

# RESPONSE AND DEVELOPMENT WORK PLAN

AREA B: SUB-PARCEL B24-1  
TRADEPOINT ATLANTIC  
SPARROWS POINT, MARYLAND

Prepared For:



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## 1.0 INTRODUCTION

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic, has prepared this Response and Development Work Plan (RADWP) for a portion of the Tradepoint Atlantic property that has been designated as Area B: Sub-Parcel B24-1 (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. As shown on **Figure 1**, Sub-Parcel B24-1 consists of approximately 13.4 acres located within Parcel B8, Parcel B14, and Parcel B24 of the approximately 3,100-acre former steel plant property.

As shown on **Figure 2**, Sub-Parcel B24-1 is slated for development as a Stormwater Management Regional Pond. This will be a wet pond with an impermeable liner. The water quality volume for the proposed wet pond will be approximately 4,900,000 cubic feet. This volume will provide treatment for approximately 1,362 acres of impervious area. The planned development activities will generally include demolition of existing pond areas, grading, construction of retention basin, installation of liner, piping, and landscaping. Outside of the main development area designated as Sub-Parcel B24-1, a temporary stockpile area (not intended for permanent use or occupancy) with a total area of 4.94 acres within the Limit of Disturbance (LOD) will be utilized to accommodate material storage during construction. As shown on **Figure 2**, a portion of the Site (approximately 0.68 acres) will be used to install underground utilities proposed as part of this RADWP, while future pavement capping that will be proposed for a portion of this area will be completed under the forthcoming Sub-Parcel B14-1 RADWP.

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 full Tradepoint Atlantic property (3,100 acres) into the MDE Voluntary Cleanup Program (MDE-VCP) was submitted to the MDE on June 27, 2014. The property's current and anticipated future use is Tier 3 (Industrial) and plans for the property include demolition and redevelopment over the next several years. Sub-Parcel B24-1 is 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 the 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 Sub-Parcel B24-1 and complement the statutory requirements of the VCP (Section 7-501 of the Environment Article). Upon submission of a RADWP and completion of any remedial activities for the sub-parcel, the MDE shall issue a No Further Action Letter (NFA) upon a recordation of an Environmental Covenant describing any necessary land use controls for the specific sub-parcel. At such time that all the sub-parcels within the larger parcel have completed remedial activities, Tradepoint Atlantic shall submit to the MDE a request for issuing a Certificate of Completion (COC) as well as all pertinent information concerning completion of remedial activities conducted on the parcel. Once the VCP has completed its review of the submitted information it shall issue a COC for the entire parcel described in Tradepoint Atlantic's VCP application.

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

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

This RADWP provides a Site description and history; summary of environmental conditions identified by the Phase I Environmental Site Assessment (ESA); summary of relevant findings and environmental conditions identified by the Parcel B8, Parcel B14, and Parcel B24 Phase II Investigations; a human health Screening Level Risk Assessment (SLRA) conducted for the identified conditions; and any necessary engineering and/or institutional controls to facilitate the planned development and address the impacts and potential human health exposures. These controls include work practices and applicable protocols that are submitted for approval to support the development and use of the Site. Engineering/institutional controls approved and installed for this RADWP shall be described in closure certification documentation submitted to the MDE demonstrating that exposure pathways on the Site are addressed in a manner that protects public health and the environment.

The remaining acreage of Parcel B8, Parcel B14, and Parcel B24 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. As noted above, a temporary stockpile area consisting of 4.94 acres outside of the sub-parcel (located to the east) will be utilized to accommodate material storage during construction. The temporary work outside of the boundary of the Site is not intended to be the basis for the issuance of a NFA or a COC, although the temporary use of this area is covered by this RADWP. Ground intrusive work will not be conducted in this stockpile area, and it will not be used for occupancy, so it has been excluded from the SLRA.

## 2.0 SITE DESCRIPTION AND HISTORY

### 2.1 SITE DESCRIPTION

The Sub-Parcel B24-1 development project consists of approximately 13.4 acres comprising the northeast portion of Parcel B24, the western portion of Parcel B14, and a small southern portion of Parcel B8 (**Figure 1**). The proposed development on this sub-parcel will include a lined Stormwater Management Regional Pond (**Figure 2**). Outside of the main development area designated as Sub-Parcel B24-1, a temporary zone (not intended for permanent use or occupancy) with a total area of 4.94 acres within the construction LOD will be utilized to accommodate material storage during construction. The Site is not currently occupied. A smaller stormwater emergency detention basin currently exists on the Site (see Section 3.1) and will be removed during the proposed development. There is no groundwater use on-site or within the surrounding Tradepoint Atlantic property.

