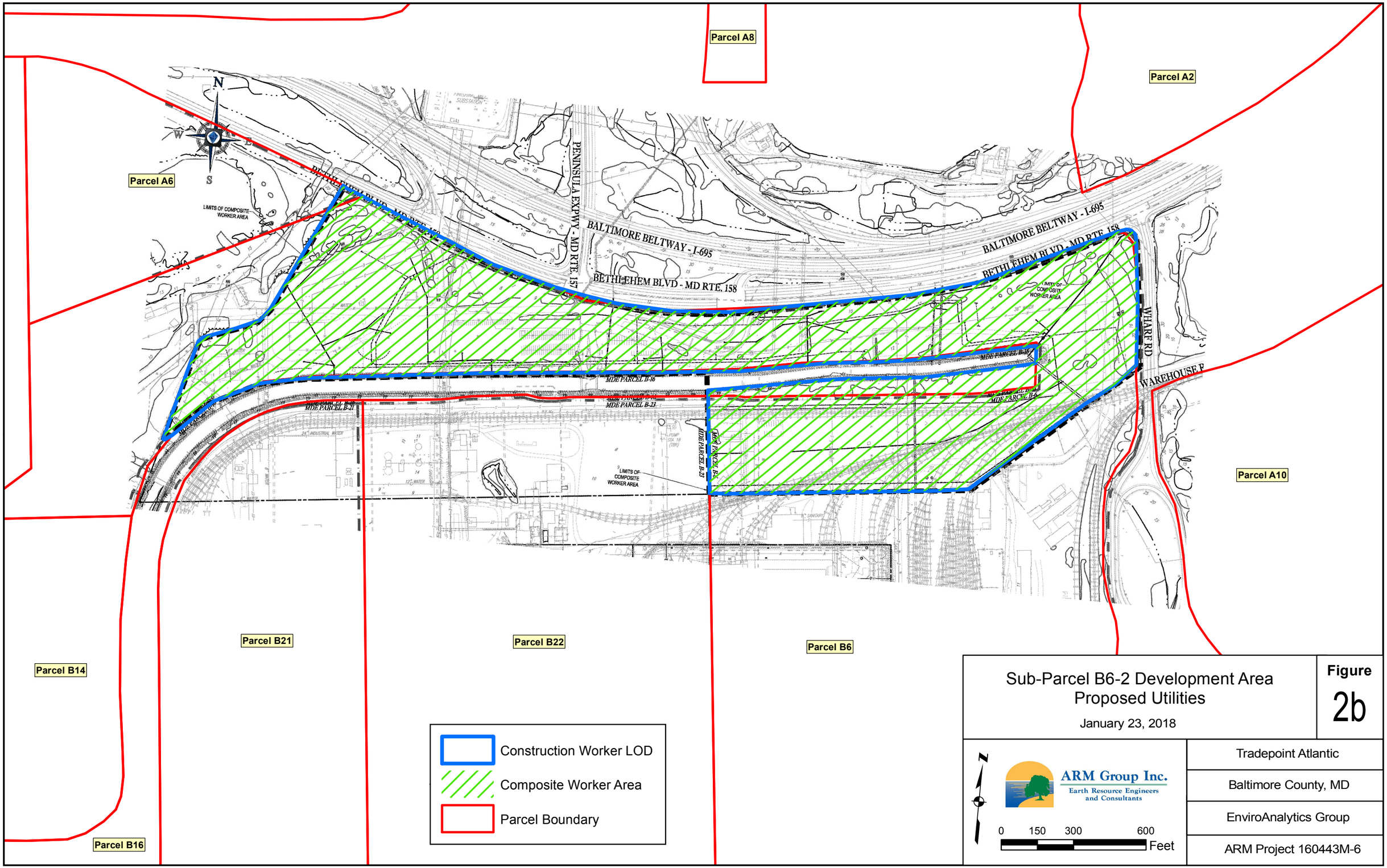
0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Sub-Parcel B6-2 Development Area Proposed Utilities

January 23, 2018

Figure 2b

ARM Group Inc.
Earth Resource Engineers and Consultants

0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

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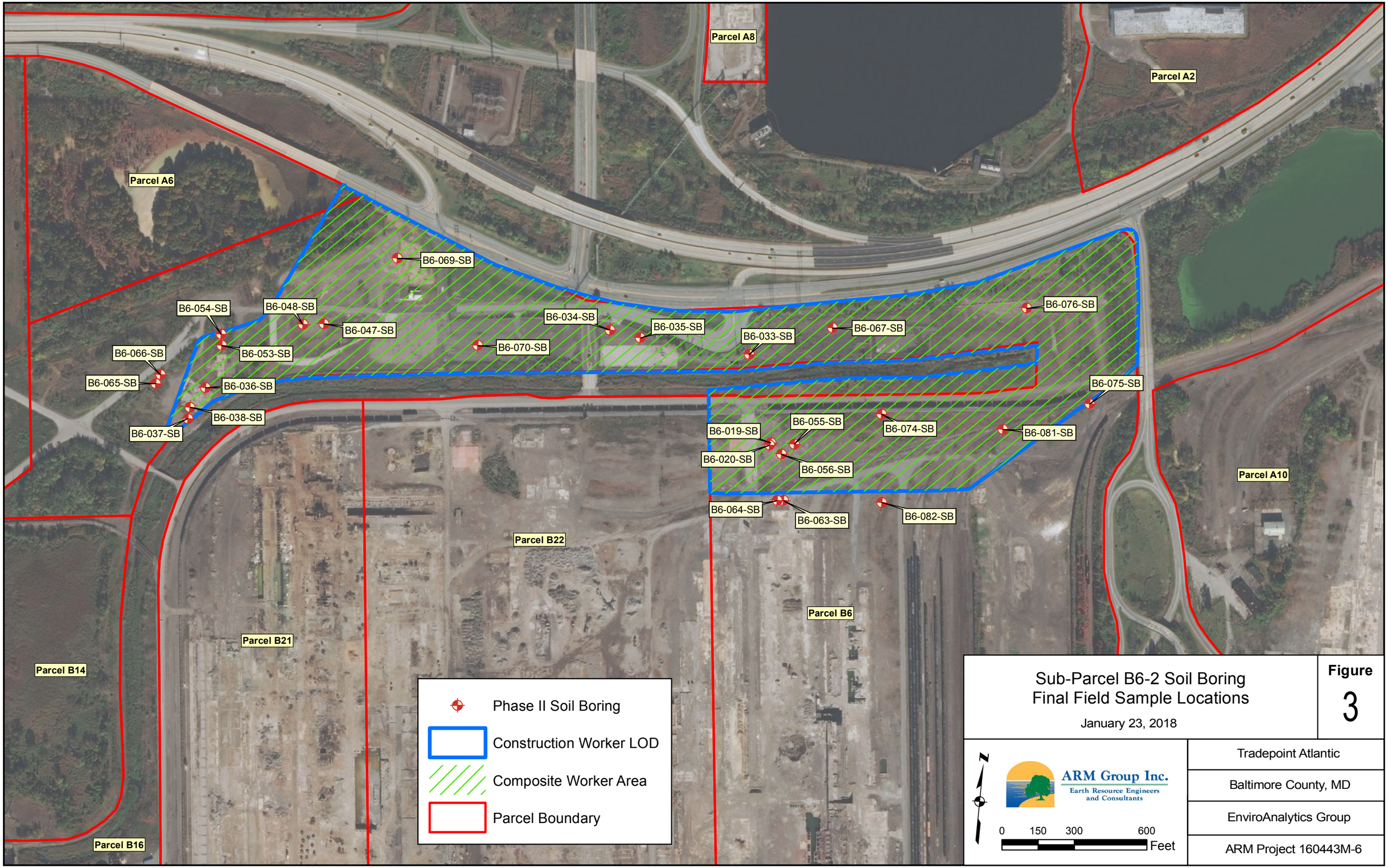


Sub-Parcel B6-2 Soil Boring Final Field Sample Locations

January 23, 2018

Figure 3

ARM Group Inc.
Earth Resource Engineers and Consultants

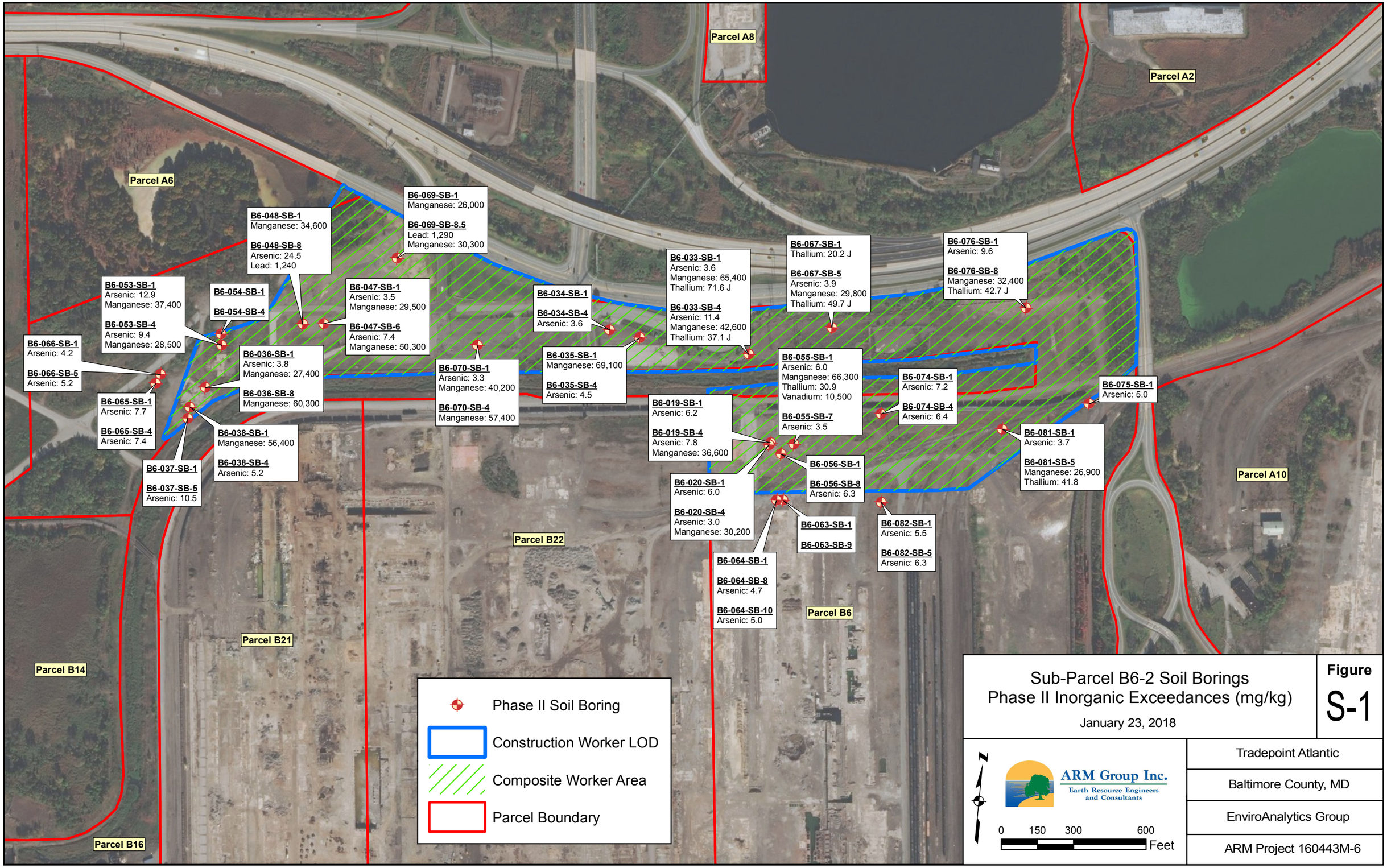
0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Sub-Parcel B6-2 Soil Borings
Phase II Inorganic Exceedances (mg/kg)

January 23, 2018

Figure
S-1

ARM Group Inc.
Earth Resource Engineers and Consultants

Tradepoint Atlantic

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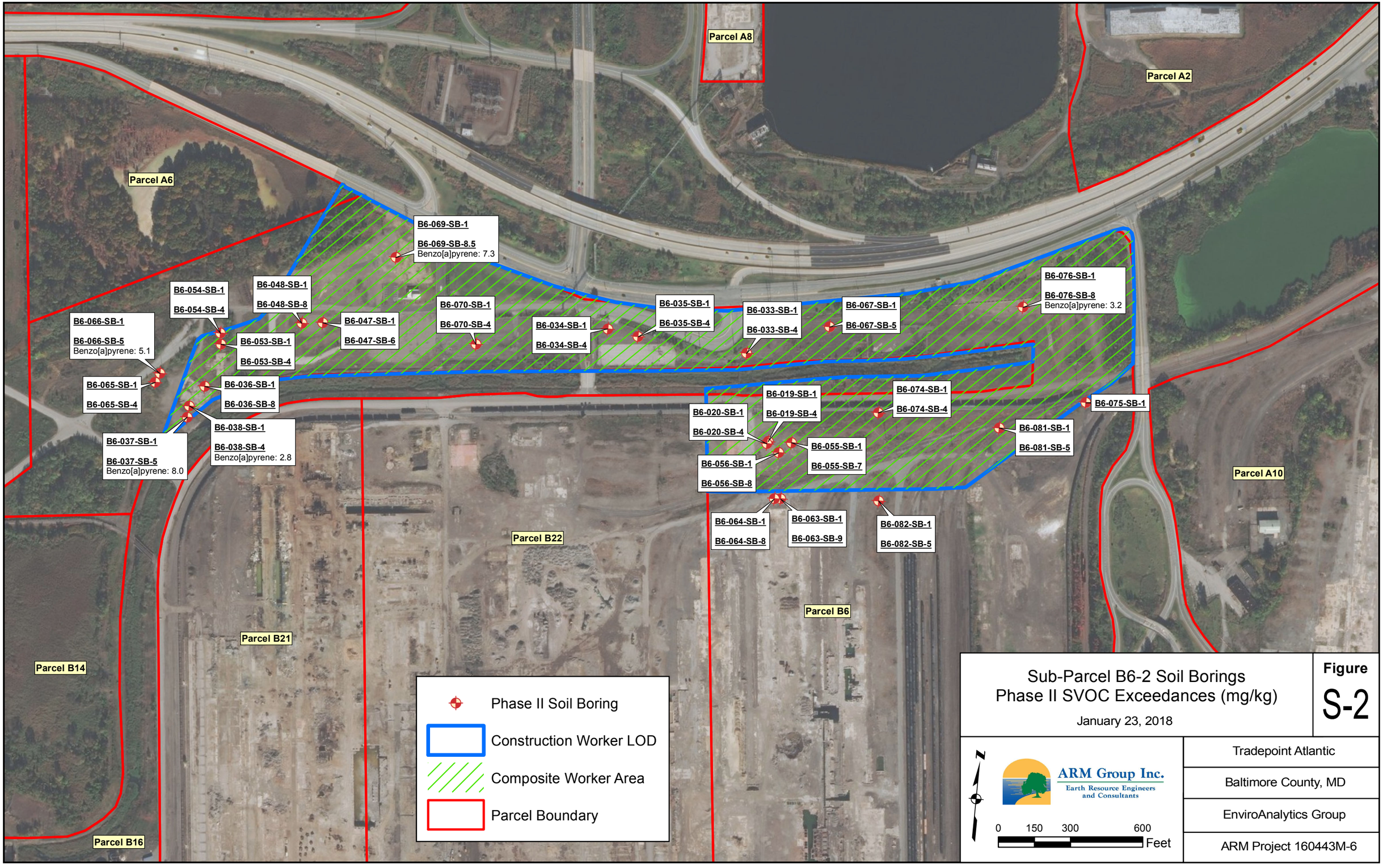


Sub-Parcel B6-2 Soil Borings
Phase II SVOC Exceedances (mg/kg)

January 23, 2018

Figure
S-2

ARM Group Inc.
Earth Resource Engineers and Consultants

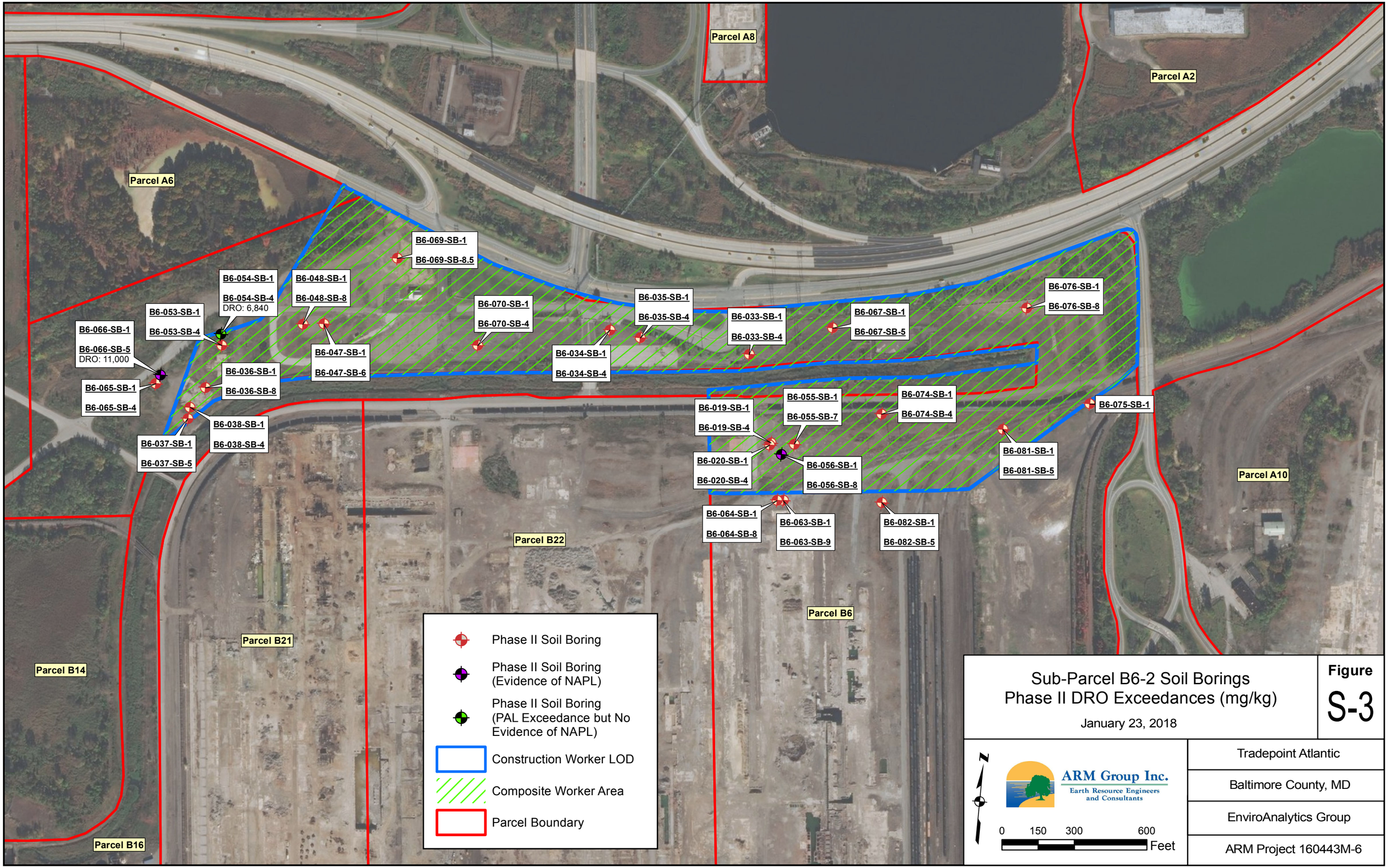
0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Sub-Parcel B6-2 Soil Borings
Phase II DRO Exceedances (mg/kg)

January 23, 2018

Figure
S-3

ARM Group Inc.
Earth Resource Engineers and Consultants

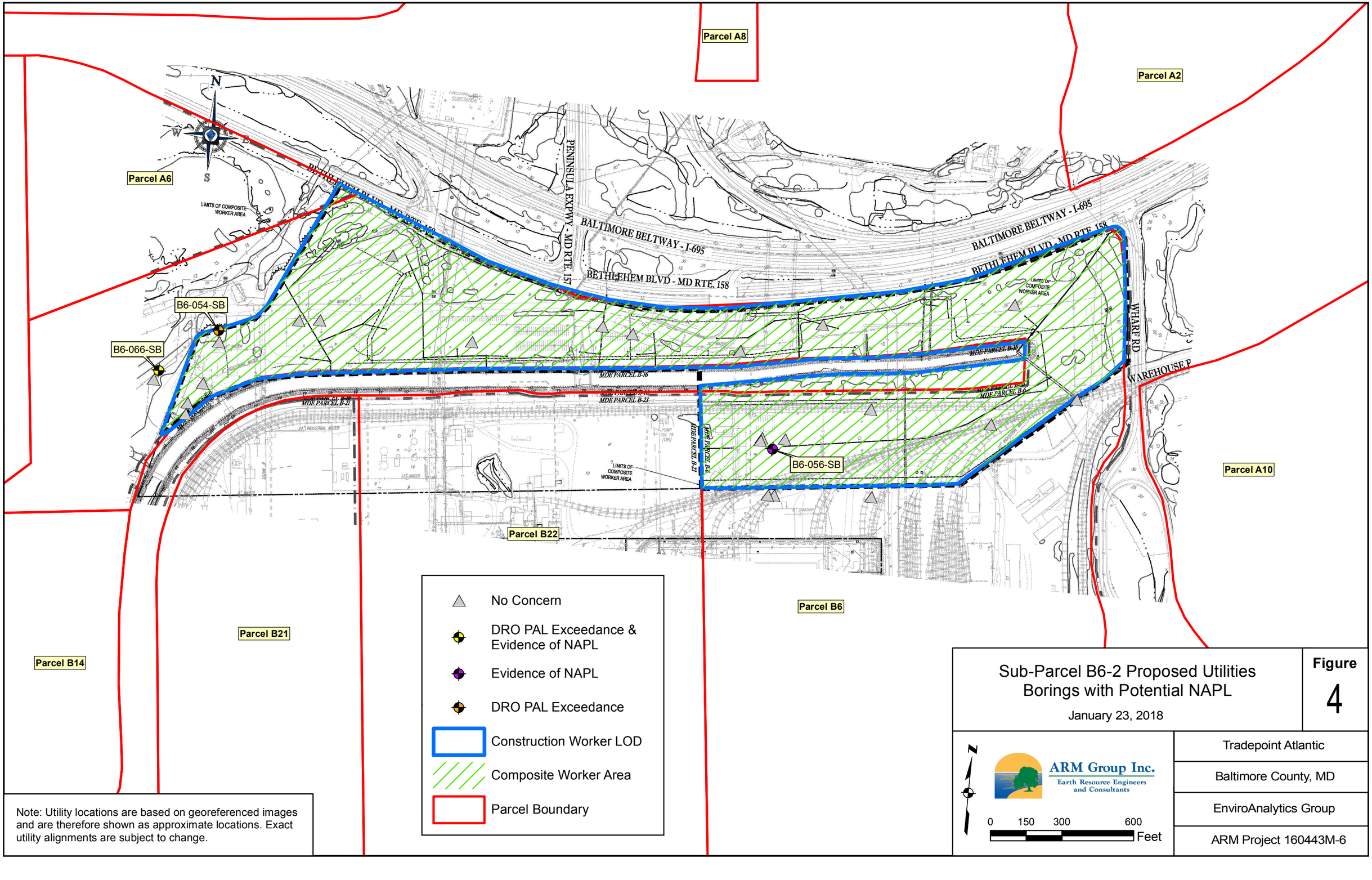
0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Note: Utility locations are based on georeferenced images and are therefore shown as approximate locations. Exact utility alignments are subject to change.

Sub-Parcel B6-2 Proposed Utilities Borings with Potential NAPL

January 23, 2018

Figure 4

ARM Group Inc.
Earth Resource Engineers and Consultants

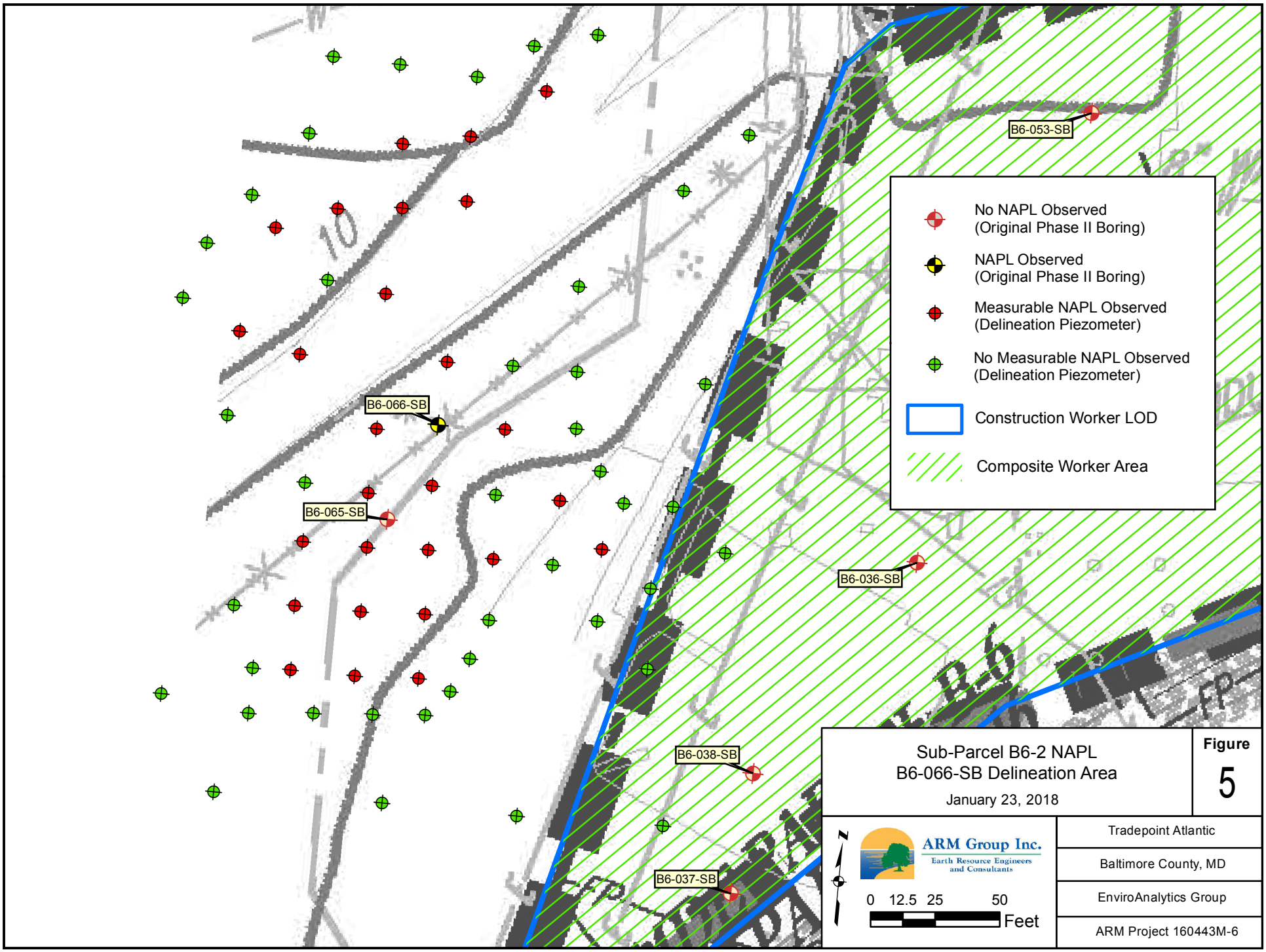
0 150 300 600 Feet

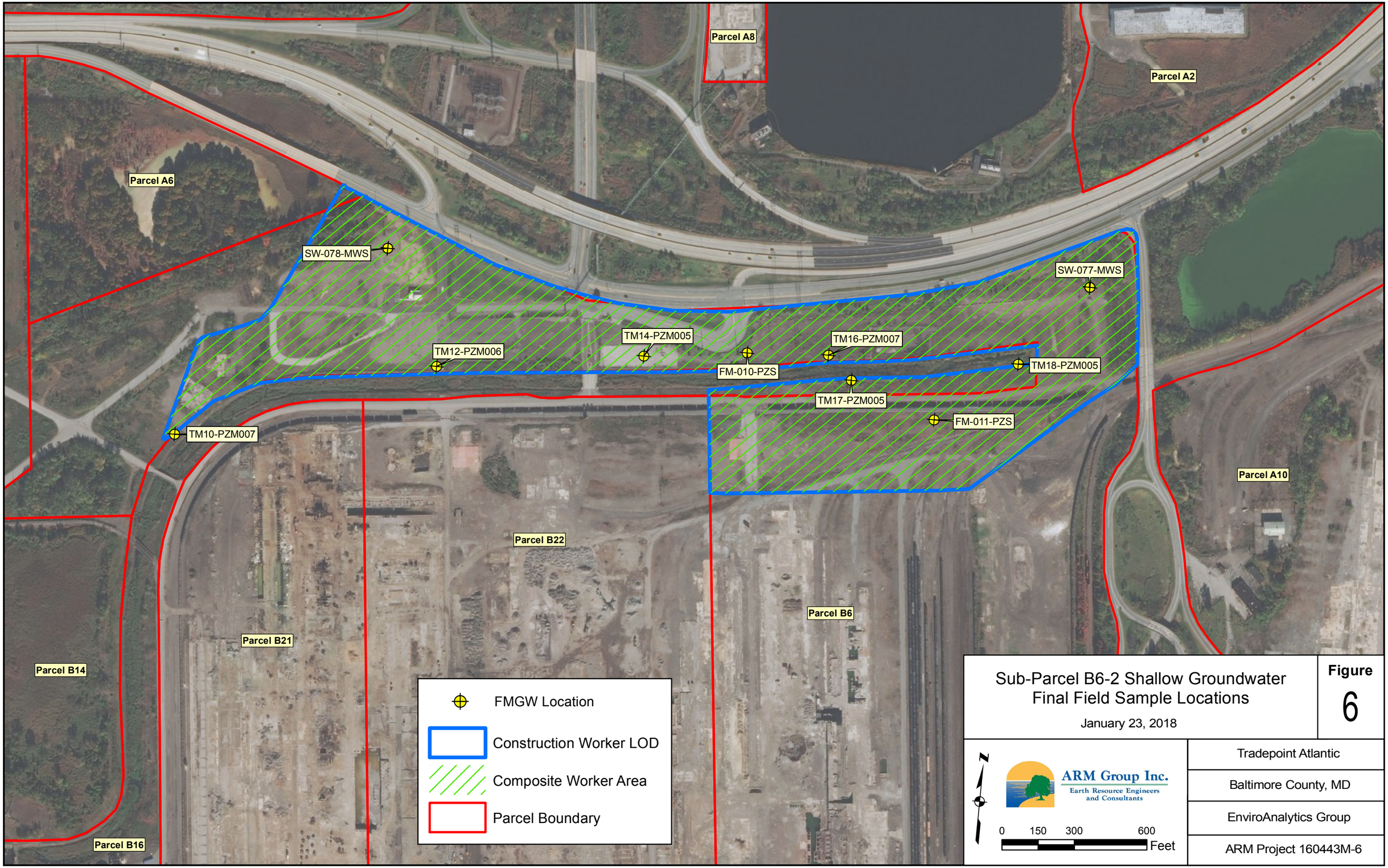
Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6