Ground surface elevations at the Site range from approximately 8 to 20 feet above mean sea level (amsl). Elevations are generally flat except for elevated berms surrounding the emergency detention basin (on Parcel B24) and the Humphrey Impoundment (on Parcel B14). According to Figure B-2 of the property Stormwater Pollution Prevention Plan (SWPPP) Revision 8 dated April 30, 2020, surface water runoff from the Site flows through National Pollutant Discharge Elimination System (NPDES) permitted Outfall 014 beyond the Humphrey Creek Wastewater Treatment Plant (HCWWTP), which discharges to the west into Bear Creek.

### 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.

Parcel B24 contains the HCWWTP directly to the south of the proposed sub-parcel development area. The HCWWTP currently handles stormwater influent from the Tin Mill Canal (TMC), which historically received stormwater and wastewater from various steel production activities on the Tradepoint Atlantic property. Since the cessation of steel operations, the HCWWTP continues to process stormwater collected in the TMC. The HCWWTP discharges treated effluent into the adjacent water body of Bear Creek to the west. The HCWWTP uses various treatment processes to treat the TMC influent, including but not limited to settling basins, thickeners, aerators, and chemical addition (lime, caustic, flocculation, and acid). Two thickener tanks located to the south of the HCWWTP building allow for sludge removal. An emergency detention basin is located to the north of the HCWWTP within the proposed sub-parcel development area. The 2.5-acre

emergency detention basin was constructed in 2002 as a temporary storage system to be used in the event of any treatment upsets.

Parcel B14 contains the Humphrey Impoundment. Prior to 1970, Humphrey Creek existed as open water (the impoundment did not yet exist) and received wastewater from various steel processing areas including the Hot Strip Mill, Cold Sheet Mill, Tin Mill, and Rod & Wire Mill. Following completion of the TMC (ca. 1969), from 1970 to 1985 the Humphrey Impoundment is believed to have been used as a dewatering area for on-site sludges and slurry materials generated from the Basic Oxygen Furnace (BOF) and various on-site water treatment plants. Materials that were dewatered within the impoundment included: BOF slurry, Blast Furnace G, H, J, K, and L thickener sludges, HCWWTP sludge, Sinter Plant slurry, Open Hearth (No.4) slurry, waste oil pit sludge and non-recoverable waste oil residue, and pre-limer clarifier sludge. Since 1985, the impoundment was used for sludge/slurry dewatering in emergency scenarios only (i.e., when upsets had occurred in the on-site water treatment systems). According to the Description of Current Conditions (DCC) Report prepared by Rust Environment and Infrastructure, dated January 1998 (included with Weaver Boos' 2014 Phase I ESA), all of the wastes that were placed inside the impoundment were determined to be non-hazardous.

More information on the historical activities conducted at the Site can be found in the agency-approved Parcel B24 Phase II Investigation Work Plan (Revision 1 dated December 27, 2019) and Parcel B14 Phase II Investigation Work Plan (Revision 0 dated August 3, 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 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 DCC Report.

Weaver Boos' distinction of a REC or Non-REC was based upon the findings of the DCC Report (which was prepared when the features remained on-site in 1998) or on observations of the general area during their site visit. Weaver Boos made the determination to identify a feature as a REC based on historical information, observations during the site visit, and prior knowledge and experience with similar facilities. The following RECs were identified in Sub-Parcel B24-1:

##### **Humphrey Impoundment Area (REC 2A, Finding 61, SWMU 190):**

According to the Phase I ESA, this area was used to receive wastewater from various steel processing areas, as a sludge dewatering area, and for the storage of process slurry and other materials. These materials may have contained hazardous substances and/or petroleum products. The impoundment was closed in the 1960s due to the legislative precursors to the Clean Water Act, and was filled in the 1980s. The Humphrey Impoundment is included as a Special Study Area (SSA) under the Consent Decree. Based on this information, the potential exists for past releases which may have impacted the environment.

##### **HCWWTP Settling Basins (REC 7A, Finding 165, also listed as SWMU 10):**

According to the Phase I ESA, the settling basins associated with the HCWWTP are believed to contain significant quantities of sediment from the nearby TMC and HCWWTP sludge. Weaver Boos recognized the potential for a material release from these basins which could have negatively impacted the environment. The TMC sediments were investigated as described in the Sediment Characterization Report for the Tin Mill Canal (Revision 3 dated January 4, 2018). The TMC effluent historically discharged through three settling basins of relatively equal surface areas. The settling basins are no longer operational. Basin No. 2 has been partially backfilled, leaving approximately half of the original volume.

**HCWWTP Aerators (REC 7B, Finding 167, also listed as SWMU 12):**

According to the Phase I ESA, the HCWWTP aeration basins are believed to contain significant quantities of sediment from the nearby TMC and HCWWTP sludge. Weaver Boos recognized the potential for a material release from the aerators which could have negatively impacted the environment.

**HCWWTP Emergency Detention Basin (REC 7C, Finding 173):**

The approximately 2.5-acre emergency detention basin serves as a bypass system for the HCWWTP to be used in the event of any treatment upsets. The emergency detention basin was constructed in 2002. The basin includes a composite liner. Weaver Boos observed the emergency detention basin to contain what appeared to be several thousand cubic yards of sediment and sludge from the HCWWTP during their site visit. The sediment/sludge was presumed to contain petroleum products and/or hazardous substances. Weaver Boos recognized the potential for a material release from the basin which could have negatively impacted the environment.

Relevant SWMUs and AOCs were also identified as located on Figure 3-1 from the DCC Report. This figure generally shows the SWMUs, AOCs, and main facility areas within the property boundaries. Apart from the co-listed RECs above, there were no SWMUs or AOCs identified within the Sub-Parcel B24-1 boundary.

**3.2 PHASE II INVESTIGATION RESULTS – SUB-PARCEL B24-1**

Phase II Investigations specific to soil and groundwater conditions were performed for the property areas encompassing Sub-Parcel B24-1 in accordance with the requirements outlined in the ACO as further described in the following agency-approved Phase II Investigation Work Plans:

- Area B: Parcel B8 (Revision 0) dated September 25, 2015
- Area B: Parcel B14 (Revision 0) dated August 3, 2017
- Area B: Parcel B24 (Revision 1) dated December 27, 2019

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

- Area B: Parcel B8 (Revision 1) dated March 16, 2018
- Area B: Parcel B14 (Revision 0) dated March 27, 2018
- Area B: Parcel B24 (Revision 0) dated September 25, 2020

This RADWP summarizes the relevant soil and groundwater findings from each investigation with respect to the proposed development of Sub-Parcel B24-1.

### 3.2.1 Phase II Soil Investigation Findings

Based on the scope of development for Sub-Parcel B24-1, 31 soil samples collected from 13 soil borings completed during the Parcel B14 and Parcel B24 Phase II Investigations were included for a representative evaluation of Sub-Parcel B24-1. The 13 boring locations are shown on **Figure 3**, and the samples obtained from these borings provided relevant analytical data for discussion of on-site conditions.

Soil samples collected during the Phase II Investigations were analyzed for the Target Compound List (TCL) semi-volatile organic compounds (SVOCs) and polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbon (TPH) diesel range organics (DRO) and gasoline range organics (GRO), Oil & Grease, Target Analyte List (TAL) metals, hexavalent chromium, and cyanide. Shallow soil samples (0 to 1 foot below ground surface (bgs)) were analyzed for polychlorinated biphenyls (PCBs). Samples from any depth interval with a sustained photoionization detector (PID) reading above 10 ppm were also analyzed for TCL volatile organic compounds (VOCs). The laboratory Certificates of Analysis (including Chains of Custody) and Data Validation Reports (30% validated soil data for Parcel B24 and 50% validated soil data for Parcel B14) are included as electronic attachments. The Data Validation Reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

Soil sample results were screened against the Project Action Limits (PALs) established in the property-wide Quality Assurance Project Plan (QAPP) dated April 5, 2016, or based on other direct agency guidance. The PALs for relevant PAHs have been adjusted upward based on revised toxicity data published by the USEPA. **Table 1** and **Table 2** provide summaries of the detected organic compounds and inorganics in the soil samples collected from the 13 soil borings at the Site. **Figure S1** through **Figure S4** present the soil sample results that exceeded the PALs among these soil borings. PAL exceedances were limited to one SVOC (benzo[a]pyrene), two PCB mixtures (Aroclor 1260 and total PCBs), Oil & Grease, and four inorganics (arsenic, lead, manganese, and thallium).