B6-053-SB
B6-066-SB
B6-065-SB
B6-036-SB
B6-038-SB
B6-037-SB
No NAPL Observed
(Original Phase II Boring)
NAPL Observed
(Original Phase II Boring)
Measurable NAPL Observed
(Delineation Piezometer)
No Measurable NAPL Observed
(Delineation Piezometer)
Construction Worker LOD
Composite Worker Area
Sub-Parcel B6-2 NAPL
B6-066-SB Delineation Area
January 23, 2018
Figure
5
ARM Group Inc.
Earth Resource Engineers and Consultants
0 12.5 25 50
Feet
Tradepoint Atlantic
Baltimore County, MD
EnviroAnalytics Group
ARM Project 160443M-6



Sub-Parcel B6-2 Shallow Groundwater
Final Field Sample Locations

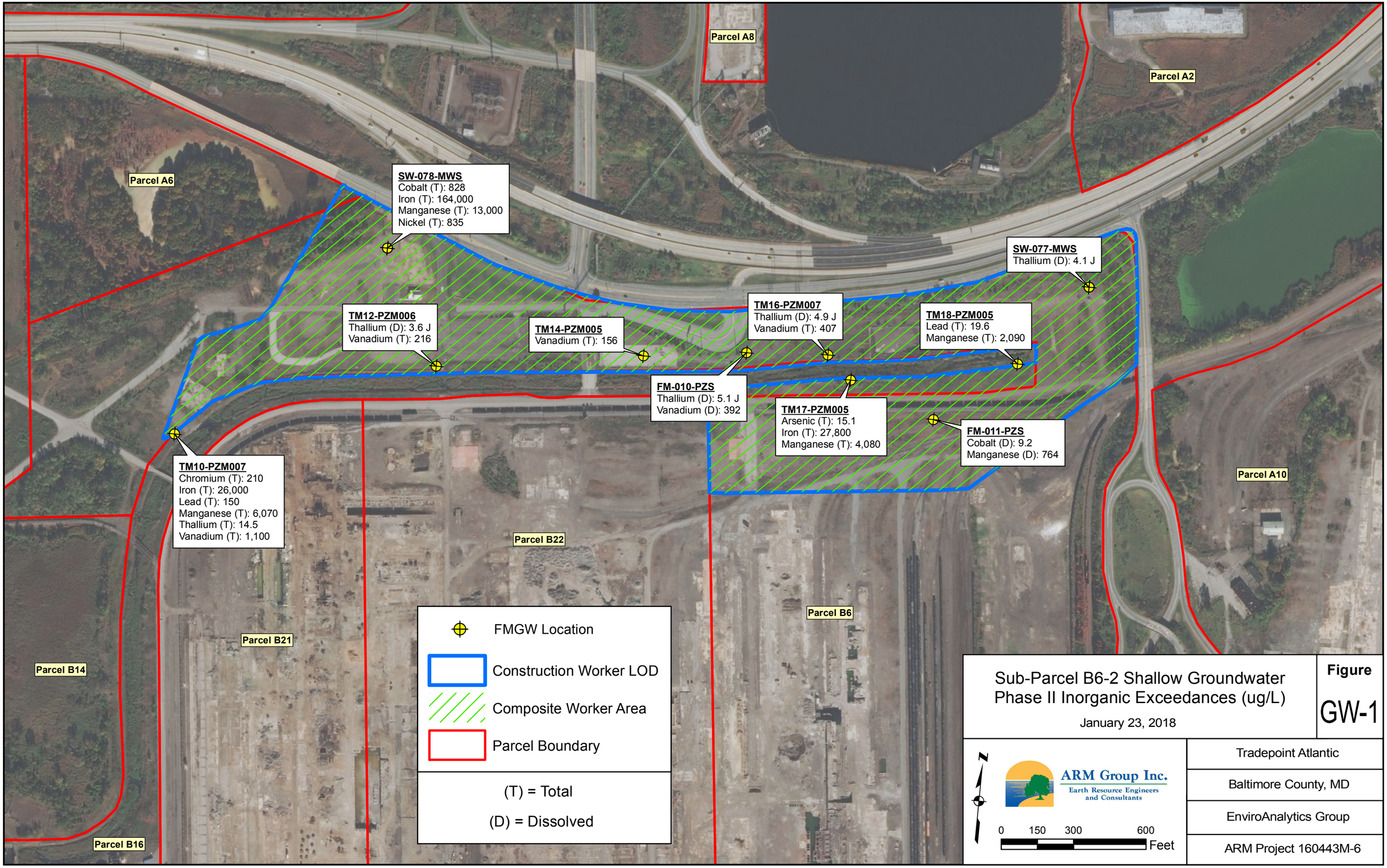
January 23, 2018

Figure
6

ARM Group Inc.
Earth Resource Engineers and Consultants

0 150 300 600 Feet

Tradepoint Atlantic
Baltimore County, MD
EnviroAnalytics Group
ARM Project 160443M-6



Sub-Parcel B6-2 Shallow Groundwater
Phase II Inorganic Exceedances (ug/L)

January 23, 2018

Figure

GW-1

ARM Group Inc.
Earth Resource Engineers and Consultants

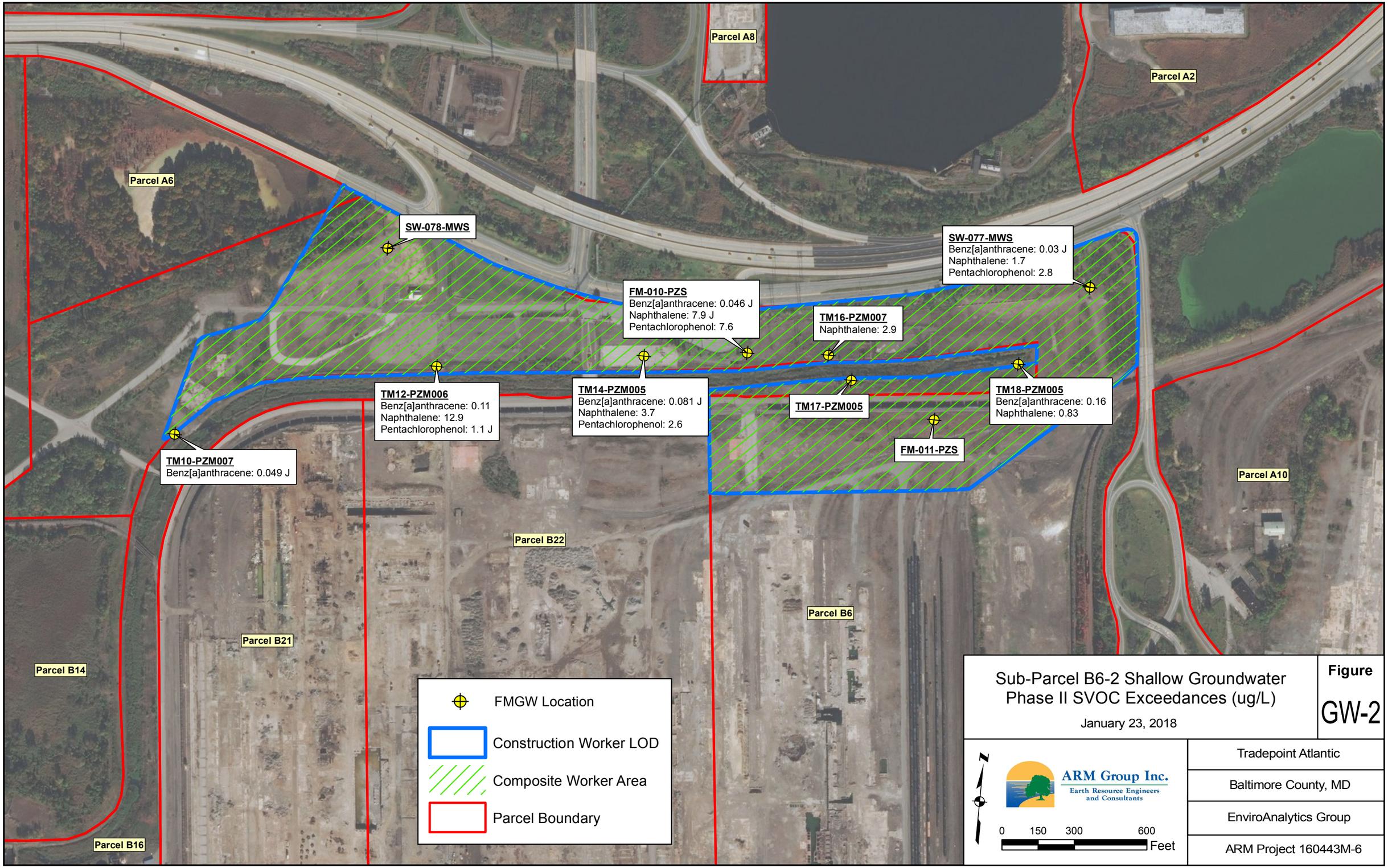
0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Sub-Parcel B6-2 Shallow Groundwater
Phase II SVOC Exceedances (ug/L)

January 23, 2018

Figure

GW-2

ARM Group Inc.
Earth Resource Engineers and Consultants

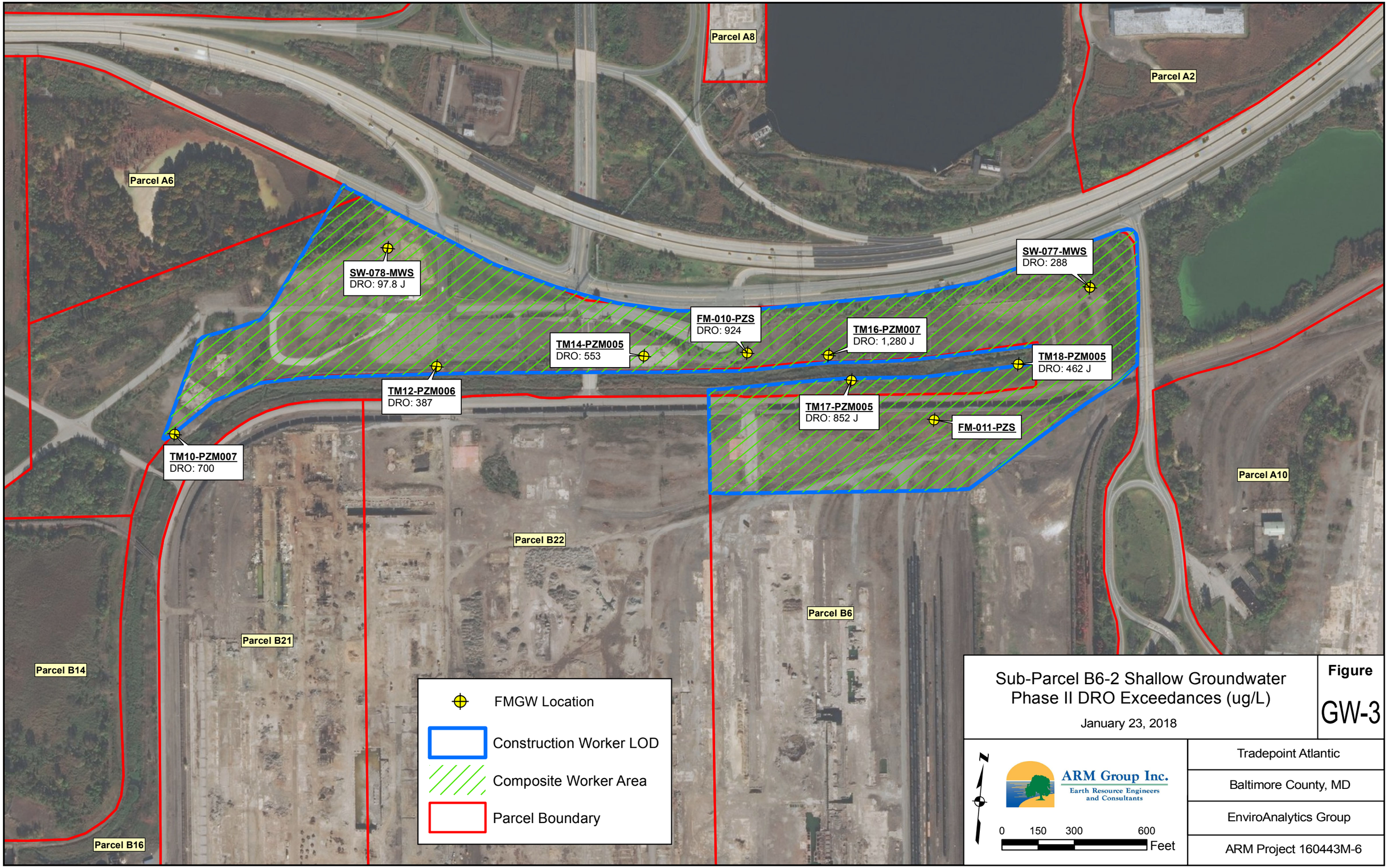
0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Sub-Parcel B6-2 Shallow Groundwater
Phase II DRO Exceedances (ug/L)

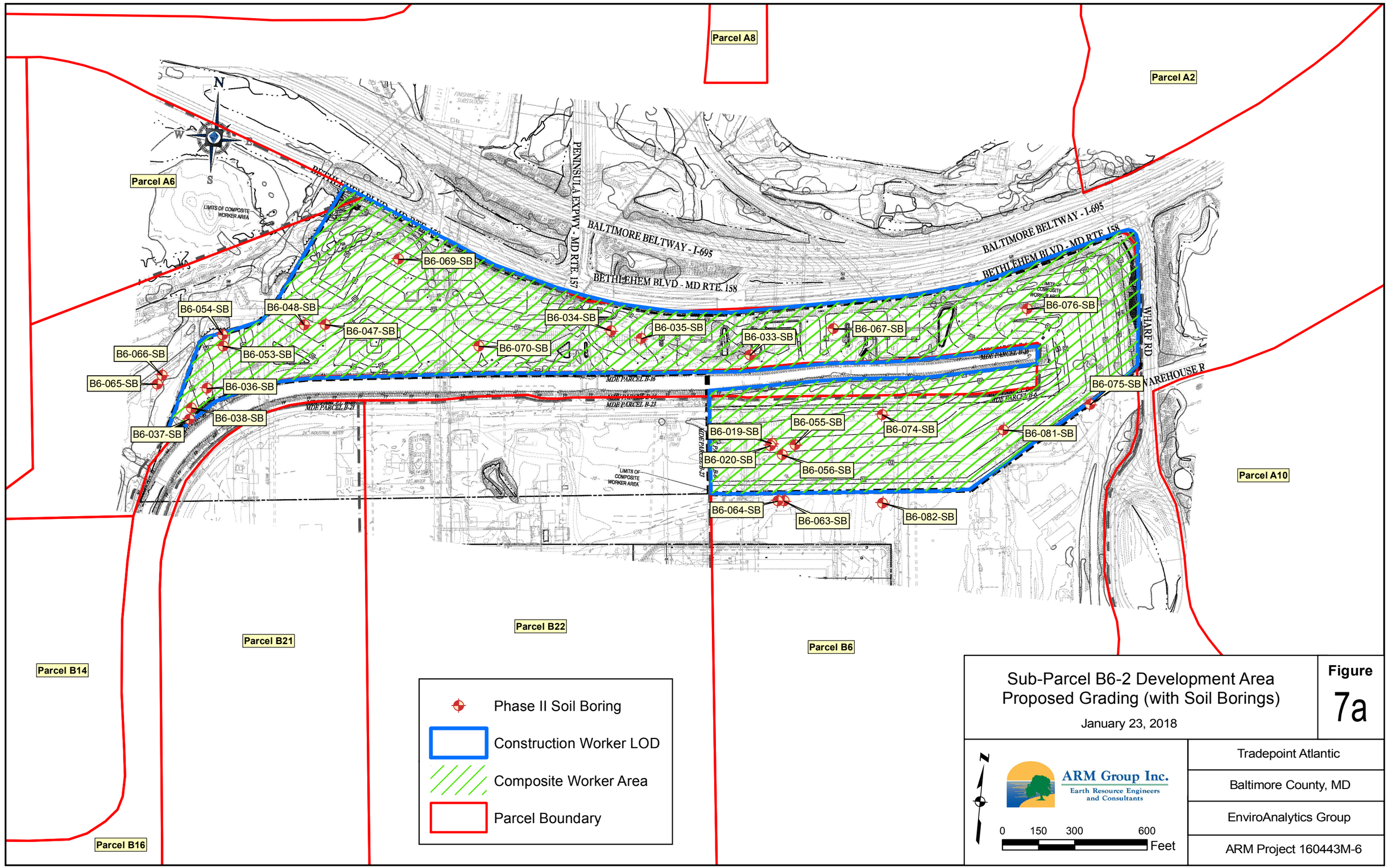
January 23, 2018

Figure

GW-3

ARM Group Inc.
Earth Resource Engineers and Consultants

Tradepoint Atlantic
Baltimore County, MD
EnviroAnalytics Group
ARM Project 160443M-6



Sub-Parcel B6-2 Development Area
Proposed Grading (with Soil Borings)

January 23, 2018

Figure
7a

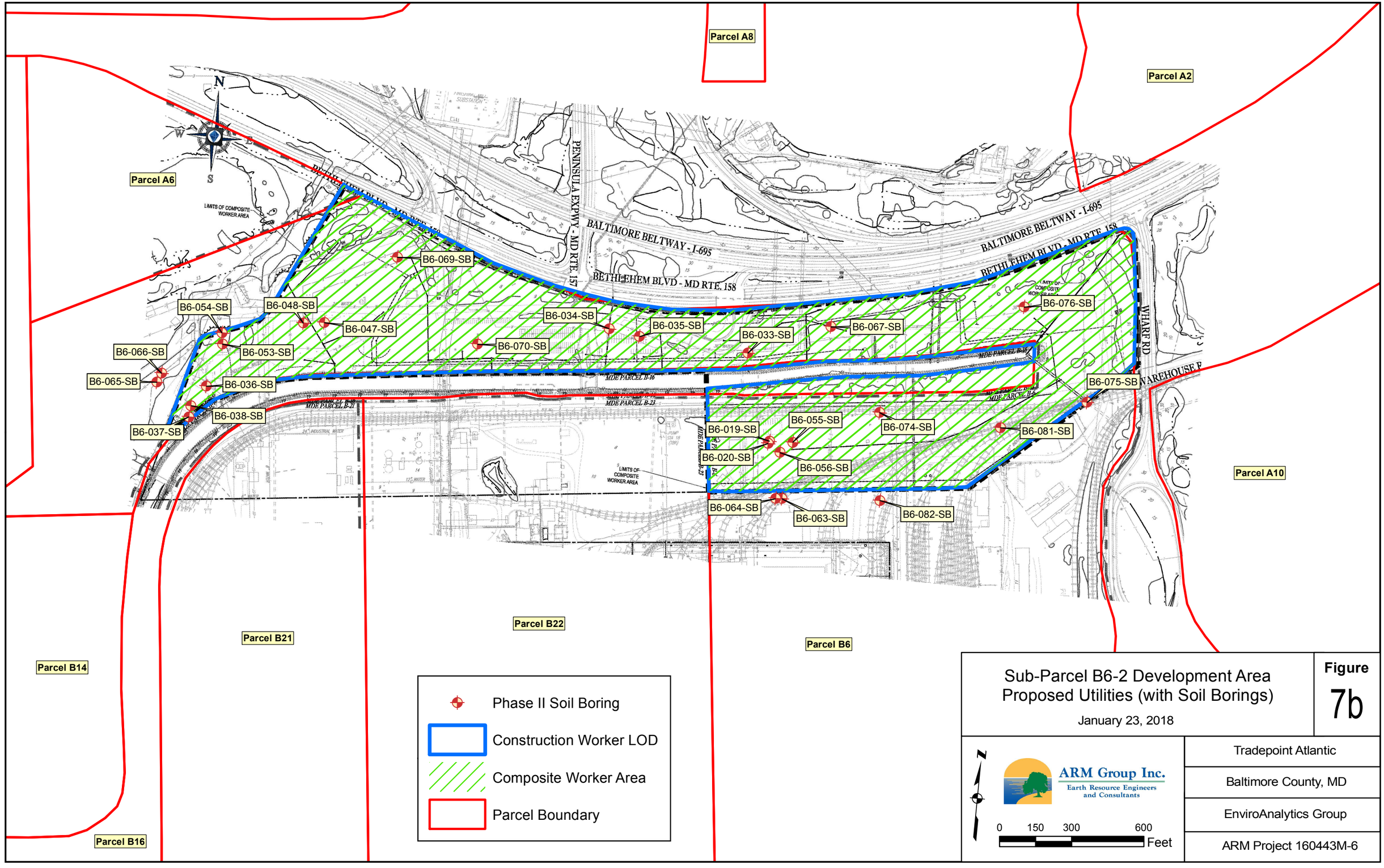
ARM Group Inc.
Earth Resource Engineers and Consultants

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Sub-Parcel B6-2 Development Area
Proposed Utilities (with Soil Borings)