Evidence of non-aqueous phase liquid (NAPL) was observed at one Phase II Investigation soil boring location (B24-034-SB) along the western border of the Humphrey Impoundment. A temporary NAPL screening piezometer was installed at this location, and no NAPL was identified on the water table during subsequent gauging events. Contingency measures to address the presence of NAPL which could be encountered during construction are addressed in subsequent sections of this RADWP.

### 3.2.2 Phase II Groundwater Investigation Findings

Groundwater conditions were investigated in accordance with the Parcel B8, Parcel B14, and Parcel B24 Phase II Investigation Work Plans. During the groundwater investigations, samples were obtained from six temporary groundwater sample collection points (piezometers) and one shallow groundwater monitoring well (TM02-PZM009) within or proximate to Sub-Parcel B24-1. The seven groundwater points which provided relevant analytical data for the proposed development project are shown on **Figure 4**. This figure also shows that two additional NAPL screening piezometers were installed to investigate potential NAPL conditions within the Humphrey Impoundment. There is no direct exposure risk to groundwater for the future Composite Worker because the stormwater pond will be lined and there is no use of groundwater on the Tradepoint Atlantic property; however, groundwater may be encountered in the sub-parcel during some construction tasks. If groundwater is encountered, it will be managed to prevent exposures in accordance with the dewatering requirements outlined in Section 5.2.

The groundwater samples were analyzed for TCL-VOCs, TCL-SVOCs and PAHs, TPH-DRO/GRO, Oil & Grease, TAL-dissolved metals, total/dissolved hexavalent chromium, and total, available, and/or amenable cyanide (depending on the specific Work Plan requirements). The groundwater sample collected from the permanent well TM02-PZM009 was also analyzed for total metals. The laboratory Certificates of Analysis (including Chains of Custody) and Data Validation Reports (30% validated groundwater data for Parcel B24 and 100% validated groundwater data for Parcel B8) are included as electronic attachments. The Data Validation Reports contain qualifier keys for the flags assigned to individual results in the attached summary tables.

The Phase II Investigation groundwater results were screened against the PALs established in the property-wide QAPP dated April 5, 2016, or based on other direct agency guidance. Similar to the evaluation of soil data, the PALs for relevant PAHs have been adjusted upward based on revised toxicity data published by the USEPA. **Table 3** and **Table 4** provide summaries of the detected organic compounds and inorganics in the groundwater samples submitted for laboratory analysis. **Figure GW1** through **Figure GW4** present the groundwater results that exceeded the PALs among these samples. PAL exceedances consisted of one VOC (benzene), five SVOCs (1,1-biphenyl, 3&4-methylphenol, benz[a]anthracene, naphthalene, and nitrobenzene), TPH-DRO, Oil & Grease, and three total/dissolved metals (hexavalent chromium, thallium, and vanadium). For simplicity, the inorganic PAL exceedances shown on **Figure GW4** do not include duplicate exceedances of total/dissolved metals. If both total and dissolved concentrations exceeded the PAL, the value for total metals is displayed.

Each groundwater collection point was also inspected for evidence of NAPL using an oil-water interface probe prior to sampling. None of the groundwater sample collection points relevant for the proposed development project showed evidence of NAPL during these checks. However, as shown on **Figure 4**, one of the two NAPL screening piezometers installed to investigate NAPL

conditions within the Humphrey Impoundment (B14-037-PZ) accumulated 0.12 feet of NAPL. Contingency measures to address the presence of NAPL which could be encountered during construction are addressed in subsequent sections of this RADWP.

### 3.2.3 Locations of Potential Concern

Groundwater data were screened to determine whether any sample results exceeded the USEPA Vapor Intrusion (VI) TCR (carcinogen) or THQ (non-carcinogen) Screening Levels. None of the individual sample results exceeded the VI TCR or THQ criteria. When the aqueous results were summed by sample location, none of the cumulative VI cancer risks exceeded  $1E-5$ , and none of the cumulative VI non-cancer Hazard Index (HI) values exceeded 1. There are no concerns related to potential VI risks/hazards at the Site. Additionally, no structures are proposed to be constructed for occupancy during this development project. The VI risk evaluation is summarized in **Table 5**.

Other locations of potential concern which are subject to special requirements could include elevated lead, PCBs, or TPH/Oil & Grease in soil. The soil data for Sub-Parcel B24-1 were evaluated to determine the presence of any such locations of potential concern including: lead concentrations above 10,000 mg/kg, PCB concentrations above 50 mg/kg, or TPH/Oil & Grease concentrations above 6,200 mg/kg. There were no soil concentrations of lead, PCBs, or TPH-DRO/GRO above the specified criteria. Oil & Grease was detected over the specified criteria at soil boring locations B14-034-SB and B24-037-SB. These areas are identified as locations of potential concern.

Borings or piezometers with physical evidence of NAPL are also considered to be locations of potential concern with respect to proposed development. Visual observations of NAPL were observed at one soil boring location (B24-034-SB); a NAPL sheen was observed at B24-034-SB between 12 and 14 feet bgs. Additionally, 0.12 feet of NAPL accumulated in NAPL screening piezometer B14-037-PZ which had been installed to investigate NAPL conditions within the Humphrey Impoundment.

**Figure 5** provides a summary of the soil borings and groundwater points that were identified by this screening evaluation as locations of potential concern at the Site. Overall, based on the depths of known impacts, NAPL is not expected to be encountered during development. However, contingency measures to address the presence of NAPL which could be encountered during construction are addressed in subsequent sections of this RADWP.

## 3.3 HUMAN HEALTH SCREENING LEVEL RISK ASSESSMENT

### 3.3.1 Analysis Process

A human health SLRA has been completed based on the analytical data obtained from the characterization of surface and subsurface soils. This includes the soil data obtained during the preceding Parcel B14 and Parcel B24 Phase II Investigations.

A Composite Worker baseline SLRA was evaluated as a conservative measure even though no long-term occupancy is proposed for the Stormwater Management Regional Pond following its construction. It should be noted that processed slag aggregate sourced from the Tradepoint Atlantic property is proposed to be placed on portions of the Site and will be used as the primary fill material for this project; therefore, regardless of the findings of the Composite Worker baseline SLRA, Sub-Parcel B24-1 will be subject to surface engineering controls (i.e., capping) unless separate approvals are received from the MDE following appropriate laboratory testing of the slag aggregate. The SLRA was conducted to further evaluate the existing soil conditions in support of the design of any additional necessary response measures.

The SLRA included the following evaluation process:

**Identification of Exposure Units (EUs):** The SLRA was evaluated using a single site-wide EU with an area of 13.4 acres. The same EU and associated soil datasets were used for the evaluation of the Composite Worker and Construction Worker scenarios.

As shown on **Figure 2**, a temporary stockpile area consisting of 4.94 acres outside of the sub-parcel will be utilized to accommodate material storage during construction. Ground intrusive work will not be conducted in this stockpile area, and it will not be used for occupancy, so it has been excluded from the SLRA. As shown on **Figure 2**, the portion of the Site (approximately 0.68 acres) that will be used to install underground utilities has been included in the SLRA, however this area will be capped under the forthcoming Sub-Parcel B14-1 RADWP.

**Identification of Constituents of Potential Concern (COPCs):** For the project-specific SLRA, compounds that were present at concentrations at or above the USEPA RSLs set at a target cancer risk of  $1E-6$  or target non-cancer Hazard Quotient (HQ) of 0.1 were identified as COPCs to be included in the SLRA. A COPC screening analysis is provided in **Table 6** to identify all compounds above the relevant screening levels.

All aroclor mixtures (e.g., Aroclor 1248, Aroclor 1260) are taken into account for the reported concentrations of total PCBs. The total PCBs concentrations are used to evaluate the carcinogenic risk associated with PCBs. Therefore, Aroclor 1260 was not separately evaluated in the SLRA.

**Exposure Point Concentrations (EPCs):** The COPC soil datasets for the site-wide EU were divided into surface (0 to 2 foot), subsurface (>2 foot), and pooled depths for estimation of potential EPCs. Thus, there are three soil datasets associated with the site-wide EU. A statistical analysis was performed for each COPC dataset using the ProUCL software (version 5.0) developed by the USEPA to determine representative reasonable maximum exposure (RME) values for the EPC for each constituent. The RME value is typically the 95% Upper Confidence Limit (UCL) of the mean. For lead, the arithmetic

mean for each depth was calculated for comparison to the Adult Lead Model (ALM)-based values (presented in **Table 7**).