January 23, 2018

Figure 7b

ARM Group Inc.
Earth Resource Engineers and Consultants

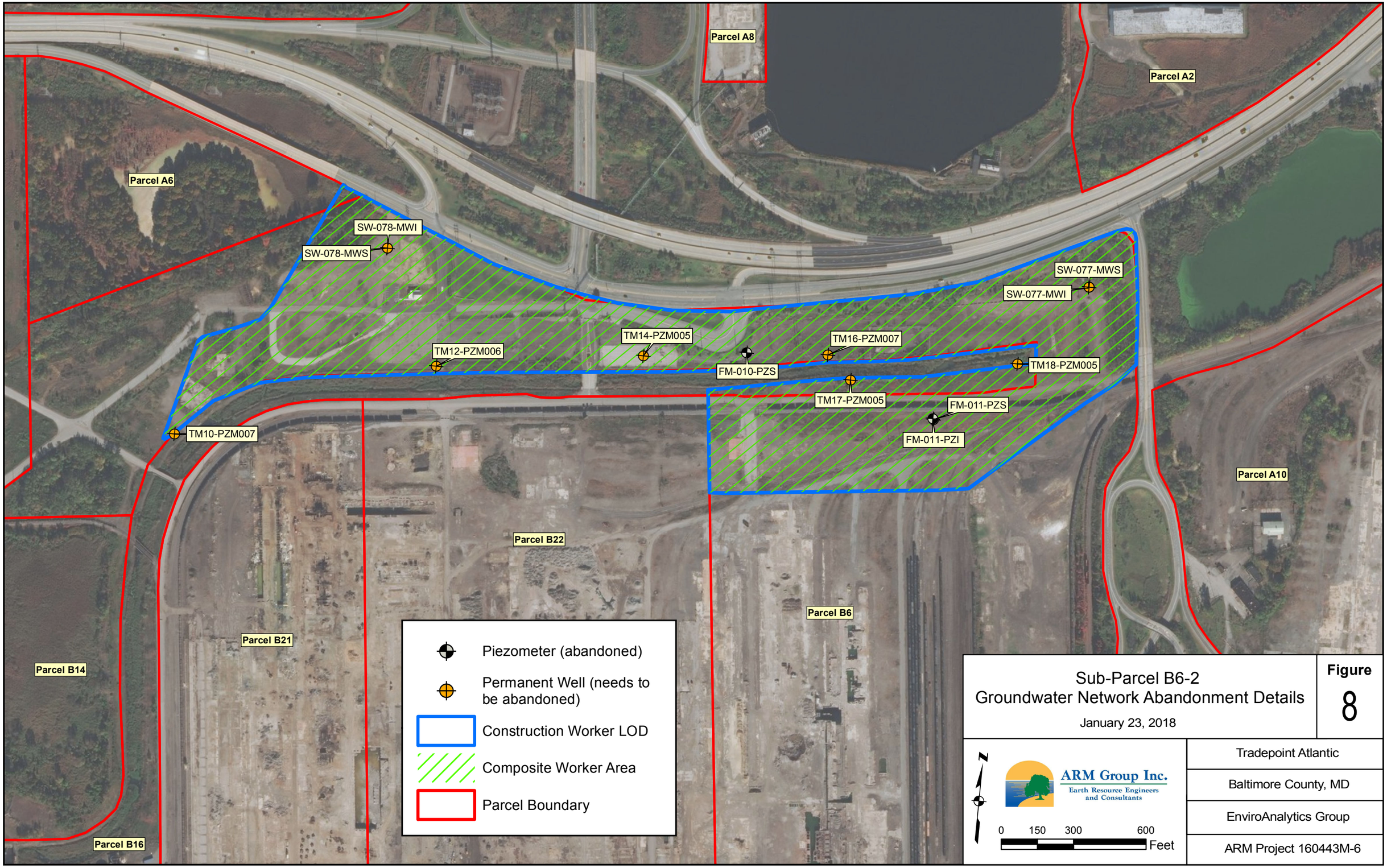
0 150 300 600 Feet

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6



Sub-Parcel B6-2
Groundwater Network Abandonment Details

January 23, 2018

Figure
8

ARM Group Inc.
Earth Resource Engineers and Consultants

Tradepoint Atlantic

Baltimore County, MD

EnviroAnalytics Group

ARM Project 160443M-6

TABLES

Table 1 - Sub-Parcel B6-2
Summary of Organics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-019-SB-1*	B6-019-SB-4*	B6-020-SB-1*	B6-020-SB-4*	B6-033-SB-1	B6-033-SB-4	B6-034-SB-1*	B6-034-SB-4*	B6-035-SB-1*	B6-035-SB-4*	B6-036-SB-1*	B6-036-SB-8*	B6-037-SB-1*
Volatile Organic Compounds															
1,2,3-Trichlorobenzene	mg/kg	930	0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
1,2-Dichlorobenzene	mg/kg	9,300	0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	**0.004 J**	0.0049 U	0.0055 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.0092 U	0.011 U	0.0095 U	0.0096 U	0.012 U	0.011 U	0.012 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0098 U	0.011 U
1,3-Dichlorobenzene	mg/kg		0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
1,4-Dichlorobenzene	mg/kg	11	0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
2-Butanone (MEK)	mg/kg	190,000	**0.0077 J**	**0.003 J**	0.0095 U	**0.0041 J**	0.012 UJ	0.011 UJ	0.012 U	0.01 U	0.011 U	0.01 U	**0.0024 J**	0.0098 U	0.011 U
Acetone	mg/kg	670,000	**0.039**	0.011 U	0.0095 U	**0.011**	0.012 UJ	0.011 UJ	0.012 U	0.011 B	0.011 U	0.0072 B	**0.016**	0.007 B	**0.019**
Benzene	mg/kg	5.1	0.0046 U	**0.0021 J**	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
Cyclohexane	mg/kg	27,000	0.0092 U	0.011 U	0.0095 U	0.0096 U	0.012 U	0.011 U	0.012 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0098 U	0.011 U
Ethylbenzene	mg/kg	25	**0.00094 J**	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
Isopropylbenzene	mg/kg	9,900	0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
Methyl Acetate	mg/kg	1,200,000	0.046 U	0.053 U	0.047 U	0.048 U	0.061 R	0.054 R	0.061 U	0.051 U	0.056 U	0.052 U	0.055 U	0.049 U	0.055 U
Tetrachloroethene	mg/kg	100	0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	**0.0058**	**0.0041 J**	0.0055 U
Toluene	mg/kg	47,000	0.0046 U	**0.0017 J**	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
Trichloroethene	mg/kg	6	0.0046 U	0.0053 U	0.0047 U	0.0048 U	0.0061 U	0.0054 U	0.0061 U	0.0051 U	0.0056 U	0.0052 U	0.0055 U	0.0049 U	0.0055 U
Xylenes	mg/kg	2,800	**0.0037 J**	0.016 U	0.014 U	0.014 U	0.018 U	0.016 U	0.018 U	0.015 U	0.017 U	0.016 U	0.016 U	0.015 U	0.017 U
Semi-Volatile Organic Compounds^															
1,1-Biphenyl	mg/kg	200	0.071 U	0.071 U	**0.024 J**	0.07 U	0.085 U	**0.031 J**	0.075 U	0.09 U	0.071 U	**0.031 J**	**0.066 J**	0.073 U	0.072 U
2,4-Dimethylphenol	mg/kg	16,000	0.071 U	0.071 U	0.071 U	0.07 U	0.085 U	0.078 U	0.075 U	0.09 U	0.071 U	0.077 U	0.076 U	0.073 U	0.072 U
2-Methylnaphthalene	mg/kg	3,000	0.071 U	**0.018**	**0.052 J**	0.071 U	**0.028**	**0.098**	0.074 U	0.009 U	**0.02 J**	**0.24**	**0.19**	**0.015**	**0.071 J**
2-Methylphenol	mg/kg	41,000	0.071 U	0.071 U	0.071 U	0.07 U	0.085 U	0.078 U	0.075 U	0.09 U	0.071 U	0.077 U	0.076 U	0.073 U	0.072 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.14 U	0.14 U	0.14 U	0.14 U	0.17 U	0.16 U	0.15 U	0.18 U	0.14 U	0.15 U	0.15 U	0.15 U	0.14 U
Acenaphthene	mg/kg	45,000	**0.0046 J**	**0.025**	**0.018 J**	**0.039 J**	**0.022**	**0.062**	**0.0068 J**	0.009 U	**0.0062 J**	**0.065 J**	**0.022 J**	**0.0023 J**	**0.011 J**
Acenaphthylene	mg/kg	45,000	0.071 U	**0.012**	**0.035 J**	**0.0066 J**	**0.0033 J**	**0.031**	**0.0063 J**	0.009 U	**0.0065 J**	**0.11**	**0.16**	**0.0046 J**	**0.014 J**
Acetophenone	mg/kg	120,000	0.071 U	0.071 U	0.071 U	0.07 U	0.085 U	0.078 U	0.075 U	0.09 U	0.071 U	**0.023 J**	0.076 U	0.073 U	0.072 U
Anthracene	mg/kg	230,000	**0.024 J**	**0.14**	**0.12**	**0.22**	**0.045**	**0.22**	**0.015 J**	0.009 U	**0.015 J**	**0.31**	**0.12**	**0.011**	**0.048 J**
Benz[a]anthracene	mg/kg	21	**0.093**	**0.71**	**0.31**	**0.76**	**0.19**	**1.1**	**0.025 J**	0.009 U	**0.035 J**	**1**	**0.29**	**0.045**	**0.14**
Benzaldehyde	mg/kg	120,000	0.071 U	0.071 U	**0.019 J**	0.07 U	0.085 UJ	0.078 UJ	0.075 U	0.09 U	0.071 U	**0.02 J**	**0.018 J**	0.073 U	0.072 U
Benzo[a]pyrene	mg/kg	2.1	**0.09**	**0.69**	**0.29**	**0.62**	**0.11**	**0.79**	**0.019 J**	0.009 U	**0.019 J**	**0.97**	**0.36**	**0.054**	**0.14**
Benzo[b]fluoranthene	mg/kg	21	**0.19**	**1**	**0.59**	**1.3**	**0.21**	**1.4**	**0.057 J**	0.009 U	**0.03 J**	**1.4**	**0.58**	**0.086**	**0.27**
Benzo[g,h,i]perylene	mg/kg		**0.082**	**0.39**	**0.2**	**0.29**	**0.035**	**0.28**	**0.015 J**	0.009 U	**0.011 J**	**0.25**	**0.25**	**0.034**	**0.081**
Benzo[k]fluoranthene	mg/kg	210	**0.17**	**0.38**	**0.52**	**1.1**	**0.082**	**0.53**	**0.014 J**	0.009 U	**0.016 J**	**0.46**	**0.27**	**0.04**	**0.27**
bis(2-Ethylhexyl)phthalate	mg/kg	160	**0.12**	0.071 U	0.071 U	**0.41**	0.085 U	0.078 U	0.075 U	0.09 U	**0.026 J**	0.077 U	**0.041 J**	0.073 U	**0.015 J**
Carbazole	mg/kg		0.071 U	**0.062 J**	**0.066 J**	**0.035 J**	**0.4**	**0.092**	0.075 U	0.09 U	0.071 U	**0.16**	**0.041 J**	0.073 U	0.072 U
Chrysene	mg/kg	2,100	**0.11**	**0.63**	**0.27**	**0.7**	**0.21**	**1.1**	**0.063 J**	0.009 U	**0.021 J**	**0.81**	**0.32**	**0.057**	**0.17**
Dibenz[a,h]anthracene	mg/kg	2.1	**0.035 J**	**0.14**	**0.058 J**	**0.099**	**0.014**	**0.12**	0.074 U	0.009 U	0.072 U	**0.11**	**0.077 J**	**0.012**	**0.022 J**
Diethylphthalate	mg/kg	660,000	**0.18**	0.071 U	**2.5**	0.07 U	0.085 U	0.078 U	0.075 U	0.09 U	0.071 U	0.077 U	0.076 U	0.073 U	0.072 U
Di-n-butylphthalate	mg/kg	82,000	0.071 U	0.071 U	0.071 U	0.07 U	0.085 U	0.078 U	0.075 U	0.09 U	0.071 U	0.077 U	0.076 U	0.073 U	0.072 U
Fluoranthene	mg/kg	30,000	**0.13**	**1.3**	**0.6**	**1.3**	**0.74**	**2.9**	**0.02 J**	**0.00078 J**	**0.031 J**	**1.6**	**0.49**	**0.076**	**0.31**
Fluorene	mg/kg	30,000	0.071 U	**0.02**	**0.035 J**	**0.03 J**	**0.011**	**0.08**	**0.013 J**	0.009 U	**0.012 J**	**0.059 J**	**0.019 J**	**0.0017 J**	**0.019 J**
Hexachloroethane	mg/kg	8	0.071 U	0.071 U	0.071 U	0.07 U	0.085 U	0.078 U	0.075 U	0.09 U	0.071 U	0.077 U	0.076 U	0.073 U	0.072 U
Indeno[1,2,3-c,d]pyrene	mg/kg	21	**0.056 J**	**0.37**	**0.17**	**0.26**	**0.038**	**0.29**	0.074 U	0.009 U	**0.012 J**	**0.29**	**0.23**	**0.032**	**0.074**
Naphthalene	mg/kg	17	0.071 U	**0.029**	**0.095**	**0.021 J**	**0.057**	**0.83**	0.074 U	0.009 U	0.072 U	**0.33**	**0.88**	**0.048**	**0.067 J**
Phenanthrene	mg/kg		**0.05 J**	**0.47**	**0.46**	**0.61**	**0.34**	**0.85**	**0.034 J**	**0.0008 J**	**0.03 J**	**0.78**	**0.43**	**0.054**	**0.19**
Phenol	mg/kg	250,000	0.071 U	0.071 U	0.071 U	0.07 U	0.085 U	0.078 U	0.075 U	0.09 U	0.071 U	0.077 U	**0.14**	0.073 U	0.072 U
Pyrene	mg/kg	23,000	**0.12**	**1.1**	**0.46**	**1**	**0.58**	**2.6**	**0.04 J**	0.009 U	**0.029 J**	**1.3**	**0.42**	**0.062**	**0.31**
PCBs															
Aroclor 1242	mg/kg	0.97	0.0547 U	N/A	0.0532 U	N/A	0.0591 U	N/A	0.0553 U	N/A	0.0542 U	N/A	**0.054 J**	N/A	0.0578 U
Aroclor 1254	mg/kg	0.97	**0.0756**	N/A	0.0532 U	N/A	0.0591 U	N/A	0.0553 U	N/A	0.0542 U	N/A	0.056 U	N/A	0.0578 U
Aroclor 1260	mg/kg	0.99	0.0547 U	N/A	0.0532 U	N/A	0.0591 U	N/A	0.0553 U	N/A	0.0542 U	N/A	**0.0842**	N/A	0.0578 U
Aroclor 1262	mg/kg		**0.0559**	N/A	**0.0453 J**	N/A	0.0591 U	N/A	0.0553 U	N/A	0.0542 U	N/A	0.056 U	N/A	0.0578 U
Aroclor 1268	mg/kg		0.0547 U	N/A	0.0532 U	N/A	0.0591 U	N/A	0.0553 U	N/A	0.0542 U	N/A	0.056 U	N/A	0.0578 U
PCBs (total)	mg/kg	0.97	**0.1315**	N/A	**0.0453 J**	N/A	0.0591 U	N/A	0.0553 U	N/A	0.0542 U	N/A	**0.1382**	N/A	0.0578 U
TPH															
Diesel Range Organics	mg/kg	6,200	**67**	**50.6**	**96.2**	**367**	**28 J**	**313 J**	**227**	8.9 U	**80.8**	**231**	**200**	**35.4**	**65.3**
Gasoline Range Organics	mg/kg	6,200	9.8 U	11.1 U	10.5 U	10.4 U	15.6 U	14.2 U	12.1 U	10.8 U	10.8 U	11.7 U	11 U	9 U	9.8 U

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
^PAH compounds were analyzed via SIM

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

Table 1 - Sub-Parcel B6-2
Summary of Organics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-037-SB-5*	B6-038-SB-1*	B6-038-SB-4*	B6-047-SB-1*	B6-047-SB-6*	B6-048-SB-1*	B6-048-SB-8*	B6-053-SB-1*	B6-053-SB-4*	B6-054-SB-1*	B6-054-SB-4*	B6-055-SB-1*	B6-055-SB-7*
Volatile Organic Compounds															
1,2,3-Trichlorobenzene	mg/kg	930	0.0056 U	0.0068 U	0.0049 U	0.0047 U	0.0059 U	0.0052 U	**0.0031 J**	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
1,2-Dichlorobenzene	mg/kg	9,300	0.0056 U	**0.013**	**0.0029 J**	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.011 U	0.014 U	**0.005 J**	0.0095 U	0.012 U	0.01 U	0.013 U	0.01 U	0.011 U	0.012 U	0.77 U	0.0092 U	0.01 U
1,3-Dichlorobenzene	mg/kg		0.0056 U	0.0068 U	0.0049 U	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
1,4-Dichlorobenzene	mg/kg	11	0.0056 U	0.0068 U	0.0049 U	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
2-Butanone (MEK)	mg/kg	190,000	**0.0043 J**	0.014 U	0.0099 U	0.0095 U	0.012 U	0.01 U	**0.0068 J**	0.01 U	0.011 U	0.012 U	0.77 U	0.0092 U	0.01 U
Acetone	mg/kg	670,000	**0.026**	**0.017**	0.0056 B	0.0084 B	0.0097 B	0.0078 B	**0.032**	0.01 U	**0.0068 J**	**0.0066 J**	0.77 U	0.0092 U	0.01 U
Benzene	mg/kg	5.1	**0.0072**	0.0068 U	0.0049 U	0.0047 U	**0.0016 J**	**0.0025 J**	0.0066 U	0.0051 U	**0.0056**	0.0062 U	0.38 U	0.0046 U	**0.0015 J**
cis-1,2-Dichloroethene	mg/kg	2,300	0.0056 U	0.0068 U	**0.0045 J**	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
Cyclohexane	mg/kg	27,000	0.011 U	0.014 U	0.0099 U	0.0095 U	0.012 U	0.01 U	0.013 U	0.01 U	0.011 U	0.012 U	0.77 U	0.0092 U	0.01 U
Ethylbenzene	mg/kg	25	0.0056 U	0.0068 U	0.0049 U	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
Isopropylbenzene	mg/kg	9,900	0.0056 U	0.0068 U	0.0049 U	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
Methyl Acetate	mg/kg	1,200,000	0.056 U	0.068 U	0.049 U	0.047 U	0.059 U	0.052 U	0.066 U	0.051 U	0.056 U	0.062 U	**0.46 J**	0.046 U	0.052 U
Tetrachloroethene	mg/kg	100	0.0056 U	**0.011**	**0.0074**	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
Toluene	mg/kg	47,000	**0.0019 J**	0.0068 U	0.0049 U	0.0047 U	**0.0019 J**	**0.0028 J**	0.0066 U	0.0051 U	**0.0047 J**	0.0062 U	0.38 U	0.0046 U	0.0052 U
Trichloroethene	mg/kg	6	0.0056 U	0.0068 U	**0.0042 J**	0.0047 U	0.0059 U	0.0052 U	0.0066 U	0.0051 U	0.0056 U	0.0062 U	0.38 U	0.0046 U	0.0052 U
Xylenes	mg/kg	2,800	**0.0063 J**	**0.0047 J**	0.015 U	0.014 U	0.018 U	0.015 U	0.02 U	0.015 U	0.017 U	0.019 U	1.1 U	0.014 U	0.016 U
Semi-Volatile Organic Compounds^															
1,1-Biphenyl	mg/kg	200	**0.092 J**	0.082 U	**0.18**	**0.02 J**	0.076 U	**0.033 J**	**0.97**	**0.036 J**	**0.095**	0.076 U	0.78 U	0.071 U	**0.031 J**
2,4-Dimethylphenol	mg/kg	16,000	0.37 U	**0.021 J**	0.079 U	0.072 U	0.076 U	0.075 U	**0.021 J**	0.074 U	**0.015 J**	0.076 U	0.78 U	0.071 U	0.081 U
2-Methylnaphthalene	mg/kg	3,000	**6.6**	**0.064 J**	**2.2**	**0.18**	**0.035 J**	**0.41**	**0.7**	**0.14**	**0.29**	**0.0023 J**	**1.2**	0.073 U	**0.057**
2-Methylphenol	mg/kg	41,000	0.37 U	0.082 U	0.079 U	0.072 U	0.076 U	0.075 U	0.1 U	0.074 U	**0.018 J**	0.076 U	0.78 U	0.071 U	0.081 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	**0.59 J**	0.16 U	**0.021 J**	0.14 U	0.15 U	0.15 U	**0.047 J**	0.15 U	**0.054 J**	0.15 U	1.6 U	0.14 U	0.16 U
Acenaphthene	mg/kg	45,000	**0.86**	0.084 U	**0.71**	**0.013 J**	**0.018 J**	**0.01**	**0.024**	**0.0099 J**	**0.06 J**	0.0075 U	**0.44**	0.073 U	**0.027**
Acenaphthylene	mg/kg	45,000	**2.3**	**0.13**	0.08 U	**0.018 J**	**0.057 J**	**0.017**	**0.049**	**0.24**	**0.62**	0.0075 U	**0.14**	**0.0063 J**	**0.088**
Acetophenone	mg/kg	120,000	0.37 U	0.082 U	0.079 U	**0.025 J**	0.076 U	**0.018 J**	**0.085 J**	0.074 U	**0.029 J**	0.076 U	0.78 U	0.071 U	0.081 U
Anthracene	mg/kg	230,000	**2.6**	**0.04 J**	**2**	**0.038 J**	**0.28**	**0.043**	**0.9**	**0.18**	**0.87**	**0.0015 J**	0.079 U	**0.016 J**	**0.17**
Benz[a]anthracene	mg/kg	21	**6.6**	**0.025 J**	**3.1**	**0.087**	**1.5**	**0.16**	**0.42**	**0.57**	**2.1**	0.0075 U	**0.03 J**	**0.088**	**0.64**
Benzaldehyde	mg/kg	120,000	0.37 U	**0.035 J**	**0.23**	**0.034 J**	0.076 U	**0.032 J**	**0.067 J**	**0.026 J**	**0.037 J**	0.076 U	0.78 U	0.071 U	0.081 U
Benzo[a]pyrene	mg/kg	2.1	**8**	**0.02 J**	**2.8**	**0.086**	**1**	**0.22**	**0.22**	**0.67**	**1.7**	0.0075 U	**0.024 J**	**0.088**	**0.72**
Benzo[b]fluoranthene	mg/kg	21	**20**	**0.028 J**	**6.2**	**0.1**	**1.5**	**0.24**	**0.54**	**0.99**	**2.6**	**0.0013 J**	**0.034 J**	**0.18**	**1.4**
Benzo[g,h,i]perylene	mg/kg		**3.6**	**0.13**	**1.2**	**0.063 J**	**0.42**	**0.14**	**0.079**	**0.33**	**0.76**	0.0075 U	0.079 U	**0.054 J**	**0.32**
Benzo[k]fluoranthene	mg/kg	210	**20.3**	**0.029 J**	**6.2**	**0.045 J**	**0.48**	**0.083**	**0.49**	**0.47**	**1.4**	**0.0013 J**	**0.034 J**	**0.16**	**1.2**
bis(2-Ethylhexyl)phthalate	mg/kg	160	**0.68**	**0.18**	**0.32**	**0.033 J**	0.076 U	0.075 U	0.1 U	**0.031 J**	**0.034 J**	0.076 U	0.78 U	0.071 U	0.081 U
Carbazole	mg/kg		0.37 U	0.082 U	**0.13**	0.072 U	**0.12**	**0.026 J**	0.1 U	**0.091**	**0.26**	0.076 U	0.78 U	0.071 U	**0.12**
Chrysene	mg/kg	2,100	**7**	**0.013 J**	**3.2**	**0.088**	**1.1**	**0.16**	**0.55**	**0.58**	**1.9**	**0.00069 J**	**0.087**	**0.085**	**0.6**
Dibenz[a,h]anthracene	mg/kg	2.1	**0.89**	0.084 U	**0.48**	**0.023 J**	**0.2**	**0.048**	**0.037**	**0.12**	**0.32**	0.0075 U	0.079 U	**0.024 J**	**0.12**
Diethylphthalate	mg/kg	660,000	0.37 U	0.082 U	0.079 U	**0.019 J**	0.076 U	0.075 U	0.1 U	0.074 U	0.072 U	0.076 U	0.78 U	0.071 U	0.081 U
Di-n-butylphthalate	mg/kg	82,000	0.37 U	**0.024 J**	0.079 U	0.072 U	0.076 U	0.075 U	0.1 U	0.074 U	0.072 U	**0.022 J**	0.78 U	0.071 U	0.081 U
Fluoranthene	mg/kg	30,000	**7.2**	**0.015 J**	**8**	**0.11**	**1.9**	**0.21**	**1.2**	**0.74**	**3.7**	**0.001 J**	**0.044 J**	**0.11**	**1.1**
Fluorene	mg/kg	30,000	**1.5**	**0.011 J**	**1.1**	**0.017 J**	**0.024 J**	**0.0095**	**0.46**	**0.027 J**	**0.31**	0.0075 U	**0.64**	0.073 U	**0.071**
Hexachloroethane	mg/kg	8	0.37 U	0.082 U	0.079 U	0.072 U	0.076 U	0.075 U	0.1 U	0.074 U	0.072 U	0.076 U	0.78 U	0.071 U	0.081 U
Indeno[1,2,3-c,d]pyrene	mg/kg	21	**3.1**	**0.013 J**	**1.3**	**0.047 J**	**0.46**	**0.13**	**0.076**	**0.33**	**0.82**	0.0075 U	0.079 U	**0.045 J**	**0.32**
Naphthalene	mg/kg	17	**3.5**	**0.082 J**	**6.6**	**0.15**	**0.042 J**	**0.37**	**0.69**	**0.48**	**1.1**	**0.0024 J**	**0.19**	0.073 U	**0.4**
Phenanthrene	mg/kg		**5.2**	**0.046 J**	**8.7**	**0.13**	**0.92**	**0.2**	**1.5**	**0.36**	**2.4**	**0.003 J**	**1.3**	**0.043 J**	**0.45**
Phenol	mg/kg	250,000	0.37 U	**0.035 J**	**0.021 J**	0.072 U	0.076 U	0.075 U	**0.03 J**	**0.018 J**	**0.056 J**	0.076 U	0.78 U	0.071 U	0.081 U
Pyrene	mg/kg	23,000	**9.8**	**0.029 J**	**6.3**	**0.09**	**1.4**	**0.17**	**1.1**	**0.59**	**3**	**0.0091**	**1.7**	**0.092**	**1**
PCBs															
Aroclor 1242	mg/kg	0.97	N/A	0.0581 U	N/A	0.0556 U	N/A	**0.162**	N/A	0.055 U	N/A	0.054 U	N/A	0.0557 U	N/A
Aroclor 1254	mg/kg	0.97	N/A	0.0581 U	N/A	0.0556 U	N/A	0.0548 U	N/A	0.055 U	N/A	0.054 U	N/A	**0.0407 J**	N/A
Aroclor 1260	mg/kg	0.99	N/A	**0.163**	N/A	0.0556 U	N/A	0.0548 U	N/A	0.055 U	N/A	0.054 U	N/A	0.0557 U	N/A
Aroclor 1262	mg/kg		N/A	0.0581 U	N/A	0.0556 U	N/A	0.0548 U	N/A	0.055 U	N/A	0.054 U	N/A	0.0557 U	N/A
Aroclor 1268	mg/kg		N/A	0.0581 U	N/A	0.0556 U	N/A	0.0548 U	N/A	0.055 U	N/A	0.054 U	N/A	**0.101**	N/A
PCBs (total)	mg/kg	0.97	N/A	**0.163**	N/A	0.0556 U	N/A	**0.162**	N/A	0.055 U	N/A	0.054 U	N/A	**0.1417**	N/A
TPH															
Diesel Range Organics	mg/kg	6,200	**2,790**	**468**	**899**	**196**	**97.3**	**938**	**5,240**	**146**	**183**	**124**	**6,840**	**20.3**	**100**
Gasoline Range Organics	mg/kg	6,200	10.8 U	11.7 U	12.2 U	10 U	11.6 U	13 U	14.3 U	11.9 U	**12.8 J**	12.4 U	**67.2**	10.5 U	9.8 U

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
^PAH compounds were analyzed via SIM

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

Table 1 - Sub-Parcel B6-2
Summary of Organics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-056-SB-1	B6-056-SB-8	B6-063-SB-1	B6-063-SB-9	B6-064-SB-1	B6-064-SB-8	B6-065-SB-1*	B6-065-SB-4*	B6-066-SB-1*	B6-066-SB-5*	B6-067-SB-1	B6-067-SB-5	B6-069-SB-1*
Volatile Organic Compounds															
1,2,3-Trichlorobenzene	mg/kg	930	0.0046 U	0.0067 UJ	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	0.25 U	0.0051 U	0.0059 U	0.0045 U
1,2-Dichlorobenzene	mg/kg	9,300	0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	**0.53**	0.0051 U	0.0059 U	0.0045 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.0092 U	0.013 U	0.014 U	0.01 U	0.011 U	0.011 U	0.013 U	0.012 U	0.0099 U	0.5 U	0.01 U	0.012 U	0.009 U
1,3-Dichlorobenzene	mg/kg		0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	**0.11 J**	0.0051 U	0.0059 U	0.0045 U
1,4-Dichlorobenzene	mg/kg	11	0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	**0.5**	0.0051 U	0.0059 U	0.0045 U
2-Butanone (MEK)	mg/kg	190,000	0.0092 U	0.013 U	0.014 U	0.01 U	0.011 U	0.011 U	0.013 U	0.012 U	0.0099 U	0.5 U	0.01 UJ	0.012 UJ	0.009 U
Acetone	mg/kg	670,000	0.0092 UJ	**0.01 J**	0.014 UJ	0.01 UJ	0.011 UJ	0.011 UJ	0.013 U	0.012 U	0.0099 U	0.35 B	0.01 UJ	0.012 UJ	0.0077 B
Benzene	mg/kg	5.1	0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	0.25 U	0.0051 U	0.0059 U	0.0045 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	0.25 U	0.0051 U	0.0059 U	0.0045 U
Cyclohexane	mg/kg	27,000	0.0092 U	**0.007 J**	0.014 U	0.01 U	0.011 U	0.011 U	0.013 U	0.012 U	0.0099 U	**0.38 J**	0.01 U	0.012 U	0.009 U
Ethylbenzene	mg/kg	25	0.0046 U	**0.015**	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	**0.14 J**	0.0051 U	**0.0013 J**	0.0045 U
Isopropylbenzene	mg/kg	9,900	0.0046 U	**0.055**	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	**0.95**	0.0051 U	0.0059 U	0.0045 U
Methyl Acetate	mg/kg	1,200,000	0.046 U	0.067 U	0.068 U	0.05 U	0.055 U	0.053 U	0.065 U	0.06 U	0.049 U	2.5 U	0.051 R	0.059 R	0.045 U
Tetrachloroethene	mg/kg	100	0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	0.25 U	0.0051 U	0.0059 U	0.0045 U
Toluene	mg/kg	47,000	0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	0.25 U	0.0051 U	**0.0025 J**	0.0045 U
Trichloroethene	mg/kg	6	0.0046 U	0.0067 U	0.0068 U	0.005 U	0.0055 U	0.0053 U	0.0065 U	0.006 U	0.0049 U	0.25 U	0.0051 U	0.0059 U	0.0045 U
Xylenes	mg/kg	2,800	0.014 U	**0.039**	0.021 U	**0.0029 J**	0.016 U	0.016 U	0.02 U	0.018 U	0.015 U	**1.3**	0.015 U	**0.0062 J**	0.013 U
Semi-Volatile Organic Compounds^															
1,1-Biphenyl	mg/kg	200	0.072 U	**0.039 J**	0.073 U	0.082 U	0.076 U	0.084 U	0.08 U	**0.02 J**	**0.024 J**	**6.4**	0.074 U	0.078 U	0.077 U
2,4-Dimethylphenol	mg/kg	16,000	0.072 UJ	0.083 U	0.073 U	0.082 U	0.076 R	0.084 U	0.08 U	0.081 U	0.074 U	0.76 U	0.074 U	0.078 U	0.077 U
2-Methylnaphthalene	mg/kg	3,000	0.071 U	**0.081**	0.074 U	**0.14**	0.077 U	**0.014**	**0.1**	**0.16**	**0.063 J**	**8.1**	**0.027**	**0.043 J**	**0.0061 J**
2-Methylphenol	mg/kg	41,000	0.072 UJ	0.083 U	0.073 U	0.082 U	0.076 R	0.084 U	0.08 U	0.081 U	0.074 U	0.076 U	0.074 U	0.078 U	0.077 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.14 UJ	0.17 U	0.15 U	0.16 U	0.15 R	0.17 U	0.16 U	0.16 U	0.15 U	**0.24**	0.15 U	0.15 U	0.15 U
Acenaphthene	mg/kg	45,000	0.071 U	**0.25**	0.074 U	**0.032**	**0.014 J**	**0.026 J**	**0.019 J**	**0.019 J**	0.15 U	**8.1**	**0.02**	**0.033 J**	**0.0017 J**
Acenaphthylene	mg/kg	45,000	**0.0097 J**	**0.11**	0.074 U	**0.085**	**0.038 J**	**0.0023 J**	**0.047 J**	**0.073 J**	**0.12 J**	**2.4**	**0.0065 J**	**0.022 J**	**0.0095**
Acetophenone	mg/kg	120,000	0.072 U	0.083 U	0.073 U	0.082 U	0.076 U	0.084 U	0.08 U	0.081 U	0.074 U	0.76 U	0.074 U	0.078 U	0.077 U
Anthracene	mg/kg	230,000	**0.013 J**	**0.57**	**0.0075 J**	**0.19**	**0.032 J**	**0.037 J**	**0.094**	**0.14**	**0.054 J**	**9**	**0.074**	**0.098**	**0.015**
Benz[a]anthracene	mg/kg	21	**0.056 J**	**0.8**	**0.034 J**	**0.21**	**0.38**	**0.047 J**	**0.35**	**0.49**	**0.22**	**5.8**	**0.16 J**	**0.42**	**0.12**
Benzaldehyde	mg/kg	120,000	0.072 U	0.083 U	0.073 U	0.082 U	0.076 U	0.084 U	0.08 U	**0.03 J**	**0.024 J**	0.076 U	0.074 UJ	0.078 UJ	0.077 U
Benzo[a]pyrene	mg/kg	2.1	**0.057 J**	**0.73**	**0.018 J**	**0.17**	**0.31**	**0.039 J**	**0.34**	**0.49**	**0.35**	**5.1**	**0.13 J**	**0.46**	**0.07**
Benzo[b]fluoranthene	mg/kg	21	**0.17**	**1.5**	**0.04 J**	**0.24**	**0.68**	**0.058 J**	**0.66**	**0.98**	**0.55**	**9.9**	**0.24 J**	**0.73**	**0.12**
Benzo[g,h,i]perylene	mg/kg		**0.055 J**	**0.26**	**0.02 J**	**0.088**	**0.24**	**0.021 J**	**0.1**	**0.13**	**0.4**	**1.8**	**0.068**	**0.24**	**0.042**
Benzo[k]fluoranthene	mg/kg	210	**0.17**	**1.3**	**0.015 J**	**0.12**	**0.27**	**0.024 J**	**0.6**	**0.9**	**0.48**	**8.6**	**0.091 J**	**0.29**	**0.044**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.022 B	0.083 UJ	0.073 UJ	0.082 U	0.076 UJ	0.084 U	0.08 U	0.081 U	**0.23**	**4**	0.074 U	0.023 B	0.077 U
Carbazole	mg/kg		0.072 U	**0.03 J**	0.073 U	**0.071 J**	0.076 U	0.084 U	0.08 U	**0.032 J**	0.074 U	**0.42 J**	**0.043 J**	**0.038 J**	0.077 U
Chrysene	mg/kg	2,100	**0.097**	**0.76**	**0.027 J**	**0.2**	**0.55**	**0.046 J**	**0.28**	**0.42**	**0.21**	**6.2**	**0.18 J**	**0.47**	**0.11**
Dibenz[a,h]anthracene	mg/kg	2.1	**0.014 J**	**0.14**	0.074 U	**0.033**	**0.065 J**	**0.0072 J**	**0.043 J**	**0.048 J**	**0.068 J**	**0.6**	**0.024**	**0.083**	**0.012**
Diethylphthalate	mg/kg	660,000	0.072 U	0.083 U	0.073 U	0.082 U	0.076 U	0.084 U	0.08 U	0.081 U	0.074 U	0.76 U	0.074 U	0.017 B	0.077 U
Di-n-butylphthalate	mg/kg	82,000	0.072 U	0.083 U	0.073 U	0.082 U	0.076 U	0.084 U	0.08 U	0.081 U	**0.02 J**	**0.36 J**	0.074 U	0.078 U	0.077 U
Fluoranthene	mg/kg	30,000	**0.11**	**1.2**	**0.037 J**	**0.62**	**0.71**	**0.11 J**	**0.5**	**0.68**	**0.18**	**13.2**	**0.4 J**	**0.73**	**0.16**
Fluorene	mg/kg	30,000	0.071 U	**0.37**	0.074 U	**0.15**	**0.0078 J**	**0.033 J**	**0.028 J**	**0.021 J**	**0.017 J**	**10.6**	**0.013**	**0.028 J**	**0.0015 J**
Hexachloroethane	mg/kg	8	0.072 U	**0.13**	0.073 U	0.082 U	0.076 U	0.084 U	0.08 U	0.081 U	0.074 U	0.076 U	0.074 U	0.078 U	0.077 U
Indeno[1,2,3-c,d]pyrene	mg/kg	21	**0.047 J**	**0.3**	**0.014 J**	**0.088**	**0.2**	**0.02 J**	**0.12**	**0.14**	**0.22**	**1.7**	**0.066**	**0.23**	**0.04**
Naphthalene	mg/kg	17	0.023 B	**0.28**	0.028 B	**2.5**	0.023 B	**0.049 J**	**0.073 J**	**0.14**	**0.068 J**	**10.5**	**0.031 J**	0.074 B	**0.0068 J**
Phenanthrene	mg/kg		**0.045 J**	**1**	**0.03 J**	**0.78**	**0.21**	**0.15 J**	**0.26**	**0.37**	**0.11 J**	**30**	**0.22 J**	**0.34**	**0.052**
Phenol	mg/kg	250,000	0.072 UJ	0.083 U	0.073 U	0.082 U	0.076 R	0.084 U	0.08 U	0.081 U	**0.031 J**	**0.71**	0.074 U	0.078 U	0.077 U
Pyrene	mg/kg	23,000	**0.094**	**1.1**	**0.037 J**	**0.43**	**0.95**	**0.085 J**	**0.41**	**0.64**	**0.24**	**13.4**	**0.31 J**	**0.64**	**0.12**
PCBs															
Aroclor 1242	mg/kg	0.97	0.0543 U	N/A	0.0534 U	N/A	0.0532 U	N/A	0.0592 U	N/A	0.0575 U	N/A	0.054 U	N/A	0.0585 U
Aroclor 1254	mg/kg	0.97	**0.142**	N/A	0.0534 U	N/A	0.0532 U	N/A	0.0592 U	N/A	0.0575 U	N/A	0.054 U	N/A	0.0585 U
Aroclor 1260	mg/kg	0.99	0.0543 U	N/A	0.0534 U	N/A	0.0532 U	N/A	**0.631**	N/A	**0.104**	N/A	0.054 U	N/A	0.0585 U
Aroclor 1262	mg/kg		0.0543 U	N/A	0.0534 U	N/A	0.0532 U	N/A	0.0592 U	N/A	0.0575 U	N/A	0.054 U	N/A	0.0585 U
Aroclor 1268	mg/kg		**1.07**	N/A	**0.0375 J**	N/A	**0.096**	N/A	0.0592 U	N/A	0.0575 U	N/A	0.054 U	N/A	0.0585 U
PCBs (total)	mg/kg	0.97	**1.212**	N/A	**0.0375 J**	N/A	**0.096**	N/A	**0.631**	N/A	**0.104**	N/A	0.054 U	N/A	0.0585 U
TPH															
Diesel Range Organics	mg/kg	6,200	**52.8 J**	**1,430 J**	**144 J**	**24 J**	**37.2 J**	**5 J**	**35.1**	**117**	**280**	**11,000**	**32.8 J**	**92.4 J**	**25.6**
Gasoline Range Organics	mg/kg	6,200	9.3 U	**12.5**	10.4 U	10.1 U	12.3 U	10.9 U	15.5 U	11.3 U	11.2 U	**129**	11.1 U	13.2 U	8.5 U