**Risk Ratios:** The surface soil EPCs, subsurface soil EPCs, and pooled soil EPCs were compared to the USEPA RSLs for the Composite Worker and to site-specific Soil Screening Levels (SSLs) for the Construction Worker based on equations derived in the USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24, December 2002). Risk ratios were calculated with a cancer risk of  $1E-6$  and a non-cancer HQ of 1. The risk ratios for the carcinogens were summed to develop a screening level estimate of the baseline cumulative cancer risk. The risk ratios for the non-carcinogens were segregated and summed by target organ to develop a screening level estimate of the baseline cumulative non-cancer Hazard Index (HI).

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

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

**Assessment of Lead:** For lead, the arithmetic mean concentrations for surface soils, subsurface soils, and pooled soils for the site-wide EU were compared to the applicable RSL (800 mg/kg) as an initial screening. If the mean concentrations for the EU were below the applicable RSL, the EU was identified as requiring no further action for lead. If a mean concentration exceeded the RSL, the mean values were compared to calculated ALM values (ALM Version dated 6/21/2009 updated with the 5/17/2017 OLEM Directive) with inputs of 1.8 for the geometric standard deviation and a blood baseline lead level of 0.6 ug/dL. The ALM calculation generates a soil lead concentration of 1,050 mg/kg, which is the most conservative (i.e., lowest) concentration which would yield a probability of 5% of a blood lead concentration of 5 ug/dL. If the arithmetic mean concentrations for the EU were below 1,050 mg/kg, the EU was identified as requiring no further action for lead. The lead averages are presented for surface, subsurface, and pooled soils in **Table 7**.

**Assessment of TPH/Oil & Grease:** EPCs were not calculated for TPH/Oil & Grease. Instead, the individual results were compared to the PAL set to a HQ of 1 (6,200 mg/kg). Four soil samples in Sub-Parcel B24-1 exceeded the Oil & Grease PAL: B14-034-SB-1

(32,000 J- mg/kg), B14-034-SB-5 (14,400 J- mg/kg), B24-037-SB-8 (14,900 mg/kg), and B24-037-SB-10 (19,200 mg/kg). Physical evidence of NAPL was also observed in the soil at B24-034-SB, and NAPL accumulated above the water table with a thickness of 0.12 feet in screening piezometer B14-037-PZ (February 1, 2018). The locations with confirmed or potential presence of NAPL (inclusive of the elevated Oil & Grease concentrations in soil) are plotted with respect to the development plan and utilities on **Figure 5**. Contingency measures to address the potential presence of NAPL which could be encountered during construction are addressed in subsequent sections of this RADWP.

**Risk Characterization Approach:** Generally, if the baseline risk ratio for each non-carcinogenic COPC or cumulative target organ does not exceed 1, and the sum of the risk ratios for the carcinogenic COPCs does not exceed a cumulative cancer risk of  $1E-5$ , then a no further action determination will be recommended. If the baseline estimate of cumulative cancer risk exceeds  $1E-5$  but is less than or equal to  $1E-4$ , then capping of the EU will be considered to be an acceptable remedy for the Composite Worker. The efficacy of capping for elevated non-cancer hazard will be evaluated in terms of the magnitude of exceedance and other factors such as bioavailability. For the Construction Worker, cumulative cancer risks exceeding  $1E-5$  (but less than or equal to  $1E-4$ ) or HI values exceeding 1 will be mitigated via site-specific health and safety requirements.

It should be noted that processed slag aggregate sourced from the Tradepoint Atlantic property will be used as the primary fill material for this project; therefore, regardless of the findings of the Composite Worker baseline assessment, Sub-Parcel B24-1 will be subject to surface engineering controls (i.e., capping) unless separate approvals are received from the MDE following appropriate laboratory testing of the slag aggregate material. The goal of the SLRA is therefore to determine whether additional response actions beyond capping may be needed due to current conditions at the Site.