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
^PAH compounds were analyzed via SIM

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

Table 1 - Sub-Parcel B6-2
Summary of Organics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-069-SB-8.5*	B6-070-SB-1*	B6-070-SB-4*	B6-074-SB-1*	B6-074-SB-4*	B6-075-SB-1	B6-076-SB-1	B6-076-SB-8	B6-081-SB-1	B6-081-SB-5	B6-082-SB-1*	B6-082-SB-5*
Volatile Organic Compounds														
1,2,3-Trichlorobenzene	mg/kg	930	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 UJ	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
1,2-Dichlorobenzene	mg/kg	9,300	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 UJ	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
1,2-Dichloroethene (Total)	mg/kg	2,300	0.01 U	0.016 U	0.0097 U	0.016 U	0.01 U	0.011 U	0.011 U	0.011 U	0.013 U	0.013 UJ	0.014 U	0.01 U
1,3-Dichlorobenzene	mg/kg		0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 UJ	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
1,4-Dichlorobenzene	mg/kg	11	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 UJ	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
2-Butanone (MEK)	mg/kg	190,000	0.01 U	0.016 U	0.0097 U	0.016 U	**0.0054 J**	0.011 U	0.011 UJ	0.011 UJ	0.013 U	0.013 UJ	0.014 U	0.01 U
Acetone	mg/kg	670,000	0.0062 B	**0.013 J**	0.011 B	0.016 U	**0.021**	0.011 UJ	0.011 UJ	0.011 UJ	0.013 UJ	0.013 UJ	0.014 U	0.01 U
Benzene	mg/kg	5.1	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 U	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
cis-1,2-Dichloroethene	mg/kg	2,300	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 U	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
Cyclohexane	mg/kg	27,000	0.01 U	0.016 U	0.0097 U	0.016 U	0.01 U	0.011 U	0.011 U	0.011 U	0.013 U	0.013 UJ	0.014 U	0.01 U
Ethylbenzene	mg/kg	25	0.0051 U	0.0081 U	0.0049 U	0.0082 U	**0.0013 J**	0.0053 U	0.0053 U	**0.28**	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
Isopropylbenzene	mg/kg	9,900	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 U	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
Methyl Acetate	mg/kg	1,200,000	0.051 U	0.081 U	0.049 U	0.082 U	0.052 U	0.053 U	0.053 R	0.054 R	0.063 U	0.067 UJ	0.069 U	0.05 U
Tetrachloroethene	mg/kg	100	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 U	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
Toluene	mg/kg	47,000	0.0051 U	0.0081 U	0.0049 U	0.0082 U	**0.002 J**	0.0053 U	0.0053 U	**0.0077**	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
Trichloroethene	mg/kg	6	0.0051 U	0.0081 U	0.0049 U	0.0082 U	0.0052 U	0.0053 U	0.0053 U	0.0054 U	0.0063 U	0.0067 UJ	0.0069 U	0.005 U
Xylenes	mg/kg	2,800	0.015 U	0.024 U	0.015 U	0.025 U	**0.011 J**	0.016 U	0.016 U	**1**	0.019 U	0.02 UJ	0.021 U	0.015 U
Semi-Volatile Organic Compounds^														
1,1-Biphenyl	mg/kg	200	**0.37**	0.092 U	0.074 U	0.1 U	0.08 U	**0.066 J**	**0.017 J**	**0.04 J**	0.075 U	0.081 U	0.075 U	0.081 U
2,4-Dimethylphenol	mg/kg	16,000	**0.029 J**	0.092 U	0.074 U	0.1 U	0.08 U	0.07 U	0.076 U	**0.033 J**	0.075 U	0.081 U	0.075 U	0.081 U
2-Methylnaphthalene	mg/kg	3,000	**0.58**	**0.041 J**	**0.02**	0.01 U	**0.0028 J**	**0.53**	**0.052 J**	**0.27**	**0.013**	**0.012**	**0.013**	0.0082 U
2-Methylphenol	mg/kg	41,000	**0.023 J**	0.092 U	0.074 U	0.1 U	0.08 U	0.07 U	0.076 U	**0.015 J**	0.075 U	0.081 U	0.075 U	0.081 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	**0.077 J**	0.18 U	0.15 U	0.2 U	0.16 U	0.14 U	0.15 U	**0.045 J**	0.15 U	0.16 U	0.15 U	0.16 U
Acenaphthene	mg/kg	45,000	**0.58**	**0.01 J**	**0.0061 J**	**0.0014 J**	**0.0018 J**	**0.0093 J**	**0.024 J**	**0.95**	**0.0026 J**	**0.0017 J**	**0.0018 J**	0.0082 U
Acenaphthylene	mg/kg	45,000	**1.8**	**0.018 J**	**0.012**	0.01 U	**0.0015 J**	**0.057 J**	**0.039 J**	0.078 U	**0.0074**	**0.0087**	**0.0066 J**	0.0082 U
Acetophenone	mg/kg	120,000	**0.044 J**	0.092 U	0.074 U	0.1 U	0.08 U	**0.03 J**	0.076 U	0.077 U	0.075 U	0.081 U	0.075 U	0.081 U
Anthracene	mg/kg	230,000	**4.5**	**0.027 J**	**0.048**	**0.0053 J**	**0.0055 J**	**0.057 J**	**0.34**	**0.27**	**0.0092**	**0.011**	**0.01**	**0.0015 J**
Benz[a]anthracene	mg/kg	21	**9.2**	**0.096**	**0.13**	**0.0042 J**	**0.012**	**0.2**	**1.8**	**1.5**	**0.036**	**0.022**	**0.041**	**0.0058 J**
Benzaldehyde	mg/kg	120,000	**0.047 J**	**0.026 J**	0.074 U	**0.028 J**	0.08 U	**0.085**	0.076 UJ	0.077 UJ	0.075 U	0.081 U	0.075 U	0.081 U
Benzo[a]pyrene	mg/kg	2.1	**7.3**	**0.066 J**	**0.1**	**0.0023 J**	**0.0089**	**0.22**	**1.3**	**3.2**	**0.041**	**0.03**	**0.036**	**0.0044 J**
Benzo[b]fluoranthene	mg/kg	21	**8.4**	**0.088 J**	**0.14**	**0.0063 J**	**0.022**	**0.52**	**2.7**	**3.9**	**0.085**	**0.069**	**0.093**	**0.0096**
Benzo[g,h,i]perylene	mg/kg		**2.4**	**0.03 J**	**0.045**	**0.0014 J**	**0.0049 J**	**0.21**	**0.24**	**1.6**	**0.035**	**0.033**	**0.027**	**0.0023 J**
Benzo[k]fluoranthene	mg/kg	210	**3.1**	**0.038 J**	**0.058**	**0.0055 J**	**0.019**	**0.53**	**2.5**	**1.7**	**0.085**	**0.025**	**0.081**	**0.0083**
bis(2-Ethylhexyl)phthalate	mg/kg	160	**0.026 J**	0.092 U	0.074 U	0.1 U	0.08 U	0.04 B	0.076 UJ	0.077 UJ	0.075 U	0.081 U	0.075 U	0.081 U
Carbazole	mg/kg		**0.83**	0.092 U	0.074 U	0.1 U	0.08 U	**0.027 J**	**0.24**	**0.16**	0.075 U	0.081 U	0.075 U	0.081 U
Chrysene	mg/kg	2,100	**6.3**	**0.056 J**	**0.11**	**0.0034 J**	**0.011**	**0.32**	**1.3**	**1.5**	**0.043**	**0.037**	**0.04**	**0.0057 J**
Dibenz[a,h]anthracene	mg/kg	2.1	**0.9**	**0.015 J**	**0.014**	0.01 U	**0.002 J**	**0.065 J**	**0.099**	**0.59**	**0.011**	**0.0097**	**0.009**	**0.0016 J**
Diethylphthalate	mg/kg	660,000	0.075 U	0.092 U	0.074 U	0.1 U	0.08 U	0.07 U	0.076 U	0.077 U	0.075 U	0.081 U	0.075 U	0.081 U
Di-n-butylphthalate	mg/kg	82,000	0.075 U	0.092 U	0.074 U	0.1 U	0.08 U	0.07 U	0.076 U	0.077 U	0.075 U	0.081 U	0.075 U	0.081 U
Fluoranthene	mg/kg	30,000	**11.6**	**0.086 J**	**0.24**	**0.009 J**	**0.022**	**0.29**	**3.4**	**1.4**	**0.062**	**0.031**	**0.058**	**0.0069 J**
Fluorene	mg/kg	30,000	**2.4**	**0.016 J**	**0.0091**	**0.0039 J**	**0.0033 J**	**0.015 J**	**0.022 J**	**0.13**	**0.0019 J**	**0.0027 J**	**0.0018 J**	0.0082 U
Hexachloroethane	mg/kg	8	0.075 U	0.092 U	0.074 U	0.1 U	0.08 U	0.07 U	0.076 U	0.077 U	0.075 U	0.081 U	0.075 U	0.081 U
Indeno[1,2,3-c,d]pyrene	mg/kg	21	**2.8**	**0.03 J**	**0.049**	**0.0015 J**	**0.0044 J**	**0.18**	**0.28**	**1.7**	**0.03**	**0.028**	**0.022**	**0.0021 J**
Naphthalene	mg/kg	17	**1.5**	**0.03 J**	**0.063**	**0.024**	**0.021**	**0.34**	**0.17**	**0.28**	**0.014**	**0.012**	**0.0064 J**	0.0082 U
Phenanthrene	mg/kg		**10.5**	**0.052 J**	**0.13**	**0.015**	**0.016**	**0.43**	**1.2**	**0.82**	**0.032**	**0.027**	**0.035**	**0.0037 J**
Phenol	mg/kg	250,000	**0.099**	0.092 U	0.074 U	0.1 U	**0.64**	0.07 U	0.076 U	**0.029 J**	0.075 U	0.081 U	0.075 U	0.081 U
Pyrene	mg/kg	23,000	**8.7**	**0.099**	**0.26**	**0.0063 J**	**0.016**	**0.27**	**2.6**	**1.4**	**0.053**	**0.029**	**0.051**	**0.0064 J**
PCBs														
Aroclor 1242	mg/kg	0.97	N/A	0.0615 U	N/A	0.0704 U	N/A	0.0517 U	0.058 U	N/A	0.055 U	N/A	0.054 U	N/A
Aroclor 1254	mg/kg	0.97	N/A	0.0615 U	N/A	0.0704 U	N/A	0.0517 U	**0.0983**	N/A	0.055 U	N/A	0.054 U	N/A
Aroclor 1260	mg/kg	0.99	N/A	0.0615 U	N/A	0.0704 U	N/A	0.0517 U	0.058 U	N/A	0.055 U	N/A	0.054 U	N/A
Aroclor 1262	mg/kg		N/A	0.0615 U	N/A	0.0704 U	N/A	0.0517 U	0.058 U	N/A	0.055 U	N/A	0.054 U	N/A
Aroclor 1268	mg/kg		N/A	0.0615 U	N/A	0.0704 U	N/A	0.0517 U	0.058 U	N/A	0.055 U	N/A	0.054 U	N/A
PCBs (total)	mg/kg	0.97	N/A	0.0615 U	N/A	0.0704 U	N/A	0.0517 U	**0.0983**	N/A	0.055 U	N/A	0.054 U	N/A
TPH														
Diesel Range Organics	mg/kg	6,200	**1,200**	**152**	**51.6**	**29**	**11.2**	**62.5 J**	**75.6 J**	**150 J**	**10.8 J**	**23.8 J**	**13.2**	**3.8 J**
Gasoline Range Organics	mg/kg	6,200	11.6 U	14 U	9.7 U	16.5 U	10.4 U	10.5 U	11.6 U	**20.6**	16 U	13.7 U	10.3 U	12 U

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
^PAH compounds were analyzed via SIM

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

Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-019-SB-1*	B6-019-SB-4*	B6-020-SB-1*	B6-020-SB-4*	B6-033-SB-1	B6-033-SB-4	B6-034-SB-1*
Metals									
Aluminum	mg/kg	1,100,000	**24,900**	**14,200**	**26,000**	**23,400**	**7,210**	**16,900**	**44,200**
Arsenic	mg/kg	3	**6.2**	**7.8**	**6**	**3**	**3.6**	**11.4**	2.1 U
Barium	mg/kg	220,000	**199**	**169**	**307**	**269**	**95.1 J**	**298 J**	**643**
Beryllium	mg/kg	2,300	**2.5**	**1.8**	**4**	**3.3**	**0.29 J**	**1.5**	**5.9**
Cadmium	mg/kg	980	1.3 B	**8.3**	1.4 B	**2.6**	1.4 B	**4.7**	0.4 B
Chromium	mg/kg	120,000	**730**	**1,410**	**487**	**645**	**1,490**	**867**	**8.9**
Cobalt	mg/kg	350	**4.7**	**13.9**	**3.1 J**	**1.5 J**	**5.3**	**18.4**	**1.9 J**
Copper	mg/kg	47,000	**55.8**	**205**	**75.2**	**35**	**94.3 J**	**139 J**	**7.7**
Iron	mg/kg	820,000	**132,000**	**152,000**	**61,800**	**86,100**	**165,000 J**	**115,000 J**	**14,200**
Lead	mg/kg	800	**126**	**466**	**91.6**	**104**	**61.5 J**	**237 J**	**3.5**
Manganese	mg/kg	26,000	**17,600**	**36,600**	**17,800**	**30,200**	**65,400**	**42,600**	**7,520**
Mercury	mg/kg	350	**0.007 J**	**0.028 J**	**0.045 J**	**0.0061 J**	**0.0037 J**	**0.06 J**	0.11 U
Nickel	mg/kg	22,000	**42.5**	**58.3**	**53.5**	**16**	**119 J**	**35.9 J**	**1.7 J**
Selenium	mg/kg	5,800	3.5 U	3.2 U	3.4 U	3.2 U	4.2 UJ	3.5 UJ	**4.1**
Silver	mg/kg	5,800	**1.4 J**	**2.4 J**	2.6 U	**0.75 J**	3.2 U	2.6 U	2.5 U
Thallium	mg/kg	12	8.7 U	**4.6 J**	8.5 U	7.9 U	**71.6 J**	**37.1 J**	8.3 U
Vanadium	mg/kg	5,800	**660**	**3,700**	**1,110**	**1,870**	**5,280**	**2,930**	**39.9**
Zinc	mg/kg	350,000	**301**	**3,160**	**331**	**603**	**157 J**	**1,030 J**	**3.4 J**
Other									
Cyanide	mg/kg	150	**1.3**	**0.63 J**	**0.67**	**0.22 J**	**0.85**	**1.6**	**0.45 J**

Detections in bold
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J-: The positive result for this analyte is a quantitative estimate but may be biased low.
J: The positive result for this analyte is a quantitative estimate.
R: The result for this analyte is unreliable.

Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-034-SB-4*	B6-035-SB-1*	B6-035-SB-4*	B6-036-SB-1*	B6-036-SB-8*	B6-037-SB-1*	B6-037-SB-5*
Metals									
Aluminum	mg/kg	1,100,000	**16,900**	**17,000**	**17,700**	**14,300**	**8,430**	**19,700**	**11,400**
Arsenic	mg/kg	3	**3.6**	2.3 U	**4.5**	**3.8**	2.2 U	2.5 U	**10.5**
Barium	mg/kg	220,000	**60.2**	**241**	**220**	**204**	**178**	**166**	**130**
Beryllium	mg/kg	2,300	**0.35 J**	**1**	**1.4**	**1.3**	0.87 U	**1.6**	**0.83 J**
Cadmium	mg/kg	980	1.5 U	1.3 B	1.8 B	**2.8**	**4.1**	0.88 B	**2.3**
Chromium	mg/kg	120,000	**20.8**	**1,330**	**103**	**603**	**1,360**	**787**	**593**
Cobalt	mg/kg	350	**2 J**	**7.6**	**10.1**	**7.4**	**3.6 J**	**1.3 J**	**7.6**
Copper	mg/kg	47,000	**5.9**	**70.6**	**458**	**63.6**	**60.3**	**30.7**	**117**
Iron	mg/kg	820,000	**18,200**	**157,000**	**45,600**	**98,400**	**131,000**	**140,000**	**158,000**
Lead	mg/kg	800	**13.9**	**58.1**	**204**	**165**	**295**	**31.5**	**484**
Manganese	mg/kg	26,000	**61.2**	**69,100**	**4,820**	**27,400**	**60,300**	**18,400**	**20,000**
Mercury	mg/kg	350	**0.022 J**	0.1 U	**0.088 J**	**0.062 J**	**0.048 J**	**0.0099 J**	**0.072 J**
Nickel	mg/kg	22,000	**5.9 J**	**16.4**	**21.7**	**24.2**	**13.2**	**17.9**	**54.7**
Selenium	mg/kg	5,800	4.1 U	3.7 U	2.6 B	4 U	3.5 U	4 U	3.6 U
Silver	mg/kg	5,800	3.1 U	2.8 U	2.7 U	3 U	2.6 U	3 U	2.7 U
Thallium	mg/kg	12	10.2 U	9.2 U	9.1 U	10.1 U	8.7 U	10 U	9.1 U
Vanadium	mg/kg	5,800	**26.4**	**3,920**	**188**	**1,280**	**3,460**	**492**	**315**
Zinc	mg/kg	350,000	**17.3**	**152**	**836**	**712**	**611**	**150**	**642**
Other									
Cyanide	mg/kg	150	0.66 U	**0.076 J**	**1.1**	**3.1**	**0.43 J**	**0.41 J**	**0.7**

Detections in bold
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Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-038-SB-1*	B6-038-SB-4*	B6-047-SB-1*	B6-047-SB-6*	B6-048-SB-1*	B6-048-SB-8*	B6-053-SB-1*
Metals									
Aluminum	mg/kg	1,100,000	**23,400**	**17,800**	**7,290**	**12,300**	**8,290**	**20,400**	**8,400**
Arsenic	mg/kg	3	2.6 U	**5.2**	**3.5**	**7.4**	2.2 U	**24.5**	**12.9**
Barium	mg/kg	220,000	**472**	**269**	**68.2**	**162**	**88**	**696**	**72**
Beryllium	mg/kg	2,300	**1.8**	**1.3**	**0.32 J**	**0.27 J**	0.9 U	**2**	**0.24 J**
Cadmium	mg/kg	980	1.3 B	1.7 B	0.73 B	1.6 B	0.81 B	**15.2**	1.3 B
Chromium	mg/kg	120,000	**599**	**189**	**759**	**1,190**	**669**	**406**	**734**
Cobalt	mg/kg	350	**4.5 J**	**14.5**	**5.6**	**10.8**	**1.3 J**	**34.8**	**141**
Copper	mg/kg	47,000	**40.6**	**81.3**	**35.6**	**105**	**29.3**	**248**	**369**
Iron	mg/kg	820,000	**74,100**	**90,500**	**173,000**	**119,000**	**96,800**	**296,000**	**186,000**
Lead	mg/kg	800	**59.3**	**152**	**23**	**164**	**18.5**	**1,240**	**99.7**
Manganese	mg/kg	26,000	**56,400**	**9,020**	**29,500**	**50,300**	**34,600**	**15,200**	**37,400**
Mercury	mg/kg	350	**0.064 J**	**0.41**	**0.007 J**	**0.021 J**	**0.026 J**	**0.44**	**0.29**
Nickel	mg/kg	22,000	**14.4**	**37.8**	**18**	**24.3**	**7.7 J**	**136**	**39.6**
Selenium	mg/kg	5,800	4.2 U	3.3 U	3.3 U	3.7 U	3.6 U	4.5 U	**6.4**
Silver	mg/kg	5,800	3.2 U	2.5 U	2.5 U	2.8 U	2.7 U	**1.2 J**	3.2 U
Thallium	mg/kg	12	10.6 U	8.2 U	8.3 U	9.3 U	9 U	11.3 U	10.7 U
Vanadium	mg/kg	5,800	**1,660**	**528**	**2,610**	**2,310**	**2,990**	**1,670**	**4,360**
Zinc	mg/kg	350,000	**168**	**582**	**153**	**280**	**52.8**	**6,700**	**365**
Other									
Cyanide	mg/kg	150	**0.78**	**1.4**	**0.59**	**1.5**	**0.49 J**	**7**	**0.61**

Detections in bold
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R: The result for this analyte is unreliable.

Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-053-SB-4*	B6-054-SB-1*	B6-054-SB-4*	B6-055-SB-1*	B6-055-SB-7*	B6-056-SB-1	B6-056-SB-8
Metals									
Aluminum	mg/kg	1,100,000	**6,350**	**45,700**	**41,800**	**10,800**	**14,100**	**33,100**	**21,100**
Arsenic	mg/kg	3	**9.4**	2 U	2.1 U	**6**	**3.5**	2.3 U	**6.3**
Barium	mg/kg	220,000	**60.2**	**386**	**463**	**296**	**94.6**	**289 J**	**216 J**
Beryllium	mg/kg	2,300	0.82 U	**7.5**	**7.5**	0.78 U	**0.78 J**	**4.4**	**1.7**
Cadmium	mg/kg	980	1 B	0.21 B	0.25 B	1 B	0.41 B	0.52 B	0.71 B
Chromium	mg/kg	120,000	**771**	**6.6**	**5.8**	**1,370**	**35.7**	**324 J**	**64.5 J**
Cobalt	mg/kg	350	**145**	**1.2 J**	**0.97 J**	**2.1 J**	**8.4**	**2.3 J**	**7.5**
Copper	mg/kg	47,000	**383**	**8.9**	**2.1 J**	**52**	**29.7**	**25.4 J**	**40.1 J**
Iron	mg/kg	820,000	**108,000**	**22,000**	**5,830**	**93,900**	**21,900**	**63,000**	**26,800**
Lead	mg/kg	800	**82.6**	2 U	**3.9**	**44.8**	**69.9**	**38.7 J**	**109 J**
Manganese	mg/kg	26,000	**28,500**	**4,080**	**4,050**	**66,300**	**500**	**8,200**	**3,180**
Mercury	mg/kg	350	**0.2**	0.11 U	0.11 U	**0.0098 J**	**0.039 J**	**0.015 J**	**0.057 J**
Nickel	mg/kg	22,000	**36.4**	**1.7 J**	8.2 U	**26.3**	**20.3**	**29.8 J**	**19.1 J**
Selenium	mg/kg	5,800	3.3 U	**3.3**	3.3 U	3.1 U	3.9 U	3.6 U	4.2 U
Silver	mg/kg	5,800	2.5 U	2.4 U	2.5 U	**13.4**	2.9 U	2.7 U	3.2 U
Thallium	mg/kg	12	8.2 U	7.9 U	8.2 U	**30.9**	9.8 U	**5.9 J**	10.6 U
Vanadium	mg/kg	5,800	**3,430**	**43**	**36.1**	**10,500**	**71.4**	**428 J**	**147 J**
Zinc	mg/kg	350,000	**278**	4 U	**1.9 J**	**79.7**	**135**	**98.6 J**	**226 J**
Other									
Cyanide	mg/kg	150	**1.3**	**0.27 J**	**0.28 J**	**1.4**	**0.18 J**	0.25 B	0.43 B

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Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-063-SB-1	B6-063-SB-9	B6-064-SB-1	B6-064-SB-8	B6-064-SB-10*	B6-065-SB-1*	B6-065-SB-4*
Metals									
Aluminum	mg/kg	1,100,000	**28,700**	**12,800**	**34,400**	**16,400**	N/A	**29,300**	**24,100**
Arsenic	mg/kg	3	2 U	**2.7**	2.3 U	**4.7**	**5**	**7.7**	**7.4**
Barium	mg/kg	220,000	**588 J**	**69.8 J**	**246 J**	**87.9 J**	N/A	**270**	**226**
Beryllium	mg/kg	2,300	**2.3**	**0.75 J**	**1.6**	**1.1**	N/A	**1.7**	**1.7**
Cadmium	mg/kg	980	0.46 B	0.24 B	0.48 B	0.19 B	N/A	**2.5**	**2.6**
Chromium	mg/kg	120,000	**108 J**	**28.7 J**	**584 J**	**37.9 J**	N/A	**155**	**192**
Cobalt	mg/kg	350	**2.1 J**	**12**	**1.2 J**	**9.5**	N/A	**9.8**	**10.8**
Copper	mg/kg	47,000	**10.6 J**	**17.1 J**	**28.8 J**	**16.4 J**	N/A	**80.1**	**94.9**
Iron	mg/kg	820,000	**14,100**	**19,200**	**146,000**	**20,200**	N/A	**53,200**	**57,300**
Lead	mg/kg	800	**13.7 J**	**29.2 J**	**11.5 J**	**19.8 J**	N/A	**190**	**203**
Manganese	mg/kg	26,000	**8,680**	**457**	**21,800**	**299**	N/A	**3,820**	**4,450**
Mercury	mg/kg	350	0.11 U	**0.02 J**	**0.013 J**	**0.024 J**	N/A	**0.16**	**0.1 J**
Nickel	mg/kg	22,000	**6.3 J**	**25.8 J**	**21.6 J**	**22.6 J**	N/A	**42.6**	**47**
Selenium	mg/kg	5,800	3.1 U	4.1 U	3.7 U	4.3 U	N/A	2.6 B	3.5 U
Silver	mg/kg	5,800	2.4 U	3.1 U	**1.6 J**	3.2 U	N/A	2.9 U	2.7 U
Thallium	mg/kg	12	**4.3 J**	10.2 U	**4.7 J**	10.7 U	N/A	9.8 U	8.8 U
Vanadium	mg/kg	5,800	**403 J**	**72.6 J**	**478 J**	**50.9 J**	N/A	**108**	**162**
Zinc	mg/kg	350,000	**60.1 J**	**105 J**	**50.1 J**	**53.1 J**	N/A	**455**	**454**
Other									
Cyanide	mg/kg	150	0.46 B	0.085 B	0.23 B	0.6 B	N/A	**4.6**	**3.6**

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Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-066-SB-1*	B6-066-SB-5*	B6-067-SB-1	B6-067-SB-5	B6-069-SB-1*	B6-069-SB-8.5*
Metals								
Aluminum	mg/kg	1,100,000	**34,600**	**25,600**	**12,400**	**13,000**	**13,700**	**12,600**
Arsenic	mg/kg	3	**4.2**	**5.2**	2.3 U	**3.9**	2.3 U	1.9 U
Barium	mg/kg	220,000	**385**	**378**	**106 J**	**170 J**	**82.5**	**167**
Beryllium	mg/kg	2,300	**4.6**	**3.3**	**1.3**	**0.71 J**	**0.9 J**	0.77 U
Cadmium	mg/kg	980	1.1 B	1.3 B	1.1 B	**12.1**	1 B	**9.6**
Chromium	mg/kg	120,000	**102**	**104**	**1,120**	**1,270**	**907**	**1,730**
Cobalt	mg/kg	350	**4.6**	**5.5**	**2.2 J**	**10.3**	4.6 U	**4.2**
Copper	mg/kg	47,000	**106**	**73.9**	**41.6 J**	**175 J**	**15.7**	**86.5**
Iron	mg/kg	820,000	**44,700**	**53,400**	**211,000 J**	**124,000 J**	**163,000**	**116,000**
Lead	mg/kg	800	**116**	**154**	**68.7 J**	**421 J**	**16.6**	**1,290**
Manganese	mg/kg	26,000	**4,190**	**4,890**	**23,100**	**29,800**	**26,000**	**30,300**
Mercury	mg/kg	350	**0.012 J**	**0.0059 J**	**0.022 J**	0.11 U	**0.0039 J**	**0.087 J**
Nickel	mg/kg	22,000	**19.3**	**25.8**	**32.9 J**	**46.2 J**	**12.6**	**22.1**
Selenium	mg/kg	5,800	3.3 U	3.5 U	3.7 UJ	3.4 UJ	3.7 U	3.1 U
Silver	mg/kg	5,800	2.5 U	2.6 U	2.8 U	2.5 U	2.8 U	2.3 U
Thallium	mg/kg	12	8.3 U	8.6 U	**20.2 J**	**49.7 J**	9.2 U	7.7 U
Vanadium	mg/kg	5,800	**135**	**138**	**1,580**	**4,830**	**1,090**	**3,770**
Zinc	mg/kg	350,000	**286**	**225**	**197 J**	**1,530 J**	**76.8**	**853**
Other								
Cyanide	mg/kg	150	**0.65 J**	**0.42 J**	**0.49 J**	**2.7**	**0.22 J**	**0.47 J**

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Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-070-SB-1*	B6-070-SB-4*	B6-074-SB-1*	B6-074-SB-4*	B6-075-SB-1	B6-076-SB-1
Metals								
Aluminum	mg/kg	1,100,000	**22,500**	**7,800**	**14,900**	**13,700**	**27,200**	**16,300**
Arsenic	mg/kg	3	**3.3**	2 U	**7.2**	**6.4**	**5**	**9.6**
Barium	mg/kg	220,000	**349**	**122**	**25.7**	**64.3**	**275 J**	**222 J**
Beryllium	mg/kg	2,300	**2.4**	0.81 U	**0.84 J**	**1.2**	**3.9**	**1.5**
Cadmium	mg/kg	980	**1.9**	**1.9**	0.46 B	0.42 B	**1.5**	**4.4**
Chromium	mg/kg	120,000	**506**	**1,200**	**25.3**	**34.1**	**342 J**	**505**
Cobalt	mg/kg	350	**6.5**	**3.7 J**	**7.1**	**10**	**5.5**	**11.4**
Copper	mg/kg	47,000	**50.4**	**50.3**	**16.3**	**23.2**	**59.3 J**	**118 J**
Iron	mg/kg	820,000	**68,800**	**97,900**	**27,600**	**41,700**	**85,800**	**112,000 J**
Lead	mg/kg	800	**82.9**	**112**	**11.7**	**34.4**	**113 J**	**511 J**
Manganese	mg/kg	26,000	**40,200**	**57,400**	**315**	**581**	**12,400**	**12,500**
Mercury	mg/kg	350	**0.027 J**	**0.029 J**	**0.03 J**	**0.023 J**	0.099 U	**0.12**
Nickel	mg/kg	22,000	**21.9**	**16.8**	**18.6**	**24.4**	**22.3 J**	**41.7 J**
Selenium	mg/kg	5,800	4.5 U	3.2 U	4.7 U	4 U	2.3 B	3.5 UJ
Silver	mg/kg	5,800	3.4 U	2.4 U	3.5 U	3 U	2.4 U	2.7 U
Thallium	mg/kg	12	11.2 U	8.1 U	11.7 U	9.9 U	**3.9 J**	**9 J**
Vanadium	mg/kg	5,800	**1,740**	**2,940**	**29.6**	**50**	**388 J**	**765**
Zinc	mg/kg	350,000	**376**	**316**	**49.4**	**112**	**288 J**	**1,720 J**
Other								
Cyanide	mg/kg	150	**0.75**	**1.1**	**0.054 J**	**0.12 J**	**0.6 J-**	**1.5**

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Table 2 - Sub-Parcel B6-2
Summary of Inorganics Detected in Soil
Sparrows Point, Maryland

Parameter	Units	PAL	B6-076-SB-8	B6-081-SB-1	B6-081-SB-5	B6-082-SB-1*	B6-082-SB-5*
Metals							
Aluminum	mg/kg	1,100,000	**8,750**	**41,300**	**32,500**	**18,700**	**11,200**
Arsenic	mg/kg	3	**2.2 J**	**3.7**	**2.3 J**	**5.5**	**6.3**
Barium	mg/kg	220,000	**68.5 J**	**354 J**	**1,010 J**	**190**	**56.2**
Beryllium	mg/kg	2,300	**0.43 J**	**6.2**	**3.7**	**1.3**	**0.53 J**
Cadmium	mg/kg	980	0.88 B	1.1 B	1 B	1.3 B	1.5 U
Chromium	mg/kg	120,000	**1,070**	**200 J**	**1,070 J**	**41**	**20**
Cobalt	mg/kg	350	**2.4 J**	**2.7 J**	**2.9 J**	**12.4**	**4.8 J**
Copper	mg/kg	47,000	**90 J**	**27.3 J**	**23.9 J**	**42.8**	**14.9**
Iron	mg/kg	820,000	**172,000 J**	**59,700**	**72,900**	**52,100**	**21,900**
Lead	mg/kg	800	**87.2 J**	**50 J**	**47.5 J**	**244**	**12**
Manganese	mg/kg	26,000	**32,400**	**5,340**	**26,900**	**2,440**	**129**
Mercury	mg/kg	350	**0.019 J**	0.11 U	**0.0088 J**	**0.018 J**	**0.008 J**
Nickel	mg/kg	22,000	**28.3 J**	**12.5 J**	**13.1 J**	**25.4**	**14.8**
Selenium	mg/kg	5,800	3.7 UJ	**3.7 J**	4.1 U	3.4 U	3.9 U
Silver	mg/kg	5,800	2.8 U	2.8 U	**1.1 J**	2.5 U	2.9 U
Thallium	mg/kg	12	**42.7 J**	9.3 U	**41.8**	8.5 U	9.7 U
Vanadium	mg/kg	5,800	**3,850**	**359 J**	**4,120 J**	**123**	**24**
Zinc	mg/kg	350,000	**197 J**	**187 J**	**92.8 J**	**478**	**34.7**
Other							
Cyanide	mg/kg	150	**0.55 J**	0.29 B	**0.7 J-**	**0.27 J**	0.74 U

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Table 3 - Sub-Parcel B6-2
Summary of Organics Detected in Groundwater
Sparrows Point, Maryland

Parameter	Units	PAL	FM-010-PZS	FM-011-PZS*	SW-077-MWS*	SW-078-MWS*	TM10-PZM007	TM12-PZM006*	TM14-PZM005*	TM16-PZM007	TM17-PZM005	TM18-PZM005
Volatile Organic Compounds												
1,1-Dichloroethane	µg/L	2.7	1 U	1 U	1 U	1 U	**0.7 J**	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene (Total)	µg/L	70	2 U	2 U	2 U	2 U	**2.1**	2 U	2 U	2 U	2 U	2 U
2-Butanone (MEK)	µg/L	5,600	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**9.1 J**	10 U
Acetone	µg/L	14,000	10 U	10 U	**19.3**	10 U	10 U	10 U	10 U	**5.8 J**	**97.7**	**4 J**
Benzene	µg/L	5	1 U	1 U	0.24 B	1 U	1 U	**1.2**	**0.42 J**	**1.1**	1 U	1 U
Carbon disulfide	µg/L	810	1 U	**2.7**	1 U	1 U	1 U	1 U	**0.98 J**	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	1 U	1 U	1 U	1 U	**2.1**	1 U	1 U	1 U	1 U	1 U
Cyclohexane	µg/L	13,000	10 U	10 U	**0.16 J**	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl tert-butyl ether (MTBE)	µg/L	14	1 U	**2.6**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**3.7**
Tetrachloroethene	µg/L	5	1 U	1 U	1 U	1 U	**0.65 J**	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1,000	**0.45 J**	1 U	**0.23 J**	1 U	1 U	**0.55 J**	**0.31 J**	0.72 B	1 U	1 U
Xylenes	µg/L	10,000	3 U	3 U	3 U	3 U	3 U	3 U	3 U	**1 J**	3 U	3 U
Semi-Volatile Organic Compounds^												
1,4-Dioxane	µg/L	0.46	**0.091 J**	**0.34**	0.1 U	**0.072 J**	**0.25**	0.1 U	0.1 U	**0.095 J**	**0.06 J**	**0.18**
2,3,4,6-Tetrachlorophenol	µg/L	240	**1.3**	1 U	1 U	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U
2,4-Dimethylphenol	µg/L	360	**12**	1 U	1 U	1 U	1.1 U	1 U	**5.1**	**5**	1 U	1 U
2-Methylnaphthalene	µg/L	36	**0.72 J**	0.1 U	**0.18**	0.1 U	0.11 UJ	**0.55**	**0.7**	**0.95**	0.023 B	**0.19**
2-Methylphenol	µg/L	930	**0.37 J**	1 U	1 U	1 U	1.1 U	1 U	**0.31 J**	1 U	1 U	1 U
3&4-Methylphenol(m&p Cresol)	µg/L	930	**1.3 J**	2 U	2 U	2.1 U	2.1 U	2.1 U	**1.1 J**	**1.2 J**	2.1 U	2.1 U
Acenaphthene	µg/L	530	**1.1 J**	0.1 U	**0.17**	0.1 U	**0.11**	**0.17**	**0.94**	**1.3**	**0.059 J**	**1.3**
Acenaphthylene	µg/L	530	**0.059 J**	0.1 U	**0.022 J**	0.1 U	**0.03 J**	**0.41**	**0.11**	**0.11**	0.1 U	**0.04 J**
Anthracene	µg/L	1,800	**0.19 J**	0.1 U	**0.099 J**	0.1 U	**0.056 J**	**0.42**	**0.44**	**0.16**	**0.064 J**	**0.29**
Benz[a]anthracene	µg/L	0.03	**0.046 J**	0.1 U	**0.03 J**	0.1 U	**0.049 J**	**0.11**	**0.081 J**	0.1 U	**0.024 J**	**0.16**
Benzo[a]pyrene	µg/L	0.2	**0.0073 J**	0.1 U	0.1 U	0.1 U	**0.023 J**	**0.016 J**	**0.019 J**	0.1 U	0.1 U	**0.12**
Benzo[b]fluoranthene	µg/L	0.25	0.1 UJ	0.1 U	0.1 U	0.1 U	**0.045 J**	**0.03 J**	**0.031 J**	0.1 U	0.1 U	**0.23**
Benzo[g,h,i]perylene	µg/L		0.1 UJ	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.062 J**
Benzo[k]fluoranthene	µg/L	2.5	**0.013 J**	0.1 U	0.1 U	0.1 U	**0.048 J**	**0.012 J**	**0.018 J**	0.1 U	0.1 U	**0.2**
bis(2-Ethylhexyl)phthalate	µg/L	6	1 U	**0.27 J**	1 U	**0.83 J**	1.1 UJ	1 U	1 U	1 U	**0.29 J**	**0.24 J**
Carbazole	µg/L		**1.1**	1 U	**0.31 J**	1 U	1.1 U	**1.1**	**3.8**	**1.2**	1 U	**1**
Chrysene	µg/L	25	**0.028 J**	0.1 U	**0.014 J**	0.1 U	**0.029 J**	**0.067 J**	**0.051 J**	**0.018 J**	**0.012 J**	**0.16**
Fluoranthene	µg/L	800	**0.59 J**	0.1 U	**0.19**	0.1 U	**0.16**	**1.4**	**0.86**	**0.29**	**0.072 J**	**0.91**
Fluorene	µg/L	290	**0.59 J**	0.1 U	**0.13**	0.1 U	**0.098 J**	**0.73**	**1.7**	**1.2**	**0.039 J**	**1**
Indeno[1,2,3-c,d]pyrene	µg/L	0.25	0.1 UJ	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.055 J**
Naphthalene	µg/L	0.17	**7.9 J**	0.054 B	**1.7**	0.1 U	0.059 B	**12.9**	**3.7**	**2.9**	0.043 B	**0.83**
Pentachlorophenol	µg/L	1	**7.6**	2.6 U	**2.8**	2.6 U	2.6 U	**1.1 J**	**2.6**	2.6 U	2.6 U	2.6 U
Phenanthrene	µg/L		**1.6 J**	0.1 U	**0.52**	0.1 U	**0.21**	**2.6**	**3.4**	**1.4**	**0.081 J**	**1.2**
Phenol	µg/L	5,800	**0.22 J**	1 U	**0.4 J**	1 U	1.1 U	1 U	1 U	1 U	1 U	1 U
Pyrene	µg/L	120	**0.46 J**	0.1 U	**0.13**	0.1 U	**0.13**	**0.9**	**0.53**	**0.2**	**0.067 J**	**0.58**
TPH												
Diesel Range Organics	µg/L	47	**924**	103 U	**288**	**97.8 J**	**700**	**387**	**553**	**1,280 J**	**852 J**	**462 J**

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

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

Table 4 - Sub-Parcel B6-2
Summary of Inorganics Detected in Groundwater
Sparrows Point, Maryland

Parameter	Units	PAL	FM-010-PZS	FM-011-PZS*	SW-077-MWS*	SW-078-MWS*	TM10-PZM007	TM12-PZM006*	TM14-PZM005*	TM16-PZM007	TM17-PZM005	TM18-PZM005
Total Metals												
Aluminum	µg/L	20,000	N/A	N/A	**762**	**2,560**	**5,930**	**274**	**474**	**1,010**	**63.8**	**152**
Antimony	µg/L	6	N/A	N/A	6 U	**2.8 J**	6 U	6 U	6 U	6 U	6 U	6 U
Arsenic	µg/L	10	N/A	N/A	5 U	5 U	5 U	5 U	5 U	**4.9 J**	**15.1**	**4 J**
Barium	µg/L	2,000	N/A	N/A	**444**	**21.5**	**98.9**	**56.4**	**63.6**	**35.4**	**375**	**110**
Beryllium	µg/L	4	N/A	N/A	1 U	**2.1**	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	µg/L	5	N/A	N/A	3 U	**2.4 J**	**2.4 J**	3 U	3 U	3 U	**0.69 J**	**0.71 J**
Chromium	µg/L	100	N/A	N/A	**2.7 J**	**2.3 J**	**210**	**1.5 J**	**1.7 J**	1.4 B	**1.2 J**	1.5 B
Chromium VI	µg/L	0.035	10 U	10 U	10 U	10 U	**5,000[¥] J**	10 U	10 U	10 U	10 U	10 U
Cobalt	µg/L	6	N/A	N/A	5 U	**828**	**1.8 J**	5 U	5 U	5 U	5 U	**2.9 J**
Copper	µg/L	1,300	N/A	N/A	**2.1 J**	**2.2 J**	**35.4**	5 U	5 U	5 U	5 U	**7.6**
Iron	µg/L	14,000	N/A	N/A	**107**	**164,000**	**26,000**	**122**	**243**	**129**	**27,800**	**11,800**
Lead	µg/L	15	N/A	N/A	5 U	5 U	**150**	5 U	5 U	5 U	5 U	**19.6**
Manganese	µg/L	430	N/A	N/A	**23.7**	**13,000**	**6,070**	**21.5**	**9.6**	**16.2**	**4,080**	**2,090**
Mercury	µg/L	2	N/A	N/A	0.2 U	0.2 U	**0.05 J**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	µg/L	390	N/A	N/A	**2.2 J**	**835**	**17.4 J**	10 U	10 U	**0.95 J**	**6.1 J**	**2.7 J**
Selenium	µg/L	50	N/A	N/A	8 U	8 U	**3.2 J**	8 U	8 U	8 U	8 U	8 U
Silver	µg/L	94	N/A	N/A	6 U	**2.2 J**	6 U	6 U	6 U	6 U	6 U	6 U
Thallium	µg/L	2	N/A	N/A	10 U	10 U	**14.5**	10 U	10 U	10 U	10 U	10 U
Vanadium	µg/L	86	N/A	N/A	**65.6**	**10.2**	**1,100**	**216**	**156**	**407**	**4.5 J**	**8.8**
Zinc	µg/L	6,000	N/A	N/A	2.4 B	**668**	**412 J**	2.6 B	**14**	4.5 B	**1.1 J**	**38.7**
Dissolved Metals												
Aluminum, Dissolved	µg/L	20,000	**612**	50 U	**702**	**658**	**222**	**247**	**378**	**1,060**	**57.2**	**30.8 J**
Antimony, Dissolved	µg/L	6	6 U	6 U	6 U	2.4 B	6 U	6 U	6 U	6 U	6 U	**2.3 J**
Arsenic, Dissolved	µg/L	10	**3.9 J**	5 U	5 U	5 U	5 U	5 U	5 U	**4.6 J**	**19.2**	5 U
Barium, Dissolved	µg/L	2,000	**49.1**	**25.7**	**426**	**21.1**	**32.1**	**55.8**	**58**	**36.7**	**408**	**107**
Beryllium, Dissolved	µg/L	4	1 U	1 U	1 U	**1.8**	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	µg/L	5	3 U	3 U	3 U	**2.5 J**	3 U	3 U	3 U	3 U	**0.96 J**	3 U
Chromium, Dissolved	µg/L	100	**1.6 J**	5 U	**1.6 J**	5 U	**2.5 J**	5 U	**1 J**	**2.5 J**	**1.8 J**	**1.3 J**
Cobalt, Dissolved	µg/L	6	5 U	**9.2**	5 U	**880**	5 U	5 U	5 U	5 U	10 U	**2.6 J**
Copper, Dissolved	µg/L	1,300	5 U	5 U	5 U	**3.5 J**	**1.6 J**	5 U	5 U	5 U	5 U	5 U
Iron, Dissolved	µg/L	14,000	**56.2 J**	**12,100**	**50.1 J**	**156,000**	**53 J**	**12.6 J**	**15.4 J**	**76.8**	**27,500**	**11,100**
Lead, Dissolved	µg/L	15	5 U	**4.1 J**	5 U	**3.4 J**	**2.7 J**	5 U	5 U	5 U	10 U	5 U
Manganese, Dissolved	µg/L	430	**7.3**	**764**	**7.4**	**13,000**	**12.7**	5 U	5 U	**4.8 J**	**3,810**	**2,110**
Nickel, Dissolved	µg/L	390	2.4 B	**8 J**	**2.5 J**	**887**	10 U	10 U	**0.7 J**	2.1 B	0.7 B	2.3 B
Silver, Dissolved	µg/L	94	6 U	6 U	6 U	**1.9 J**	6 U	6 U	6 U	6 U	6 U	6 U
Thallium, Dissolved	µg/L	2	**5.1 J**	10 U	**4.1 J**	10 U	**6.4 J**	**3.6 J**	10 U	**4.9 J**	20 U	10 U
Vanadium, Dissolved	µg/L	86	**392**	**1.4 J**	**64.6**	**8.4**	**645**	**212**	**151**	**427**	**6.5**	**6.5**
Zinc, Dissolved	µg/L	6,000	**1.5 J**	5.2 B	1.4 B	**687**	10 U	1.6 B	2.5 B	3.9 B	10 U	**11.4**
Other												
Cyanide	µg/L	200	**28.8**	10 U	10 U	10 U	**5.2 J**	**14.2**	**14.7**	**17.6**	**10.2**	10 U

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

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

[¥]The reported result of 5,000 µg/L for hexavalent chromium in TM10-PZM007 is suspect because high turbidities present in some unfiltered samples resulted in a matrix interference for the colorimetric method 7196. This sample was recollected on July 15, 2016 to be analyzed for dissolved and total hexavalent chromium, and both analyses returned non-detect results with a reporting limit of 10 µg/L. The results of the resample event are used in lieu of the original hexavalent chromium result. The original reported result of 5,000 µg/L does not represent a legitimate detection and does not appear on Figure GW-1.

Table 5 - Sub-Parcel B6-2
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	B6-066-SB-5	6.4		0.017	0.43	51	39.22	410	20	no
1,2,3-Trichlorobenzene	87-61-6	B6-048-SB-8	0.0031	J	0.0031	0.003	51	1.96		93	no
1,2-Dichlorobenzene	95-50-1	B6-066-SB-5	0.53		0.0029	0.14	51	7.84		930	no
1,3-Dichlorobenzene	541-73-1	B6-066-SB-5	0.11	J	0.11	0.11	51	1.96			no
1,4-Dichlorobenzene	106-46-7	B6-066-SB-5	0.5		0.5	0.50	51	1.96	11	2,500	no
2,4-Dimethylphenol	105-67-9	B6-076-SB-8	0.033	J	0.015	0.02	50	10.00		1,600	no
2-Butanone (MEK)	78-93-3	B6-019-SB-1	0.0077	J	0.0024	0.005	51	13.73		19,000	no
2-Methylnaphthalene	91-57-6	B6-066-SB-5	8.1		0.0023	0.56	51	80.39		300	no
2-Methylphenol	95-48-7	B6-069-SB-8.5	0.023	J	0.015	0.02	50	6.00		4,100	no
Acenaphthene	83-32-9	B6-066-SB-5	8.1		0.0014	0.29	51	84.31		4,500	no
Acenaphthylene	208-96-8	B6-066-SB-5	2.4		0.0015	0.21	51	84.31			no
Acetone	67-64-1	B6-019-SB-1	0.039		0.0066	0.02	51	23.53		67,000	no
Acetophenone	98-86-2	B6-048-SB-8	0.085	J	0.018	0.04	51	13.73		12,000	no
Aluminum	7429-90-5	B6-054-SB-1	45,700		6,350	19,716	51	100.00		110,000	no
Anthracene	120-12-7	B6-066-SB-5	9		0.0015	0.49	51	96.08		23,000	no
Aroclor 1242	53469-21-9	B6-048-SB-1	0.162		0.054	0.11	26	7.69	0.95		no
Aroclor 1254	11097-69-1	B6-056-SB-1	0.142		0.0407	0.09	26	15.38	0.97	1.5	no
Aroclor 1260	11096-82-5	B6-065-SB-1	0.631		0.0842	0.25	26	15.38	0.99		no
Arsenic	7440-38-2	B6-048-SB-8	24.5		2.2	6.25	52	71.15	3	48	YES (C)
Barium	7440-39-3	B6-081-SB-5	1,010	J	25.7	242	51	100.00		22,000	no
Benz[a]anthracene	56-55-3	B6-069-SB-8.5	9.2		0.0042	0.86	51	96.08	21		no
Benzaldehyde	100-52-7	B6-038-SB-4	0.23		0.018	0.05	51	31.37	820	12,000	no
Benzene	71-43-2	B6-037-SB-5	0.0072		0.0015	0.003	51	11.76	5.1	42	no
Benzo[a]pyrene	50-32-8	B6-037-SB-5	8		0.0023	0.82	51	96.08	2.1	22	YES (C)
Benzo[b]fluoranthene	205-99-2	B6-037-SB-5	20		0.0013	1.46	51	98.04	21		no
Benzo[g,h,i]perylene	191-24-2	B6-037-SB-5	3.6		0.0014	0.36	51	94.12			no
Benzo[k]fluoranthene	207-08-9	B6-037-SB-5	20.3		0.0013	1.12	51	98.04	210		no
Beryllium	7440-41-7	B6-054-SB-1 & B6-054-SB-4	7.5		0.24	2.12	51	88.24	6,900	230	no
bis(2-Ethylhexyl)phthalate	117-81-7	B6-066-SB-5	4		0.015	0.44	51	27.45	160	1,600	no
Cadmium	7440-43-9	B6-048-SB-8	15.2		1.5	5.10	51	29.41	9,300	98	no
Carbazole	86-74-8	B6-069-SB-8.5	0.83		0.026	0.15	51	45.10			no
Chromium	7440-47-3	B6-069-SB-8.5	1,730		5.8	567	51	100.00		180,000	no
Chrysene	218-01-9	B6-037-SB-5	7		0.00069	0.78	51	98.04	2,100		no
cis-1,2-Dichloroethene	156-59-2	B6-038-SB-4	0.0045	J	0.0045	0.005	51	1.96		230	no
Cobalt	7440-48-4	B6-053-SB-4	145		0.97	12.2	51	98.04	1,900	35	YES (NC)
Copper	7440-50-8	B6-035-SB-4	458		2.1	81.0	51	100.00		4,700	no

Table 5 - Sub-Parcel B6-2
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?
Cyanide	57-12-5	B6-048-SB-8	7		0.054	1.10	51	82.35		120	no
Cyclohexane	110-82-7	B6-066-SB-5	0.38	J	0.007	0.19	51	3.92		2,700	no
Dibenz[a,h]anthracene	53-70-3	B6-069-SB-8.5	0.9		0.0016	0.13	51	84.31	2.1		no
Diethylphthalate	84-66-2	B6-020-SB-1	2.5		0.019	0.90	51	5.88		66,000	no
Di-n-butylphthalate	84-74-2	B6-066-SB-5	0.36	J	0.02	0.11	51	7.84		8,200	no
Ethylbenzene	100-41-4	B6-076-SB-8	0.28		0.00094	0.07	51	11.76	25	2,000	no
Fluoranthene	206-44-0	B6-066-SB-5	13.2		0.00078	1.37	51	100.00		3,000	no
Fluorene	86-73-7	B6-066-SB-5	10.6		0.0015	0.42	51	86.27		3,000	no
Hexachloroethane	67-72-1	B6-056-SB-8	0.13		0.13	0.13	51	1.96	8	46	no
Indeno[1,2,3-c,d]pyrene	193-39-5	B6-037-SB-5	3.1		0.0015	0.36	51	92.16	21		no
Iron	7439-89-6	B6-048-SB-8	296,000		5,830	91,875	51	100.00		82,000	YES (NC)
Isopropylbenzene	98-82-8	B6-066-SB-5	0.95		0.055	0.50	51	3.92		990	no
Lead	7439-92-1	B6-069-SB-8.5	1,290		3.5	166	51	98.04		800	YES (NC)
Manganese	7439-96-5	B6-035-SB-1	69,100		61.2	21,832	51	100.00		2,600	YES (NC)
Mercury	7439-97-6	B6-048-SB-8	0.44		0.0037	0.06	51	84.31		35	no
Methyl Acetate	79-20-9	B6-054-SB-4	0.46	J	0.46	0.46	45	2.22		120,000	no
Naphthalene	91-20-3	B6-066-SB-5	10.5		0.0024	0.78	51	80.39	17	59	no
Nickel	7440-02-0	B6-048-SB-8	136		1.7	29.1	51	98.04	64,000	2,200	no
PCBs (total)	1336-36-3	B6-056-SB-1	1.212		0.0375	0.25	26	46.15	0.94		YES (C)
Phenanthrene	85-01-8	B6-066-SB-5	30		0.0008	1.42	51	100.00			no
Phenol	108-95-2	B6-066-SB-5	0.71		0.018	0.16	50	22.00		25,000	no
Pyrene	129-00-0	B6-066-SB-5	13.4		0.0063	1.30	51	98.04		2,300	no
Selenium	7782-49-2	B6-053-SB-1	6.4		3.3	4.38	51	7.84		580	no
Silver	7440-22-4	B6-055-SB-1	13.4		0.75	3.12	51	13.73		580	no
Tetrachloroethene	127-18-4	B6-038-SB-1	0.011		0.0041	0.007	51	7.84	100	39	no
Thallium	7440-28-0	B6-033-SB-1	71.6	J	3.9	25.1	51	25.49		1.2	YES (NC)
Toluene	108-88-3	B6-076-SB-8	0.0077		0.0017	0.003	51	15.69		4,700	no
Trichloroethene	79-01-6	B6-038-SB-4	0.0042	J	0.0042	0.004	51	1.96	6	1.9	no
Vanadium	7440-62-2	B6-055-SB-1	10,500		24	1,633	51	100.00		580	YES (NC)
Xylenes	1330-20-7	B6-066-SB-5	1.3		0.0029	0.26	51	17.65		250	no
Zinc	7440-66-6	B6-048-SB-8	6,700		1.9	520	51	98.04		35,000	no

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

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 regional screening levels (e.g. Aroclor 1262, Aroclor 1268) which are not displayed.
^The COPC screening level for lead was not adjusted to the HQ=0.1 because lead is not assessed in the SLRA. The 800 mg/kg PAL is relevant to the Adult Lead Model procedure.

Table 6 - Sub-Parcel B6-2
Assessment of Lead

Exposure Unit	Surface/Sub-Surface	Arithmetic Mean (mg/kg)
Development Area (50.5 ac.)	Surface	86.6
	Sub-Surface	241
	Pooled	163

Lead Screening Levels	
Soil Concentration	Source
400 mg/kg	Integrated Exposure Uptake Biokinetic (IEUBK) model
800 mg/kg	Composite Worker Regional Screening Level (RSL)
2,518 mg/kg	Adult Lead Model (ALM) - See Below

ALM Risk Levels	
Soil Concentration	Probability of Blood Concentration of 10 ug/dL
2,518 mg/kg	5%
3,216 mg/kg	10%

Table 7 - Sub-Parcel B6-2
Exposure Point Concentrations - Construction Worker Soil

			Construction Worker LOD (50.5 ac.)					
			Surface Soil EPCs		Sub-Surface Soil EPCs		Pooled Soil EPCs	
Parameter	Cancer COPC Screening Level (mg/kg)	Non-Cancer COPC Screening Level (mg/kg)	EPC Type LOD	EPC LOD (mg/kg)	EPC Type LOD	EPC LOD (mg/kg)	EPC Type LOD	EPC LOD (mg/kg)
Arsenic	3.00	48.0	95% KM (t) UCL	**5.19**	95% GROS Adjusted Gamma UCL	**11.4**	95% GROS Approximate Gamma UCL	**7.22**
Cobalt	1,900	35.0	97.5% KM (Chebyshev) UCL	**42.9**	95% H-UCL	21.5	95% KM (Chebyshev) UCL	28.7
Iron		82,000	95% Student's-t UCL	**115,800**	95% Student's-t UCL	**109,500**	95% Student's-t UCL	**106,200**
Manganese		2,600	95% Student's-t UCL	**30,859**	97.5% Chebyshev (Mean, Sd) UCL	**43,913**	95% Approximate Gamma UCL	**29,363**
Thallium		1.20	95% KM (Percentile Bootstrap) UCL	**14.3**	95% KM (Percentile Bootstrap) UCL	**17.4**	95% KM (t) UCL	**13.4**
Vanadium		580	95% Adjusted Gamma UCL	**2,702**	95% Chebyshev (Mean, Sd) UCL	**3,115**	95% Approximate Gamma UCL	**2,284**
PCBs (total)	0.94		95% KM (% Bootstrap) UCL	0.22			95% KM (% Bootstrap) UCL	0.23
Benzo[a]pyrene	2.10	22	95% KM (Chebyshev) UCL	0.43	95% KM (Chebyshev) UCL	**3.36**	95% KM (Chebyshev) UCL	1.81

Bold indicates EPC higher than lowest COPC SL
COPC = Constituent of Potential Concern
Highlighting indicates parameter not sampled in the sub-surface

Table 8 - Sub-Parcel B6-2
Surface Soils
Construction Worker Risk Ratios

36 Day		Construction Worker LOD (50.5 ac.)				
			Construction Worker			
			SSLs		Risk Estimates	
Parameter	Target Organ	EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	Cardiovascular; Dermal	5.19	105	670	4.9E-08	0.008
Cobalt	Thyroid	42.9	37,460	6,664	1.1E-09	0.006
Iron	Gastrointestinal	115,800		1,670,426		0.07
Manganese	Nervous	30,859		29,569		1
Thallium	Dermal	14.3		95.5		0.1
Vanadium	Dermal	2,702		11,148		0.2
PCBs (total)		0.22	22.9		9.6E-09	
Benzo[a]pyrene	Developmental	0.43	115	25.4	3.7E-09	0.02
					6E-08	↓

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

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0

Table 9 - Sub-Parcel B6-2
Sub-Surface Soils
Construction Worker Risk Ratios

36 Day		Construction Worker LOD (50.5 ac.)				
			Construction Worker			
			SSLs		Risk Estimates	
Parameter	Target Organ	EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	Cardiovascular; Dermal	11.4	105	670	1.1E-07	0.02
Cobalt	Thyroid	21.5	37,460	6,664	5.7E-10	0.003
Iron	Gastrointestinal	109,500		1,670,426		0.07
Manganese	Nervous	43,913		29,569		1
Thallium	Dermal	17.4		95.5		0.2
Vanadium	Dermal	3,115		11,148		0.3
Benzo[a]pyrene	Developmental	3.36	115	25.4	2.9E-08	0.1
					1E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002

Guidance Equation Input Assumptions:

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

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0

Table 10 - Sub-Parcel B6-2
Pooled Soils
Construction Worker Risk Ratios

36 Day		Construction Worker LOD (50.5 ac.)				
			Construction Worker			
			SSLs		Risk Estimates	
Parameter	Target Organ	EPC mg/kg	Cancer	Non-Cancer	Risk	HQ
Arsenic	Cardiovascular; Dermal	7.22	105	670	6.9E-08	0.01
Cobalt	Thyroid	28.7	37,460	6,664	7.7E-10	0.004
Iron	Gastrointestinal	106,200		1,670,426		0.06
Manganese	Nervous	29,363		29,569		1
Thallium	Dermal	13.4		95.5		0.1
Vanadium	Dermal	2,284		11,148		0.2
PCBs (total)		0.23	22.9		1.0E-08	
Benzo[a]pyrene	Developmental	1.81	115	25.4	1.6E-08	0.07
					1E-07	↓

SSLs calculated using equations in the EPA Supplemental Guidance dated 2002

Guidance Equation Input Assumptions:

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

Total HI	Cardiovascular	0
	Dermal	0
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0

APPENDIX B

Construction Worker Soil Screening Levels
36 Work Day Exposure
Calculation Spreadsheet - Sub-Parcel B6-2

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
36 Work Day Exposure
Calculation Spreadsheet - Sub-Parcel B6-2

Area of site (ac)	Ac	50.5
Overall duration of construction (wk/yr)	EW	7.2
Exposure frequency (day/yr)	EF	**36**
Cars per day	Ca	5
Tons per car	CaT	2
Trucks per day	Tru	5
Tons per truck	TrT	20
Mean vehicle weight (tons)	w	**11**
Derivation of dispersion factor - particulate emission factor (g/m2-s per kg/m3)	Q/Csr	**13.5**
Overall duration of traffic (s)	Tt	**1,036,800**
Surface area (m2)	AR	**204,366**
Length (m)	LR	**452**
Distance traveled (km)	ΣVKT	**163**
Particulate emission factor (m3/kg)	PEFsc	**158,343,347**
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	**6.57**
Total time of construction (s)	Tcv	**1,036,800**

Input
Calculation

Chemical	Toxicity Criteria Source	^Ingestion SF $(mg/kg\text{-}day)^{-1}$	^Inhalation Unit Risk $(ug/m^3)^{-1}$	^Subchronic RfD (mg/kg-day)	^Subchronic RfC (mg/m^3)	^GIABS	Dermally Adjusted RfD (mg/kg-day)	^ABS	^RBA	*Dia	*Diw	*Henry's Law Constant (unitless)	*Kd	*Koc	DA	Volatilization Factor - Unlimited Reservoir (m^3/kg)	Carcinogenic Ingestion/ Dermal SL (SLing/der)	Carcinogenic Inhalation SL (SLinh)	Carcinogenic SL (mg/kg)	Non-Carcinogenic Ingestion/ Dermal SL (SLing/der)	Non-Carcinogenic Inhalation SL (SLinh)	Non-Carcinogenic SL (mg/kg)
Arsenic, Inorganic	I/C	1.50E+00	4.30E-03	3.00E-04	1.50E-05	1	3.00E-04	0.03	0.6			-	2.90E+01				105	78,405	105	676	72,244	670
Cobalt	P	-	9.00E-03	3.00E-03	2.00E-05	1	3.00E-03	**0.01**	1			-	4.50E+01					37,460	37,460	7,159	96,326	6,664
Iron	P	-	-	7.00E-01	-	1	7.00E-01	**0.01**	1			-	2.50E+01							1,670,426		1,670,426
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	**0.01**	1			-	6.50E+01							33,709	240,814	29,569
Thallium (Soluble Salts)	P	-	-	4.00E-05	-	1	4.00E-05	**0.01**	1			-	7.10E+01							95.5		95.5
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	**0.01**	1			-	1.00E+03							11,412	481,628	11,148
PCB Total	I	2.00E+00	5.71E-04	-	-	1		0.14	1	2.40E-02	6.30E-06	1.70E-02	4.68E+02	7.80E+04	4.66E-08	9.89E+3	60.6	36.9	22.9			
Benzo[a]pyrene	I	1.00E+00	6.00E-04	3.00E-04	2.00E-06	1	3.00E-04	0.13	1	4.80E-02	5.60E-06	1.87E-05	3.54E+03	5.90E+05	2.37E-11	4.39E+5	124	1,553	115	530	26.6	25.4

*chemical specific parameters found in Chemical Specific Parameters Spreadsheet at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016
^chemical specific parameters found in Unpaved Road Traffic calculator at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search
I: chemical specific parameters found in the IRIS at https://www.epa.gov/iris or IRIS 2017 Recent Additions at https://www.epa.gov/iris/iris-recent-additions
C: chemical specific parameters found in Cal EPA at https://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-2016-01.pdf
A: chemical specific parameters found in Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs) at https://www.atsdr.cdc.gov/mrls/pdfs/atsdr_mrls.pdf
P: chemical specific parameters found in the Database of EPA PPRTVs at https://hhpprtv.ornl.gov/quickview/pprtv.php

APPENDIX C

RIPARIUS CONSTRUCTION, INC.

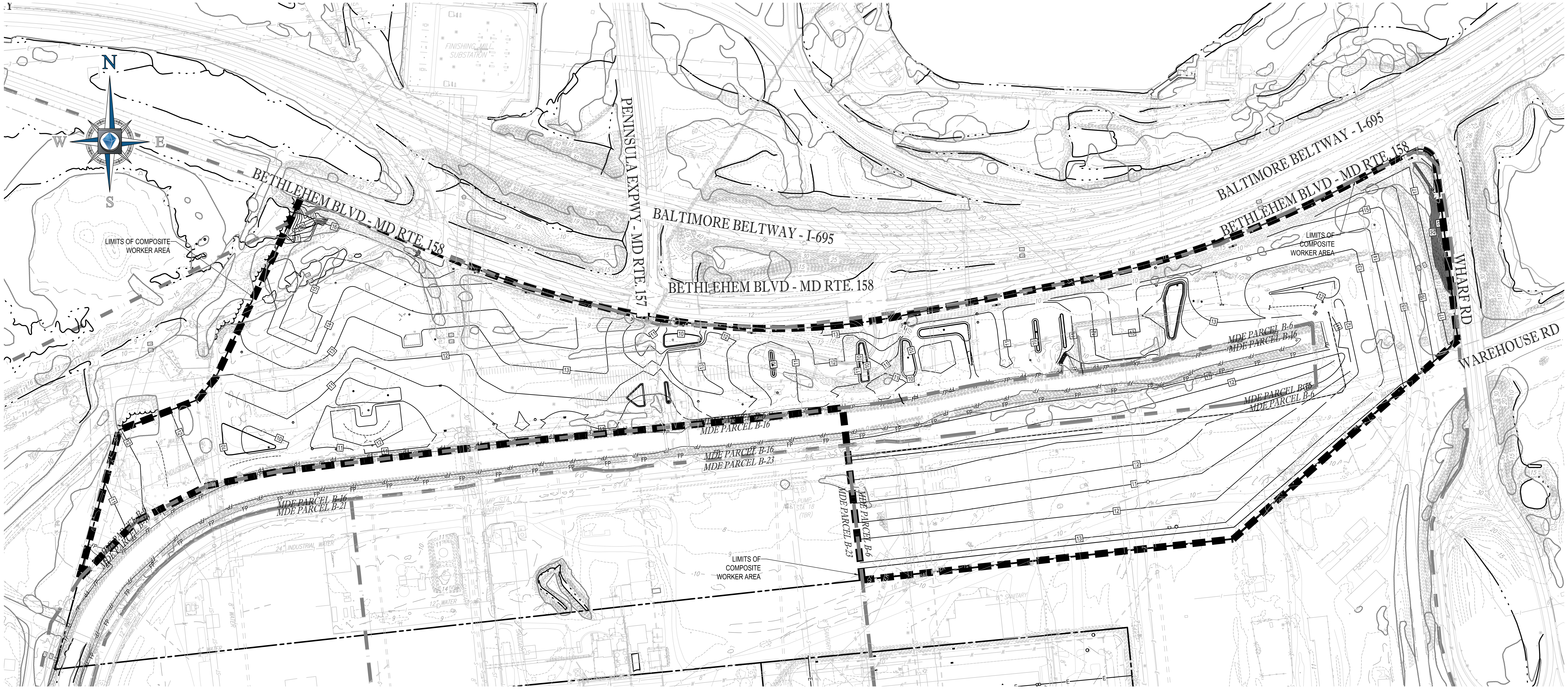
Tradepoint Retail Area Mass Grading
Ground Intrusive Work Schedule

January 12, 2018

Task Name	# Of Working Days	Anticipated Exposure Days	Approximate Dates of Tasks	
			Start	Finish
Subcontractor awards	5	0	Thur 02/01/18	Wed 02/07/18
Submittals	10	0	Thur 02/01/18	Wed 02/14/18
Sediment and Erosion Controls	10	0	Mon 02/19/18	Fri 03/02/18
Cut and Fill Grading Activities	35	0	Mon 02/26/18	Wed 4/18/18
Storm installation	18	18	Mon 03/26/18	Wed 04/18/18
Pumping Station/Sewer Installation	36	36	Wed 03/26/18	Tue 05/08/2018
Water installation	21	21	Mon 04/23/18	Tue 05/22/2018

Crews performing ground intrusive work shall not exceed 36 days

APPENDIX E



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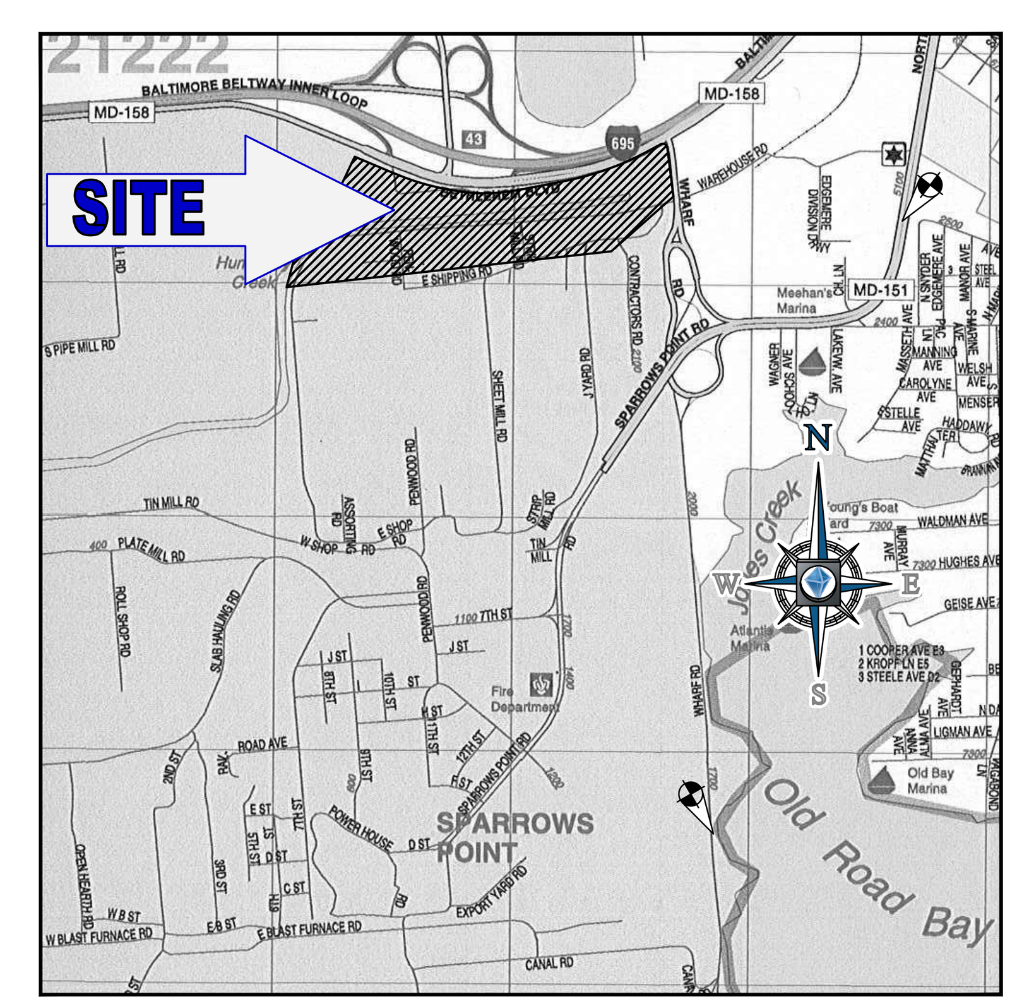

LOCATION MAP

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SCALE: 1"=2000'

MARYLAND COORDINATE SYSTEM (MCS)

ELEVATIONS BASED ON NAVD 88, COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER MONUMENTS BCO #1433 AND GIS 2

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REVISIONS

REV	DATE	COMMENT	BY
1	12/20/17	REVISED PER COUNTY & MDE COMMENTS	DSH

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(VA 1-800-552-7001) (MD 1-800-257-7777) (DE 1-800-282-8555)

NOT APPROVED FOR CONSTRUCTION

PROJECT No.:	MD1620661
DRAWN BY:	DML
CHECKED BY:	MJG
DATE:	01/19/18
SCALE:	AS NOTED
CAD I.D.:	EX0

PROJECT:

PROPOSED GRADING EXHIBIT

FOR

TRADEPOINT ATLANTIC

LOCATION OF SITE
RETAIL AREA
BETHLEHEM BLVD (MD RTE. 158)
TAX MAP 111, PARCEL 318
BALTIMORE, MD 21219
BALTIMORE COUNTY

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

SHEET TITLE:

PROPOSED GRADING EXHIBIT

SHEET NUMBER:

C-01

MDE #18-SF-0032

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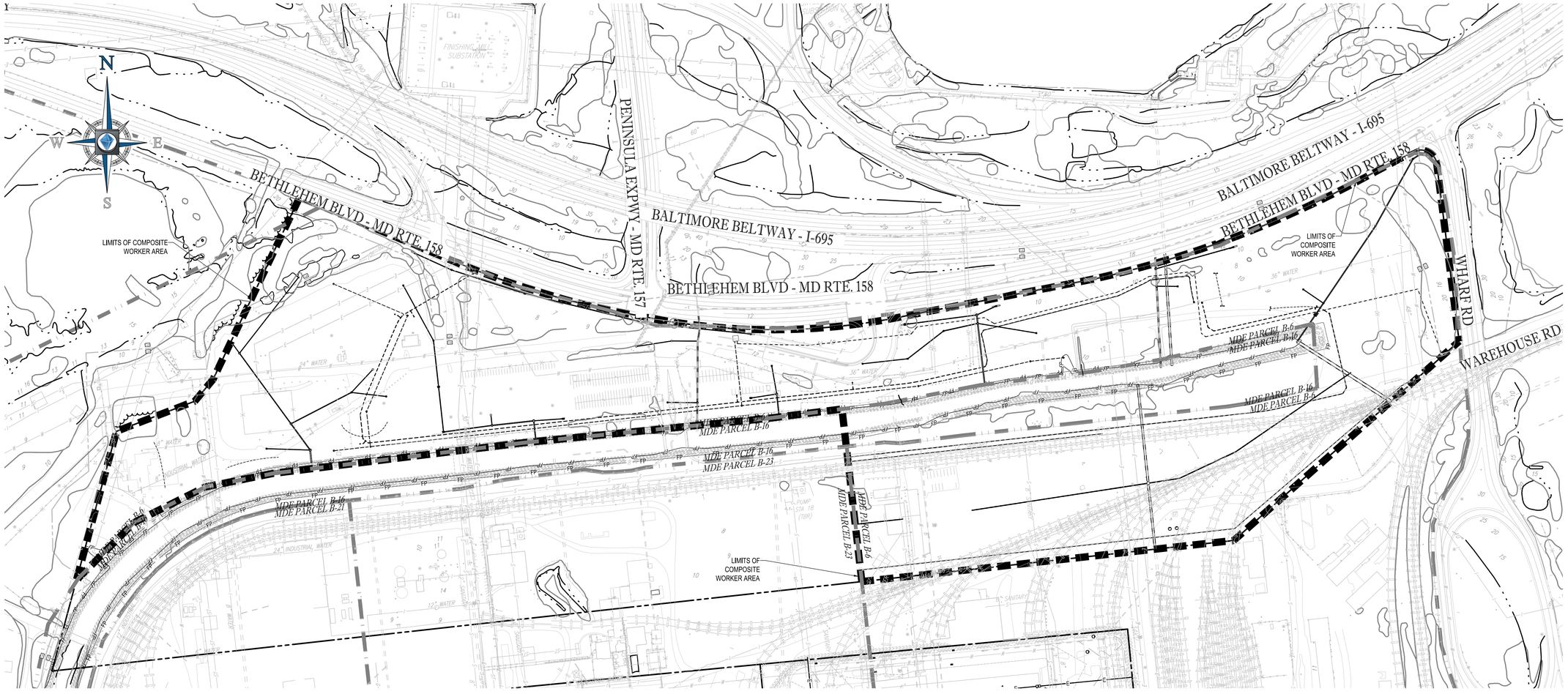

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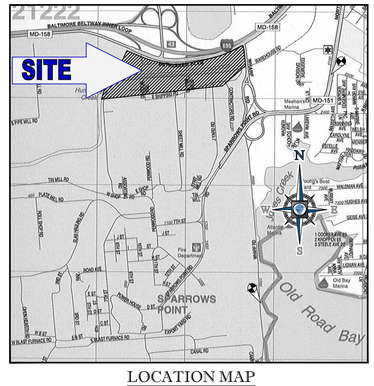

LOCATION MAP

SCALE: 1"=2000'

MARYLAND COORDINATE SYSTEM (MCS)

ELEVATIONS BASED ON NAVD 88, COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER MONUMENTS BCO #1433 AND GIS 2

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REVISIONS

REV	DATE	COMMENT	BY
1	12/20/17	REVISED PER COUNTY & MDE COMMENTS	DSH

THE FOLLOWING STATES REQUIRE NOTIFICATION BY EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN THE STATE IN VIRGINIA, MARYLAND, THE DISTRICT OF COLUMBIA, AND DELAWARE CALL - 811
(WV 1-800-245-4848) (PA 1-800-242-1776) (DC 1-800-257-7777)
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SHEET TITLE:

PROPOSED UTILITY EXHIBIT

SHEET NUMBER:

C-01

MDE #18-SF-0032

APPENDIX F

Appendix F-1

Finishing Mills Groundwater Investigation Report Resources

Table 11
Vapor Intrusion Criteria Comparison

Sample Location	Parameter	Result (ug/L)	Final Flag	Target Groundwater Concentration (ug/L) TCR=1E-05 or THQ=1	Comparison = Result / Target	Exceeds Criteria	Toxicity Type
FM-002-PZS	Cyanide	3.7	J	3.5	1.06	YES	NC
FM-004-PZI	Cyanide	4.6	J	3.5	1.31	YES	NC
FM-004-PZS	Cyanide	8.1	J	3.5	2.31	YES	NC
FM-005-PZS	Cyanide	33.5		3.5	9.57	YES	NC
FM-006-PZS	Cyanide	4.9	J+	3.5	1.40	YES	NC
FM-007-PZS	Cyanide	3.6	J	3.5	1.03	YES	NC
FM-008-PZS	Cyanide	12.1		3.5	3.46	YES	NC
FM-010-PZS	Cyanide	28.8		3.5	8.23	YES	NC
FM-016-PZS	Cyanide	6.2	J	3.5	1.77	YES	NC
FM-017-PZS	Cyanide	8.4	J	3.5	2.40	YES	NC
FM05-PZM004	Cyanide	9.3	J	3.5	2.66	YES	NC
SW-075-MWS	Cyanide	9.6	J+	3.5	2.74	YES	NC
SW-079-MWS	Cyanide	31.4		3.5	8.97	YES	NC
SW-081-MWS	Cyanide	1350	J+	3.5	385.71	YES	NC
TM07-PZM005	Cyanide	31.4		3.5	8.97	YES	NC
TM09-PZM007	Cyanide	45.8		3.5	13.09	YES	NC
TM10-PZM007	Cyanide	5.2	J	3.5	1.49	YES	NC
TM11-PZM007	Cyanide	58.3		3.5	16.66	YES	NC
TM12-PZM006	Cyanide	14.2		3.5	4.06	YES	NC
TM13-PZM007	Cyanide	18		3.5	5.14	YES	NC
TM14-PZM005	Cyanide	14.7		3.5	4.20	YES	NC
TM15-PZM007	Cyanide	73.6		3.5	21.03	YES	NC
TM15-PZM011	Cyanide	33.3		3.5	9.51	YES	NC
TM16-PZM007	Cyanide	17.6		3.5	5.03	YES	NC
TM17-PZM005	Cyanide	10.2		3.5	2.91	YES	NC

NC indicates non-carcinogenic hazard

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 high.

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	FM-001-PZI	FM-001-PZS	FM-002-PZI	FM-002-PZS	FM-003-PZI	FM-003-PZS	FM-004-PZI
Cancer Risk									
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	0	0	0	2.2E-11	1.4E-09	6.9E-09	5.5E-10
Naphthalene	SVOC	Nervous; Respiratory	1.8E-09	3.3E-09	1.2E-09	0	2.8E-09	5E-09	1.6E-09
1,1-Dichloroethane	VOC	None Specified	0	0	0	5.8E-08	2.8E-08	6.09E-07	4.2E-08
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	2.3E-06	0
Benzene	VOC	Immune	0	0	0	0	0	0	0
Bromodichloromethane	VOC	Urinary	0	0	0	0	0	0	0
Chloroform	VOC	Hepatic	3.06E-07	0	7.2E-08	0	5E-07	0	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	3.7E-07	0
Cumulative Vapor Intrusion - Target Cancer Risk =			3E-07	3E-09	7E-08	6E-08	5E-07	3E-06	4E-08
Non-Cancer Hazard									
Cyanide	Other	None Specified	0	0.71	0	1.1	0.69	0	1.3
Cumulative Vapor Intrusion - Hazard Index =			0	0.7	0	1	0.7	0	1
1,1-Dichloroethene	VOC	Hepatic	0	0	0	4.3E-04	0	0.16	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	4E-04	0	0.2	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0

Values highlighted in red indicate exceedances of the
cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	FM-004-PZS	FM-005-PZI	FM-005-PZS	FM-006-PZI	FM-006-PZS	FM-007-PZI	FM-007-PZS
Cancer Risk									
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	7.9E-10	1.08E-10	7.2E-11	0	7E-12	0	0
Naphthalene	SVOC	Nervous; Respiratory	1E-08	5.5E-09	1.5E-07	2.9E-09	1.5E-09	1.7E-09	3.0E-09
1,1-Dichloroethane	VOC	None Specified	0	0	1.4E-08	0	0	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0	0
Benzene	VOC	Immune	0	0	0	0	0	0	0
Bromodichloromethane	VOC	Urinary	0	0	0	0	0	0	0
Chloroform	VOC	Hepatic	0	0	0	0	0	0	1.9E-07
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			1E-08	6E-09	2E-07	3E-09	2E-09	2E-09	2E-07
Non-Cancer Hazard									
Cyanide	Other	None Specified	2.3	0.57	9.6	0	1.4	0	1.0
Cumulative Vapor Intrusion - Hazard Index =			2	0.6	10	0	1	0	1
1,1-Dichloroethene	VOC	Hepatic	8.8E-04	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			9E-04	0	0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	FM-008-PZI	FM-008-PZS	FM-009-PZI	FM-009-PZS	FM-010-PZS	FM-011-PZI	FM-011-PZS	FM-012-PZI
Cancer Risk										
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	0	7.5E-12	1.8E-11	0	7E-12	4.6E-11	2.6E-11	0
Naphthalene	SVOC	Nervous; Respiratory	9E-08	3.2E-08	1.6E-09	1.8E-09	4.0E-07	2.2E-09	2.7E-09	3.4E-09
1,1-Dichloroethane	VOC	None Specified	0	0	0	0	0	3.6E-08	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0	0	0
Benzene	VOC	Immune	0	0	0	0	0	0	0	0
Bromodichloromethane	VOC	Urinary	0	0	0	0	0	0	0	0
Chloroform	VOC	Hepatic	3.6E-07	0	1.6E-06	0	0	0	0	3.6E-07
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	6.6E-08	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	1.2E-08	1.3E-09	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			5E-07	1E-07	2E-06	2E-09	4E-07	5E-08	4E-09	4E-07
Non-Cancer Hazard										
Cyanide	Other	None Specified	0	3.5	0	0.86	8.2	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	3	0	0.9	8	0	0	0
1,1-Dichloroethene	VOC	Hepatic	0	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	FM-012-PZS	FM-013-PZI	FM-013-PZS	FM-014-PZI	FM-014-PZS	FM-015-PZI	FM-015-PZS	FM-016-PZI
Cancer Risk										
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	0	1.3E-11	6.5E-11	1.9E-10	3.6E-11	2.8E-11	0	4.8E-11
Naphthalene	SVOC	Nervous; Respiratory	6E-09	0.000000007	1.2E-08	0.000000007	1.4E-09	2.2E-09	1.5E-08	1.5E-09
1,1-Dichloroethane	VOC	None Specified	0	0	2.3E-08	5.8E-08	0	0	0	2.4E-08
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0	0	0
Benzene	VOC	Immune	0	0	0	0	0	0	0	0
Bromodichloromethane	VOC	Urinary	0	0	0	0	0	0	0	0
Chloroform	VOC	Hepatic	0	1.06E-06	2.4E-07	0	0	2.7E-07	0	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	5E-08	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			6E-09	1E-06	3E-07	6E-08	1E-09	3E-07	2E-08	3E-08
Non-Cancer Hazard										
Cyanide	Other	None Specified	0	0	0	0	0.74	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0.7	0	0	0
1,1-Dichloroethene	VOC	Hepatic	0	0	0	4.5E-03	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	5E-03	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	FM-016-PZS	FM-017-PZS	FM01-PZM003	FM01-PZM041	FM05-PZM004	FM05-PZM024	SW-048-MWS
Cancer Risk									
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	1.2E-09	6.5E-12	0	0	2.8E-12	0	0
Naphthalene	SVOC	Nervous; Respiratory	1.6E-09	1.7E-08	2.6E-09	1.2E-09	5.4E-06	2.4E-07	1.9E-09
1,1-Dichloroethane	VOC	None Specified	2.4E-07	1.4E-08	0	0	0	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0	0
Benzene	VOC	Immune	0	6.2E-08	0	0	3.8E-07	0	0
Bromodichloromethane	VOC	Urinary	0	0	0	0	0	0	0
Chloroform	VOC	Hepatic	5E-07	0	7.8E-06	0	0	0	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			7E-07	9E-08	8E-06	1E-09	6E-06	2E-07	2E-09
Non-Cancer Hazard									
Cyanide	Other	None Specified	1.8	2.4	0	0	2.7	0	0
Cumulative Vapor Intrusion - Hazard Index =			2	2	0	0	3	0	0
1,1-Dichloroethene	VOC	Hepatic	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	SW-053-MWS	SW06-PZM001	SW06-PZM053	SW-075-MWI	SW-075-MWS	SW-076-MWI
Cancer Risk								
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	0	0	0	0	0	1E-11
Naphthalene	SVOC	Nervous; Respiratory	0	2.7E-09	1.2E-09	1.9E-09	2.1E-08	0
1,1-Dichloroethane	VOC	None Specified	0	0	0	0	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0
Benzene	VOC	Immune	0	0	0	0	9.3E-08	0
Bromodichloromethane	VOC	Urinary	0	0	0	0	0	0
Chloroform	VOC	Hepatic	0	0	1.6E-06	1.3E-06	2.7E-07	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	1.7E-09
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			0	3E-09	2E-06	1E-06	4E-07	2E-09
Non-Cancer Hazard								
Cyanide	Other	None Specified	0	0	0	0	2.7	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	3	0
1,1-Dichloroethene	VOC	Hepatic	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0.55
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0.5

Values highlighted in red indicate exceedances of the
cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	SW-076-MWS	SW-077-MWI	SW-077-MWS	SW-078-MWI	SW-078-MWS	SW-079-MWI	SW-079-MWS
Cancer Risk									
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	0	0	0	0	5.5E-12	0	7.2E-12
Naphthalene	SVOC	Nervous; Respiratory	9E-10	2.1E-09	8.5E-08	0	0	9E-09	6E-07
1,1-Dichloroethane	VOC	None Specified	0	0	0	0	0	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0	0
Benzene	VOC	Immune	0	0	3.5E-08	0	0	0	3.6E-08
Bromodichloromethane	VOC	Urinary	0	3.2E-07	0	9.5E-07	0	0	0
Chloroform	VOC	Hepatic	0	3.8E-06	0	6.4E-06	0	6.7E-07	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			9E-10	4E-06	1E-07	7E-06	6E-12	7E-07	6E-07
Non-Cancer Hazard									
Cyanide	Other	None Specified	0	0	0	0	0	0	9
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	9
1,1-Dichloroethene	VOC	Hepatic	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	SW-080-MWI	SW-080-MWS	SW-081-MWI	SW-081-MWS	TM07-PZM005	TM07-PZM045	TM09-PZM007
Cancer Risk									
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	3.7E-10	2E-11	1.4E-09	6E-12	6.5E-12	2.08E-11	1.5E-10
Naphthalene	SVOC	Nervous; Respiratory	1.1E-09	0	0.000000007	1.9E-07	7E-09	1.6E-09	3.1E-07
1,1-Dichloroethane	VOC	None Specified	4.8E-07	1.7E-07	5.5E-08	0	2.0E-08	0	7.6E-08
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0	0
Benzene	VOC	Immune	0	0	0	1.3E-07	0	0	1.03E-07
Bromodichloromethane	VOC	Urinary	0	0	0	0	0	0	0
Chloroform	VOC	Hepatic	7.8E-07	0	0	0	0	0	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	2.4E-09	0	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			1E-06	2E-07	6E-08	3E-07	3E-08	2E-09	5E-07
Non-Cancer Hazard									
Cyanide	Other	None Specified	0	0	0	385.7	9.0	0	13.1
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	386	9	0	13
1,1-Dichloroethene	VOC	Hepatic	2.7E-02	1.09E-03	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			3E-02	1E-03	0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0	0.1
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0	0.1

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	TM09-PZM047	TM10-PZM007	TM11-PZM007	TM11-PZM034	TM12-PZM006	TM13-PZM007
Cancer Risk								
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	0	1.9E-11	1.6E-10	7.7E-12	0	0
Naphthalene	SVOC	Nervous; Respiratory	0	3.0E-09	2.3E-07	6E-09	6.5E-07	1.2E-06
1,1-Dichloroethane	VOC	None Specified	0	2.1E-08	3.03E-08	0	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0	0
Benzene	VOC	Immune	0	0	5.9E-08	0	1.7E-07	3.8E-07
Bromodichloromethane	VOC	Urinary	0	0	0	1.4E-07	0	0
Chloroform	VOC	Hepatic	0	0	0	2.08E-06	0	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			0	2E-08	3E-07	2E-06	8E-07	2E-06
Non-Cancer Hazard								
Cyanide	Other	None Specified	0	1.5	16.7	0	4.1	5.1
Cumulative Vapor Intrusion - Hazard Index =			0	1	17	0	4	5
1,1-Dichloroethene	VOC	Hepatic	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

Parameter	Type	Organ Systems	TM13-PZM046	TM14-PZM005	TM15-PZM007	TM15-PZM011	TM15-PZM031
Cancer Risk							
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	0	0	0	1.3E-11	0
Naphthalene	SVOC	Nervous; Respiratory	3.8E-06	1.9E-07	5.7E-06	1.5E-06	0
1,1-Dichloroethane	VOC	None Specified	0	0	0	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0	0	0
Benzene	VOC	Immune	0	6.09E-08	2.9E-07	1.7E-07	0
Bromodichloromethane	VOC	Urinary	0	0	0	0	0
Chloroform	VOC	Hepatic	1.5E-06	0	0	0	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	3.9E-08	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	0	0	0
Vinyl chloride	VOC	Hepatic	0	0	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			5E-06	2E-07	6E-06	2E-06	0
Non-Cancer Hazard							
Cyanide	Other	None Specified	0	4.2	21.0	9.5	0
Cumulative Vapor Intrusion - Hazard Index =			0	4	21	10	0
1,1-Dichloroethene	VOC	Hepatic	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 12
Cumulative Vapor Intrusion Comparison

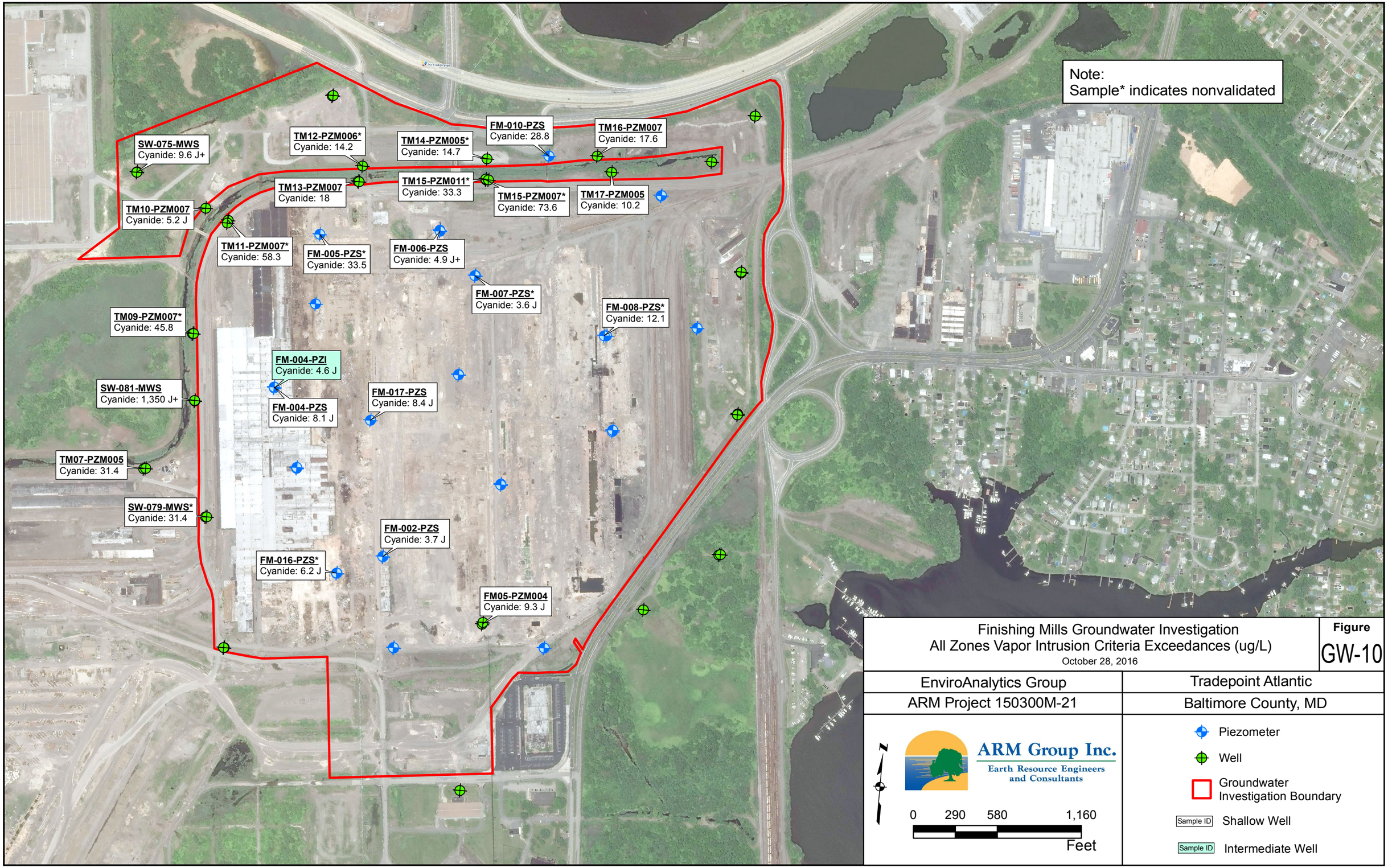
Parameter	Type	Organ Systems	TM16-PZM007	TM17-PZM005	TM18-PZM005
Cancer Risk					
1,4-Dioxane	SVOC	Hepatic; Nervous; Respiratory; Urinary	7.3E-12	4.6E-12	1.4E-11
Naphthalene	SVOC	Nervous; Respiratory	1.5E-07	2.2E-09	4.2E-08
1,1-Dichloroethane	VOC	None Specified	0	0	0
1,2-Dichloroethane	VOC	None Specified	0	0	0
Benzene	VOC	Immune	1.6E-07	0	0
Bromodichloromethane	VOC	Urinary	0	0	0
Chloroform	VOC	Hepatic	0	0	0
Ethylbenzene	VOC	Developmental; Hepatic; Urinary	0	0	0
Methyl tert-butyl ether (MTBE)	VOC	Hepatic; Ocular; Urinary	0	0	1.9E-09
Vinyl chloride	VOC	Hepatic	0	0	0
Cumulative Vapor Intrusion - Target Cancer Risk =			3E-07	2E-09	4E-08
Non-Cancer Hazard					
Cyanide	Other	None Specified	5.0	2.9	0
Cumulative Vapor Intrusion - Hazard Index =			5	3	0
1,1-Dichloroethene	VOC	Hepatic	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	0	0	0
Cumulative Vapor Intrusion - Hazard Index =			0	0	0

Values highlighted in red indicate exceedances of the cumulative vapor intrusion criteria
TCR > 1E-05
THI > 1

Table 13
Ambient Water Quality Criteria Comparison

Parameter (Shallow Zone)	Mean Concentration (ug/L)	Consumption of Organism Only Criteria (ug/L)	Consumption of Organism Only Average Comparison	Salt Water Chronic Criteria (ug/L)	Salt Water Chronic Average Comparison
Shallow Hydrogeologic Zone					
2-Methylnaphthalene	1.93	N/A		2.1	0.92
Aluminum	826.4	N/A		87	9.50
Aluminum, Dissolved	384.0	N/A		87	4.41
Anthracene	0.32	40,000	0.00	0.73	0.44
Arsenic	4.11	1.4	2.93	36	0.11
Arsenic, Dissolved	3.27	1.4	2.34	36	0.09
Barium	82.5	N/A		200	0.41
Barium, Dissolved	76.8	N/A		200	0.38
Benzo[a]anthracene	0.05	0.18	0.29	0.027	1.94
Benzo[a]pyrene	0.01	0.18	0.08	0.014	0.99
Benzo[b]fluoranthene	0.03	0.18	0.15	9.07	0.00
Benzo[k]fluoranthene	0.02	0.18	0.12	N/A	
Carbon disulfide	0.48	N/A		0.92	0.52
Chromium	17.8	N/A		50	0.36
Cobalt	0.36	N/A		1	0.36
Cobalt, Dissolved	0.19	N/A		1	0.19
Copper	3.31	N/A		3.1	1.07
Cyanide	121.5	140	0.87	1	121.5
Fluorene	1.55	5,300	0.00	3.9	0.40
Iron	5,170	N/A		1,000	5.17
Iron, Dissolved	2,829	N/A		1,000	2.83
Lead	13.0	N/A		8.1	1.61
Manganese	958.0	N/A		100	9.58
Manganese, Dissolved	437.0	N/A		100	4.37
Naphthalene	14.9	N/A		1.4	10.7
Nickel	2.75	4,600	0.00	8.2	0.34
PCBs (total)	0.06	N/A		0.03	1.94
Phenanthrene	2.28	N/A		4.6	0.50
Thallium	2.14	0.47	4.55	17	0.13
Thallium, Dissolved	2.88	0.47	6.12	17	0.17
Vanadium	273.0	N/A		50	5.46
Vanadium, Dissolved	252.9	N/A		50	5.06
Zinc	37.6	26,000	0.00	81	0.46

N/A indicates no criteria
Orange highlight indicates exceedance of criteria by a factor of 2 or more
Yellow highlight indicates exceedance of criteria by a factor of 10 or more
A glossary of laboratory flags can be viewed in the attached laboratory reports


Note:
Sample* indicates nonvalidated
SW-075-MWS
Cyanide: 9.6 J+
TM12-PZM006*
Cyanide: 14.2
TM14-PZM005*
Cyanide: 14.7
FM-010-PZS
Cyanide: 28.8
TM16-PZM007
Cyanide: 17.6
TM13-PZM007
Cyanide: 18
TM15-PZM011*
Cyanide: 33.3
TM15-PZM007*
Cyanide: 73.6
TM17-PZM005
Cyanide: 10.2
TM10-PZM007
Cyanide: 5.2 J
TM11-PZM007*
Cyanide: 58.3
FM-005-PZS*
Cyanide: 33.5
FM-006-PZS
Cyanide: 4.9 J+
FM-007-PZS*
Cyanide: 3.6 J
FM-008-PZS*
Cyanide: 12.1
TM09-PZM007*
Cyanide: 45.8
FM-004-PZI
Cyanide: 4.6 J
SW-081-MWS
Cyanide: 1,350 J+
FM-017-PZS
Cyanide: 8.4 J
FM-004-PZS
Cyanide: 8.1 J
TM07-PZM005
Cyanide: 31.4
SW-079-MWS*
Cyanide: 31.4
FM-002-PZS
Cyanide: 3.7 J
FM-016-PZS*
Cyanide: 6.2 J
FM05-PZM004
Cyanide: 9.3 J
Finishing Mills Groundwater Investigation
All Zones Vapor Intrusion Criteria Exceedances (ug/L)
October 28, 2016
Figure
GW-10
EnviroAnalytics Group
ARM Project 150300M-21
Tradepoint Atlantic
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
290
580
1,160
Feet
Piezometer
Well
Groundwater Investigation Boundary
Sample ID
Shallow Well
Sample ID
Intermediate Well

Note:
Sample* indicates nonvalidated

TM10-PZM007
Organism Consumption
Thallium (T): 14.5
Salt Water Chronic
Aluminum (T): 5,930
Benzo(a)anthracene: 0.049 J
Benzo(a)pyrene: 0.023 J
Chromium: 210
Cobalt (T): 1.8
Copper (T): 35.4
Cyanide: 5.2 J
Iron (T): 26,000
Lead (T): 150
Manganese (T): 6,070
Nickel (T): 17.4 J
Vanadium (T): 1,100
Zinc (T): 412 J

TM12-PZM006*
Organism Consumption
Thallium (D): 3.6 J
Salt Water Chronic
Aluminum (T): 274
Benzo(a)anthracene: 0.11
Benzo(a)pyrene: 0.016 J
Cyanide: 14.2
Naphthalene: 12.9
Vanadium (T): 216

TM14-PZM005*
Salt Water Chronic
Aluminum (T): 474
Benzo(a)anthracene: 0.081 J
Benzo(a)pyrene: 0.019 J
Carbon Disulfide: 0.98 J
Cyanide: 14.7
Naphthalene: 3.7
Vanadium (T): 156

FM-010-PZS
Organic Cunsumption
Arsenic (D): 3,9 J
Thallium (D): 5.1 J
Salt Water Chronic
Aluminum (D): 612
Benzo(a)anthracene: 0.046 J
Cyanide: 28.8
Naphthalene: 7.9 J
Vanadium (D): 392

TM16-PZM007
Organism Consumption
Arsenic (T): 4.9 J
Thallium (D): 4.6 J
Salt Water Chronic
Aluminum (T): 1,010
Cyanide: 17.6
Naphthalene: 2.9
Vanadium (T): 407

TM18-PZM005
Organism Consumption
Arsenic (T): 4 J
Benzo(b)fluoranthene: 0.23
Benzo(k)fluoranthene: 0.2
Salt Water Chronic
Aluminum (T): 152
Benzo(a)anthracene: 0.16
Benzo(a)pyrene: 0.12
Cobalt (T): 2.9 J
Copper (T): 7.6
Iron (T): 11,800
Lead (T): 19.6
Manganese (T): 2,090

TM13-PZM007
Salt Water Chronic
Aluminum (T): 150
Benzo(a)anthracene: 0.073 J
Cyanide: 18
Naphthalene: 23.3
PCBs (T): 0.75
Vanadium (T): 135

TM11-PZM007*
Salt Water Chronic
Aluminum (T): 101
Carbon Disulfide: 0.99 JB
Cyanide: 58.3
Manganese (T): 151
Naphthalene: 4.6

TM17-PZM005
Organism Consumption
Arsenic (T): 15.1
Salt Water Chronic
Barium (T): 375
Cyanide: 10.2
Iron (T): 27,800
Manganese (T): 4,080

TM15-PZM007*
Organism Consumption
Arsenic (T): 6.7
Thallium (T): 9.3 J
Salt Water Chronic
2-Methylnaphthalene: 18.1
Aluminum (T): 538
Anthracene: 1.3
Benzo(a)anthracene: 0.078 J
Carbon Disulfide: 1.2
Cyanide: 73.6
Fluorene: 11.9
Naphthalene: 113
Phenanthrene: 12.5
Vanadium (T): 806

TM15-PZM011*
Organism Consumption
Arsenic (T): 12.8
Salt Water Chronic
Aluminum (T): 549
Benzo(a)anthracene: 0.04 J
Carbon Disulfide: 1.5
Cyanide: 33.3
Naphthalene: 29.5
Vanadium (T): 67.1

TM09-PZM007*
Organism Consumption
Arsenic (T): 5.1
Salt Water Chronic
Aluminum (T): 551
Carbon Disulfide: 1.5
Cyanide: 45.8
Naphthalene: 6.2
Vanadium (T): 212

SW-081-MWS
Organism Consumption
Arsenic (T): 4.8 J
Thallium (D): 4.2 J
Cyanide: 1,350 J+
Salt Water Chronic
Aluminum (T): 805
Benzo(a)anthracene: 0.047 J
Cyanide: 1,350 J+
Naphthalene: 3.7 B
Vanadium (T): 246

TM07-PZM005
Organism Consumption
Thallium (T): 4 J
Salt Water Chronic
Aluminum (T): 146
Cyanide: 31.4
Vanadium (T): 176

Finishing Mills Groundwater Investigation
Shallow Zone Ambient Water Quality Criteria Exceedances (ug/L)
October 28, 2016

Figure
GW-11

EnviroAnalytics Group
ARM Project 150300M-21

Tradepoint Atlantic
Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 290 580 1,160
Feet

Piezometer
Well
Groundwater Investigation Boundary
Sample ID Shallow Well

(T) = Total Metals
(D) = Dissolved Metals

Appendix F-2

Site-Wide Groundwater Study Report Resources

Table 2
Total Cyanide and Available Cyanide Comparison
Tradepoint Atlantic
Sparrows Point, Maryland

Sample ID	Unit	Vapor Intrusion Criteria	Ambient Water Quality Criteria				Total Cyanide Result	Available Cyanide Result
			Consumption of Organism Only Criteria	10x Consumption of Organism Only Critieria	Salt Water Chronic Criteria	10x Salt Water Chronic Criteria		
B8-018-PZ	ug/L	3.5	140	1,400	1	10	59.2	0.8 J
LF-01S	ug/L	3.5	140	1,400	1	10	44.6	0.68 J
LF-02	ug/L	3.5	140	1,400	1	10	148	5.3
RW19-PZM000	ug/L	3.5	140	1,400	1	10	1,330	1.7 J
SW-024-MWS	ug/L	3.5	140	1,400	1	10	296	1.6 J
SW-029-MWS	ug/L	3.5	140	1,400	1	10	1,420	3
SW-030-MWS	ug/L	3.5	140	1,400	1	10	64.6	0.63 J
SW-034-MWS	ug/L	3.5	140	1,400	1	10	71.8	0.65 J
SW-035-MWS	ug/L	3.5	140	1,400	1	10	225	1.2 J
SW-065-MWS	ug/L	3.5	140	1,400	1	10	1,030	1.7 J
SW-081-MWS	ug/L	3.5	140	1,400	1	10	1,350 J+	1.6 J
TM11-PZM007	ug/L	3.5	140	1,400	1	10	58.3	1 J
TM15-PZM007	ug/L	3.5	140	1,400	1	10	73.6	2.1

Sample Locations

Parcel Boundary

RW19-PZM000 has been renamed RW06-MW(S).

Parcel A9

Parcel A5

Parcel A11

Parcel A7

LF-01S
Total Cyanide (ug/L): 44.6
Available Cyanide (ug/L): 0.68 J

Parcel A8

Parcel A12

LF-02
Total Cyanide (ug/L): 148
Available Cyanide (ug/L): 5.3

Parcel A2

RW19-PZM000
Total Cyanide (ug/L): 1,330
Available Cyanide (ug/L): 1.7 J

Parcel A6

Parcel A4

TM15-PZM007
Total Cyanide (ug/L): 73.6
Available Cyanide (ug/L): 2.1

Parcel A1

Parcel A10

Parcel A3

TM11-PZM007
Total Cyanide (ug/L): 58.3
Available Cyanide (ug/L): 1 J

B8-018-PZ
Total Cyanide (ug/L): 59.2
Available Cyanide (ug/L): 0.8 J

SW-081-MWS
Total Cyanide (ug/L): 1,350 J+
Available Cyanide (ug/L): 1.6 J

Parcel B8

Parcel B14

Parcel B15

Parcel B22

Parcel B6

Parcel B16

Parcel B23

Parcel B21

Parcel B7

SW-024-MWS
Total Cyanide (ug/L): 296
Available Cyanide (ug/L): 1.6 J

Parcel B1

Parcel B2

Parcel B3

Parcel B17

Parcel B19

Parcel B5

Parcel B4

SW-029-MWS
Total Cyanide (ug/L): 1,420
Available Cyanide (ug/L): 3

SW-065-MWS
Total Cyanide (ug/L): 1,030
Available Cyanide (ug/L): 1.7 J

SW-035-MWS
Total Cyanide (ug/L): 225
Available Cyanide (ug/L): 1.2 J

Parcel B9

Parcel B18

SW-030-MWS
Total Cyanide (ug/L): 64.6
Available Cyanide (ug/L): 0.63 J

SW-034-MWS
Total Cyanide (ug/L): 71.8
Available Cyanide (ug/L): 0.65 J

Parcel B10

Parcel B13

Parcel B20

Parcel B11

Parcel B12

Bear Creek

Patapsco

0 500 1,000 2,000 Feet

ARM Group Inc.
Earth Resource Engineers and Consultants

Site-Wide Groundwater Cyanide Groundwater Sample Results

July 10, 2017

EnviroAnalytics Group

Tradepoint Atlantic
Baltimore County, MD

Figure
13

\\armgroup.lcl\CorpData\Projects\EnviroAnalytics Group\170194M EAG Groundwater Conditions Summary Report\GIS\Site-wide GW Cyanide.mxd

APPENDIX H

GENERAL NOTES:

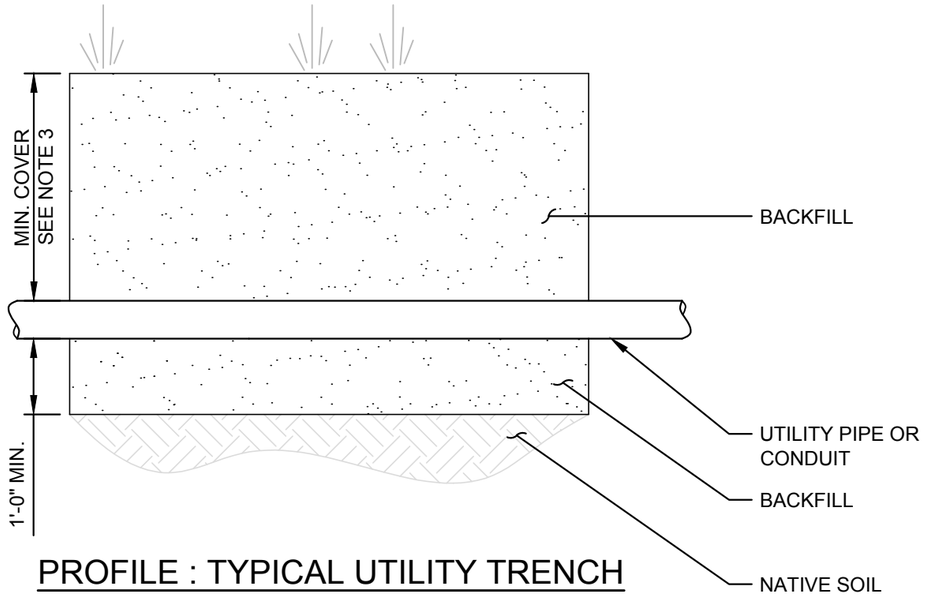
1. ALL PIPES OR CONDUIT SHALL BE LEAK-PROOF AND WATERTIGHT. ALL JOINTS SHALL BE SEALED OR GASKETED.

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.

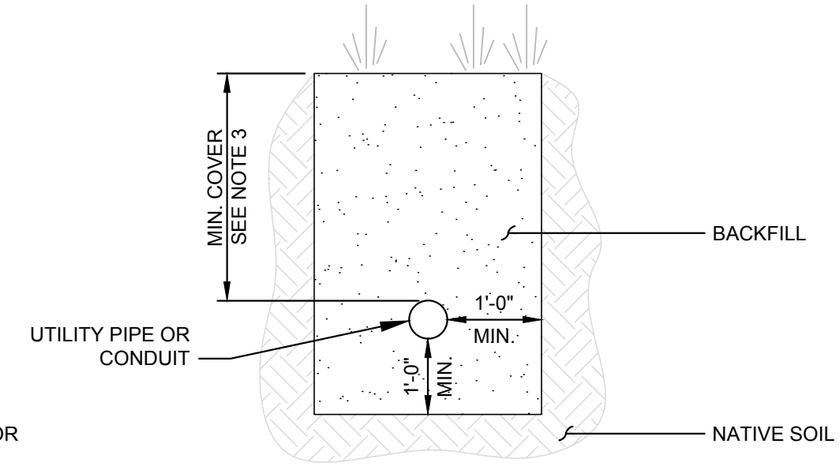
3. MINIMUM COVER ABOVE UTILITY SHALL BE BASED ON SPECIFIC UTILITY REQUIREMENTS.

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

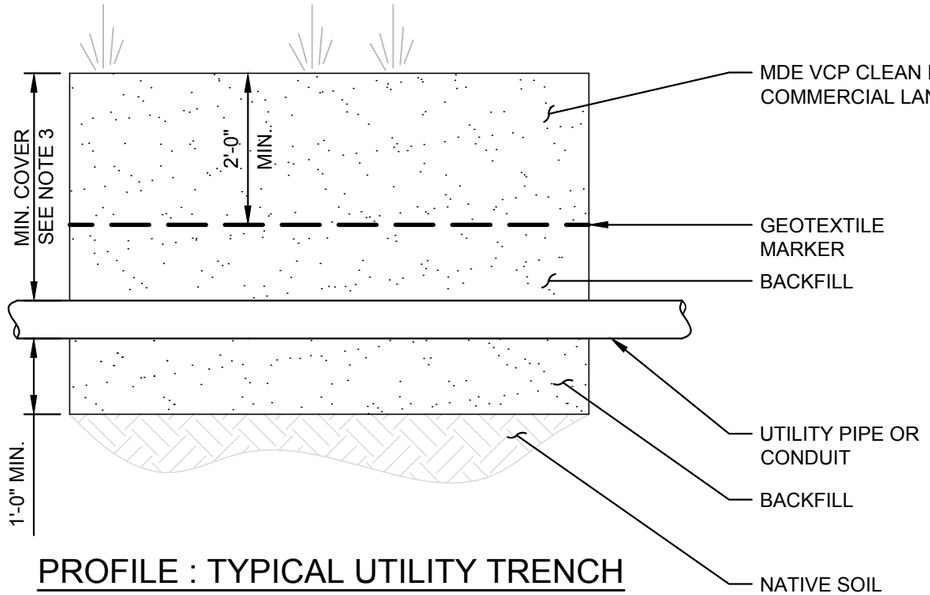
5. FOR ANY UTILITY SEGMENT WHICH GOES THROUGH AN AREA WHICH IS DESIGNATED TO RECEIVE A LANDSCAPED CAP, THE UPPER 2 FEET OF BACKFILL MUST MEET THE REQUIREMENTS OF MDE VCP CLEAN FILL FOR COMMERCIAL LAND USE. IN THIS CASE THE MDE VCP CLEAN FILL WILL BE UNDERLAIN BY A GEOTEXTILE MARKER FABRIC. UTILITY SEGMENTS 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.



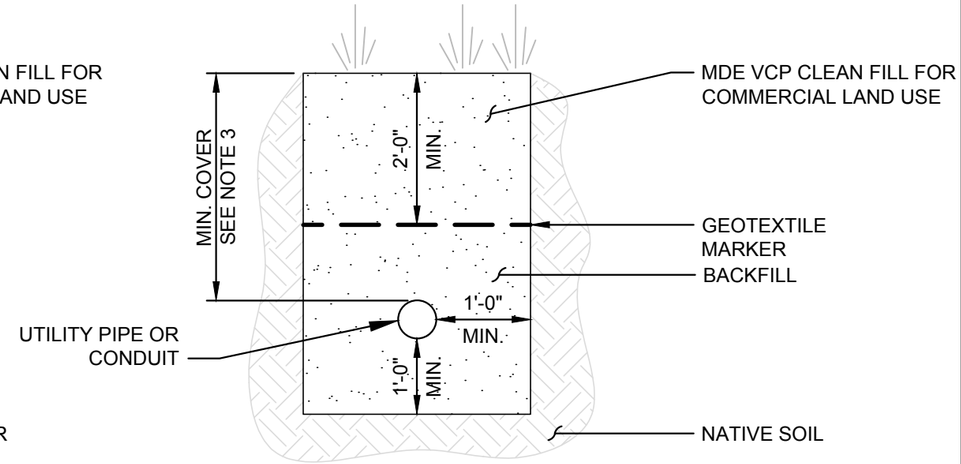
PROFILE : TYPICAL UTILITY TRENCH



SECTION : TYPICAL UTILITY



PROFILE : TYPICAL UTILITY TRENCH
(SEE NOTE 5)



SECTION : TYPICAL UTILITY
(SEE NOTE 5)

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

TYPICAL UTILITY CROSS SECTIONS
Sparrows Point Site
EnviroAnalytics Group, LLC

January 2018
1/2" = 1'-0"
160443M

Figure 1

APPENDIX I

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.

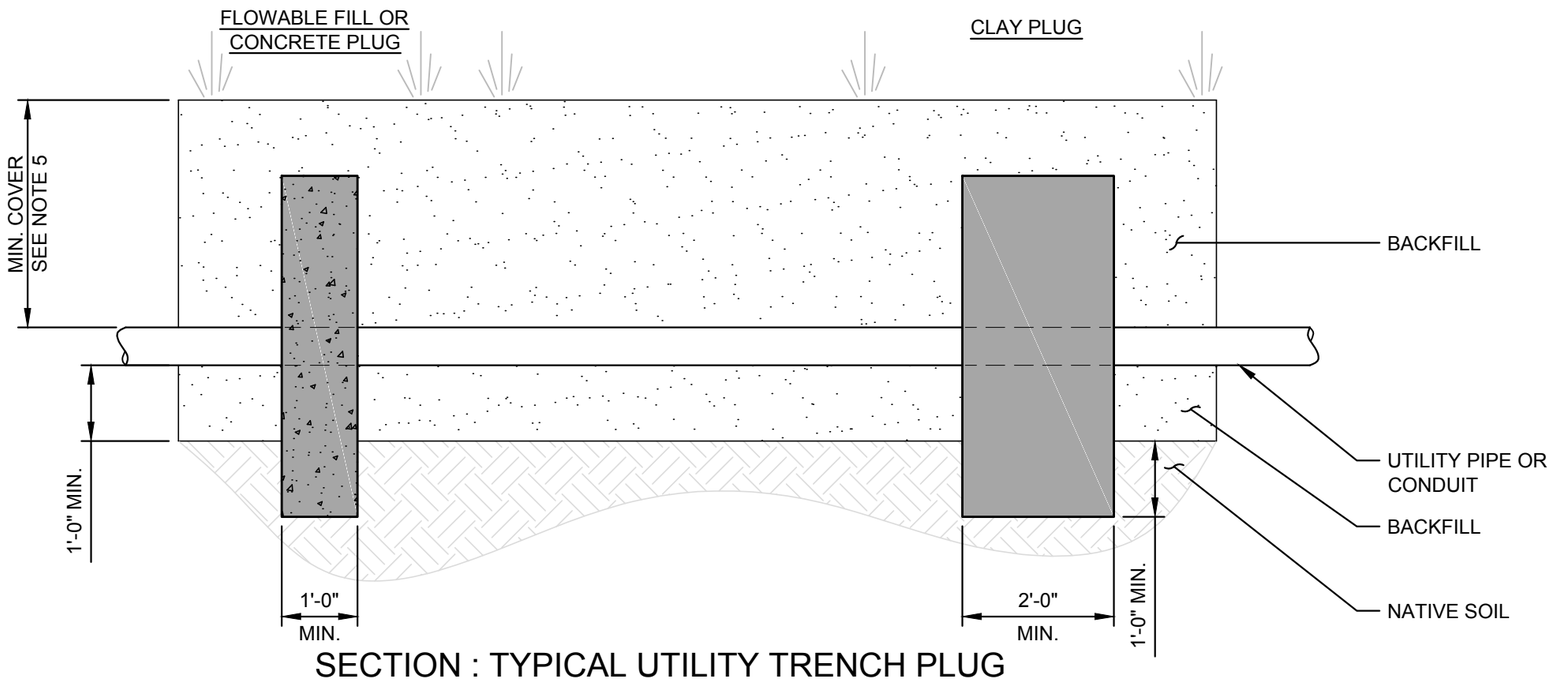
3. TRENCH PLUGS SHALL EXTEND A MINIMUM OF ONE (1) FOOT BEYOND PERMEABLE BEDDING OR BACKFILL IN ALL DIRECTIONS.

4. ANTI-SEEP COLLARS FROM THE PIPE MANUFACTURER, THAT ARE PRODUCED SPECIFICALLY FOR THE PURPOSE OF PREVENTING SEEPAGE AROUND THE PIPE, ARE ACCEPTABLE IF INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AND ONLY WITH PRIOR APPROVAL BY EAG.

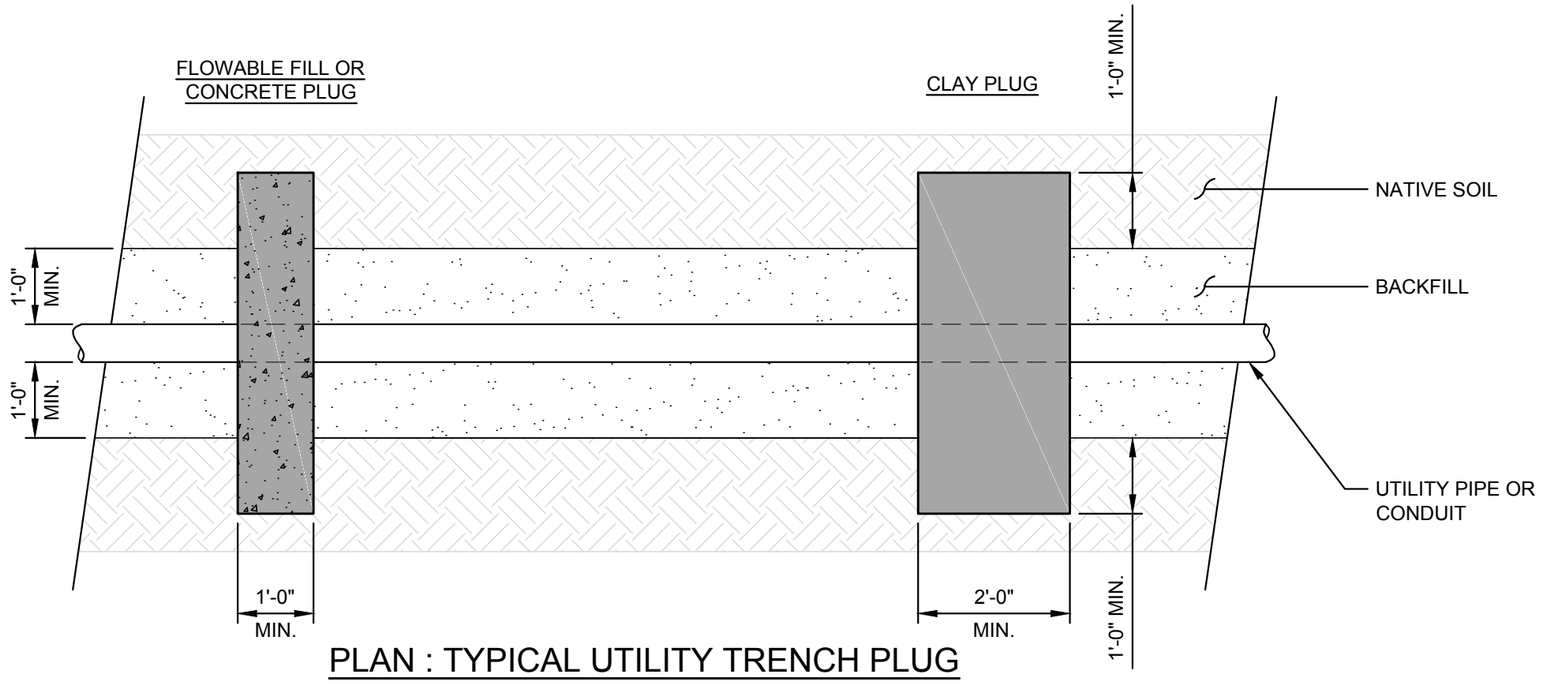
5. MINIMUM COVER ABOVE UTILITY SHALL BE BASED ON SPECIFIC UTILITY REQUIREMENTS.

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

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



SECTION : TYPICAL UTILITY TRENCH PLUG



PLAN : TYPICAL UTILITY TRENCH PLUG

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

UTILITY TRENCH PLUG
Sparrows Point Site
EnviroAnalytics Group, LLC

January 2018
1/2" = 1'-0"
160443M

Figure 1

APPENDIX J

CONTAINMENT REMEDY OPERATIONS AND MAINTENANCE PLAN
SUB-PARCEL B6-2 FORMER SPARROWS POINT STEEL MILL

Containment Remedy Operations and Maintenance Overview

In accordance with the Sub-Parcel B6-2 Response and Development Work Plan (RADWP) for development on a designated portion of the Sparrows Point Peninsula in Sparrows Point, MD (the Site), post remediation care requirements include compliance with the conditions placed on the No Further Action Letter, Certificate of Completion, and deed restrictions recorded for the Site. In addition, maintenance will be performed on the capped areas to control degradation and exposure to the underlying soil. Inspections of the capped areas will be conducted annually. The responsible party will perform cap inspections, maintenance of the cap, and retain cap inspection records. Maintenance records will include the date of the inspection, name of the inspector, any noted issues, and subsequent resolution of the issues. Maintenance records will be maintained in a designated area at the Site for Maryland Department of the Environment (MDE) inspection and review, if requested.

The containment remedy (cap) will be constructed as described in the MDE-approved RADWP. The following sections provide details of the Operations and Maintenance Plan (O&M Plan) procedures to be followed at the Site to assess when maintenance of the capped areas is necessary.

Designated Pavement Area Inspections

The designated paved areas, as identified in the RADWP, will be maintained to ensure integrity of the cap. Paved areas subject to this O&M Plan include both exterior pavements (parking lots and roads) and interior pavements (building slabs).

Pavement area inspections will be conducted on an annual basis to ensure that the capped areas are maintained as needed. During the inspection, the capped surfaces will be inspected to check for the following potential conditions:

- Differential settlement and significant surface-water ponding;
- Erosion or cracking of the cap materials; and
- Obstruction or blocking of drainage facilities.

When inspections indicate that cap repair is necessary, repairs will be completed as soon as practically possible in compliance with any recorded deed restrictions. The work will be documented on a form similar to the attached example Pavement Inspection Form. The inspection documentation will include the results of each inspection, recommended maintenance actions, and the actual maintenance/repair implemented. The responsible party will maintain inspection forms and any resulting repair records.

Pavement Inspection Protocol

A pavement management system (pavement condition index) will be implemented in the designated areas of the Site. The purpose of this system is to plan and prioritize future pavement maintenance needs. The system is based on a numerical rating of pavement distresses as published by the United States Army Corps of Engineers. The following chart will be used to provide an index of the pavement condition.

PAVEMENT CONDITION INDEX (PCI)		
PCI	**Characterization**	**Description**
1	New crack-free surface	Black in color, smooth texture
2	Oxidation has started	Short hairline cracks start to develop; dark gray color.
3	Oxidation in advanced state	Hairline cracks are longer and wider; gray in color
4	Oxidation complete	Cracked area 0.25 inch wide and crack lines have found base faults
5	Moisture penetrating through 0.25 inch cracks; loose material, stone and sand, evident	Texture of surface becoming rough; Preventative maintenance
6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter lines
7	Potholes develop in low spots	Gatoring areas begin to break up; overall texture very rough.
8	Potholes developing	Pavement breaking up
9	Heaving due to excessive moisture in base	Distorts entire surface

PAVEMENT CONDITION INDEX (PCI)		
PCI	**Characterization**	**Description**
10	General breakup of surface	General breakup of surface

An inspection indicating a PCI of 4 or greater for designated areas of the Site will require maintenance. The intent is that repairs should be completed before the pavement degrades beyond a PCI of 4. MDE will be notified in a timely manner of any repairs that are the result of a PCI of 4 or greater. The notification will include documentation of the conditions being repaired and the location of the repair.

Designated Landscaped Area Inspections

The planned Site redevelopment includes landscaped areas which also need to be maintained. In designated landscaped areas, identified in the RADWP, capping will include an MDE-approved geotextile fabric beneath a minimum two-foot thick clean fill and top soil layer. The designated landscaped areas will be maintained to ensure the integrity of the cap.

Landscape Inspection Protocol

Inspections will be performed by traversing the designated landscaped areas and observing the surface conditions. Landscaped areas will be inspected to evaluate the condition of the plants, signs of animal burrows, erosion, or other features that may compromise the cap integrity. If plants need to be replaced, they will be replaced with shallow-rooted species whose root systems will not penetrate beyond the cap thickness. Alternatively, an excavation notification may be submitted to the MDE VCP for review and approval to extend the cap thickness in the area of the plants to allow for deeper-rooted species. The extended cap thickness will encompass the maximum anticipated root depth of the plant(s).

When inspections indicate that capped landscaped areas are in need of repair, repairs will be completed as soon as practically possible and in compliance with the MDE deed restriction. A form similar to the attached example Landscape Inspection Form will be used to document the results of each inspection, the recommended maintenance actions, and the actual maintenance/repair implemented. The responsible party will maintain inspection forms and any resulting repair records. MDE will be notified in a timely manner if damage to the capped landscaped area(s) exceeds one foot in diameter and/or two feet in depth.

PAVEMENT INSPECTION FORM	Sub-Parcel B6-2 Development Fmr. Sparrows Point Steel Mill
Date:	Time:
Weather Conditions:	
General Pavement Conditions:	

PCI		Characterization	Description
1		New crack-free surface	Black in color, smooth texture
2		Oxidation has started	Short hairline cracks start to develop; dark gray color
3		Oxidation in advanced state	Hairline cracks are longer and wider; gray in color
RESPONSE REQUIRED	4	Oxidation complete	Crack area 0.25 inch wide and crack lines have found base faults
	5	Moisture penetrating through 0.25-inch cracks; loose material, stone and sand,evident	Texture of surface becoming rough; preventative maintenance
	6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter lines
	7	Potholes develop in low spots	Gatoring areas begin to break up; overall texture very rough
	8	Potholes developing	Pavement breaking up
	9	Heaving due to excessive moisture in base	Distorts entire surface
	10	General breakup of surface	General breakup of surface

PAVEMENT INSPECTION FORM	Sub-Parcel B6-2 Development Fmr. Sparrows Point Steel Mill
CURB CONDITION	☐ Exists ☐ Sound ☐ Cracked ☐ Root Intrusion ☐ Deteriorated Comments: _____
SIDEWALK CONDITION	Comments: _____
RESPONSE REQUIRED	
WORK COMPLETED	
PHOTOGRAPHS / FIGURES ATTACHED	
RESPONSE CONTRACTOR	Work Completed By: _____ Date: Signature:

LANDSCAPE INSPECTION FORM	Sub-Parcel B6-2 Development Fmr. Sparrows Point Steel Mill
Date:	Time:
Weather Conditions:	
General Landscaping Description:	

GENERAL LANDSCAPE CONDITION	☐ Sound ☐ Erosion ☐ Root Intrusion ☐ Healthy Plant Condition ☐ Signs of Mortality ☐ Animal Burrows
GROUND COVER	☐ Dry ☐ Damp ☐ Wet Comments: _____
TREES	☐ Exists ☐ Healthy ☐ Poor Health ☐ Dead ☐ Fallen Comments: _____
SHRUBS	☐ Exists ☐ Healthy ☐ Poor Health ☐ Dead ☐ Fallen Comments: _____
EROSION	☐ Exists ☐ Slight ☐ Moderate ☐ Significant Comments: _____
HOLES	☐ Exists Depth of Holes: _____ Comments: _____

LANDSCAPE INSPECTION FORM	Sub-Parcel B6-2 Development Fmr. Sparrows Point Steel Mill
RESPONSE REQUIRED	
WORK COMPLETED	
PHOTOGRAPHS / FIGURES ATTACHED	
RESPONSE CONTRACTOR	Work Completed By: _____ Date: Signature:

Reference 1

Specifications

Specifications	
Concentration Ranges (Auto-ranging)	0-0.5, 0-1, 0-10 0-65 mg/m3
Laser	670 nm, 5 mW
Sensitivity	0.001mg/m3
Sample Period	1 sec
Sample Flow Rate	2 LPM
Pump Type	Diaphram 10,000 hr
Accuracy	8% of NIOSH 0600
Precision	0.003 mg/m3 or 2% reading
Particle Size Sensitivity Range	0.1-100 micron
Long term Stability	5% reading
Sensor Type	Forward Light Scatter
Average Period	1 – 60 minutes
Display	4X20 LCD
Internal Battery (Optional)	12 VDC 12 Amp-Hr, lead acid
Power Consumption	350mA (no heater) 1.1 A (w/heater)
Internal Battery Operation, no heater	>30 Hours
with heater	10 Hours
Battery Type	Lead Acid
Size	10.5 (267) X 9.25 (235) X 5.7 (145) inches (mm)
MOI Service Period	2 yrs
Programmable Auto-Zero	15min to 24 hours
Programmable Auto-Span	15min to 24 hours
Traceable Testing	Gravimetric
Sample Line Heater	Configurable RH Con trolled
Outputs	Analog 0-1,0-2.5, 0-5VDC, RS232
Data Storage Capacity	12000 Records
Temperature Compensation	Standard
Temperature Range	-10 deg to 50 deg C
RH Measurement	Internal
Ambient Temperature	-30 deg to 50 deg C
Ambient Pressure	1040 to 600 mbars
Alarm	Contact Closure
Available Cut Points	TSP, PM10, PM2.5, PM1

Standard Equipment
Universal Voltage Power Supply
Battery Charger Internal
47 mm Filter Holder
Comet Software
TSP Inlet
Inlet Heater
Digital Output Cable
Instruction Manual

Options
PM10, PM2.5, PM1 Sharp-Cut Cyclone
Extra 47 mm Filter Holders
Aluminum Tripod
MicroMet Software
Radio Modem
Phone Modem
Satellite
Wind Speed/Direction Sensor
Ambient RH
External Battery Cable
Battery

Met One Instruments, Inc.
Sales & Service: 1600 Washington Boulevard, Grants Pass, Oregon 97526 • Tel 541/471-7111, Fax 541/471-7116
Regional Sales & Service: 3206 Main Street, Suite 106, Rowlett, Texas 75088 • Tel 972/412-4747, Fax 972/412-4716
http://www.metone.com

11/08

E-SAMPLER™

The New Standard in Real-Time Aerosol Monitoring

The E-SAMPLER is the most feature-packed light-scatter Aerosol Monitor available. Whatever your monitoring needs, the E-sampler will provide accurate, dependable and relevant data.

Features
- Programmable Auto-Zero
- Programmable Auto-Span
- Auto-ranging (1 to 65000 μm/m3)
- Automatic Flow Control Protocol
- Internal Battery (30 Hours Operation without heater & 10 Hours with heater.)
- Laser-Diode Precise Optical Engine
- Integral 47mm Analysis Filter
- Ambient Pressure and Temperature
- Internal Datalogger
- PM_{10}, $PM_{2.5}$, PM_1, TSP Monitoring
- Aluminum Weatherproof Enclosure
- Sheath-Air protected Optics
- Completely Self-Contained
- No Tools Filter Replacement

Applications
- Ambient Air Monitoring
- Remediation Site Perimeter Monitoring
- Indoor Air Quality Monitoring
- Source Monitoring
- Visibility Monitoring
- Mobile Monitoring

Met One Instruments, Inc.

E-SAMPLER™

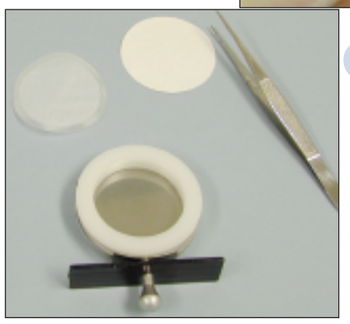
Dual Technology
The E-SAMPLER is a dual technology instrument that combines the unequalled real-time measurement of light scatter with the accuracy standard of filter methods. The simple filter loading process testifies to the seamless blending of both technologies. Filters can be extracted and replaced in less than one minute and filter medium can be selected based on laboratory analysis. Particulate loading on the filter does not reduce performance due to the Met One actual flow control protocol. Ambient temperature and pressure are measured and actual flow is calculated and controlled by the E-SAMPLER microprocessor independent of filter loading change.

Principle
The E-SAMPLER provides real-time particulate measurement through near-forward light scattering. An internal rotary vane pump draws air at 2 LPM into the sensing chamber where it passes through visible laser light. Aerosols in the air scatter light in proportion to the particulate load in the air. Scattered light is collected by precise glass optics and focused on a PIN diode. Rugged state of the art electronics measure the intensity of the focused light and output a signal to the CPU. The output is linear to concentrations greater than 65,000 ug/m3. Every E-SAMPLER is factory calibrated using polystyrene latex spheres of known index of refraction and diameter at multiple points to validate linearity.

Maintenance
Each E-SAMPLER has two internal filters (not the 47mm Analysis Filter) to protect sensitive optics and prevent damage to the flow components. Both filters are accessible from

the front panel. Coin slots enable these filters to be removed and checked or replaced without any tools. Filter life for both will exceed 1 year in the harshest of conditions. All E-SAMPLERS have sheath air from the internal filters that continually curtain the optics. This sheath air protection allows the E-SAMPLER to

continuous



aerosol

monitoring

be used in adverse environments without performance degradation. Even in harsh conditions the E-SAMPLER will operate to specifications for 2 years without need of recalibration.

Operation
The E-SAMPLER is rugged, portable and easy to use. The all aluminum enclosure is not only rugged but provides electronic stability by filtering potential RF interference. Set-up is a snap with the quick connect system which works with the EX-905 tripod. For other mounting applications, holes are provided to fasten to any structure. Simply turning the monitor on will start a sample using the most recent parameters. The unit will continue to operate until user intervention or battery failure. Auto-Zero and Auto-Span ensure that the data collected will be of the highest quality. Both Zero and Span can be operated manually or individually programmed at varying time bases (15 minutes to 24 hours). The E-SAMPLER can also be configured for start/stop times, recording periods, averaging time and other parameters.

Data Collection and Software
Optional MicroMet Plus is a complete communications, data collection and data reporting tool. This software supports modem, radio, direct connection and generates summary reports as well as recordings and charts. Comet software included which provides easy to use terminal access to E-Sampler data.