The USEPA's acceptable risk range is between  $1E-6$  and  $1E-4$ . If the sum of the risk ratios for carcinogens exceeds a cumulative cancer risk of  $1E-4$ , further analysis of site conditions will be required including the consideration of toxicity reduction in any proposal for a remedy. The magnitude of any non-carcinogen HI exceedances and bioavailability of the COPC will also dictate further analysis of site conditions including consideration of toxicity reduction in any proposal for a remedy.

For lead, if the ALM results indicate that the mean concentrations would present a 5% to 10% probability of a blood concentration of 5 ug/dL for the EU, then capping of the EU would be an acceptable presumptive remedy. The mean soil lead concentrations corresponding to ALM probabilities of 5% and 10% are 1,050 mg/kg and 1,400 mg/kg, respectively. If the ALM indicates that the mean concentrations would present a >10% probability of a blood concentration of 5 ug/dL for the EU, further analysis of site

conditions including toxicity reduction will be completed such that the probability would be reduced to less than 10% after toxicity reduction, but before capping.

### 3.3.2 Sub-Parcel B24-1 SLRA Results and Risk Characterization

Soil data were divided into three datasets (surface, subsurface, and pooled) for Sub-Parcel B24-1 to evaluate potential exposure scenarios. Due to the grading activities including cut and fill which will be implemented during development at the Site, each of these potential exposure scenarios is relevant for the SLRA.

EPCs were calculated for each soil dataset (i.e., surface, subsurface, and pooled soils) in the site-wide EU. ProUCL output tables (with computed UCLs) derived from the data for each COPC in soils are provided as electronic attachments, with computations presented and EPCs calculated for COPCs within each of the datasets. The ProUCL input tables are also included as electronic attachments. The results were evaluated to identify any samples that may require additional assessment or special management based on the risk characterization approach. The calculated EPCs for the surface, subsurface, and pooled exposure scenarios are provided in **Table 8**.

As indicated above, the EPCs for lead are the average (i.e., arithmetic mean) values for each dataset. A lead evaluation spreadsheet, providing the computations to determine lead averages for each dataset, is also included as an electronic attachment. The screening criterion for lead was set at an arithmetic mean of 800 mg/kg based on the RSL, with a secondary limit of 1,050 mg/kg based on the May 2017 updated ALM developed by the USEPA (corresponding to a 5% probability of a blood lead level of 5 ug/dL). The average and maximum lead concentrations are presented for each dataset in **Table 7**, which indicates that neither surface, subsurface, nor pooled soils exceeded an average lead value of 800 mg/kg.

#### Composite Worker Assessment:

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

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Composite Worker	Site-Wide EU (13.4 acres)	Surface Soil	none	2E-5
		Subsurface Soil	Dermal = 2	4E-6
		Pooled Soil	none	7E-6

Based on the risk ratios for Sub-Parcel B24-1, environmental capping (100% of the Site) is an acceptable remedy to be protective for the surface, subsurface, and pooled exposure scenarios.

The surface carcinogenic risk estimate exceeded  $1E-5$ . Additionally, the subsurface dermal system HI value exceeded 1. Given these exceedances and based on the proposed placement of slag aggregate at the Site, capping and institutional controls (to maintain the integrity of the cap) are suitable measures for the protection of a future Composite Worker. As noted above, this evaluation has been conducted as a conservative measure because no long-term occupancy is proposed for the Stormwater Management Regional Pond following its construction.

### Construction Worker Assessment:

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

Worker Scenario	Exposure Unit	Medium	Hazard Index (>1)	Total Cancer Risk
Construction Worker	Site-Wide EU (13.4 acres) (50 exposure days)	Surface Soil	none	$8E-7$
		Subsurface Soil	none	$1E-7$
		Pooled Soil	none	$3E-7$

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

Certain activities at the Site have the potential to exceed the allowable duration, and Construction Worker risks will be mitigated via site-specific health and safety requirements. Upgraded Personal Protective Equipment (PPE) beyond standard Level D protection will be used for the entire scope of ground intrusive work covered by this RADWP as a protective measure to ensure that there are no unacceptable exposures for Construction Workers during project implementation. The Modified Level D PPE requirements which will be applied immediately and throughout this

project, including specific PPE details, planning, tracking/supervision, enforcement, and documentation, are outlined in the PPE Standard Operational Procedure (SOP) provided as **Appendix C**.

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

### 3.3.3 Evaluation of RCRA Criteria

Results from the SLRA indicate that a site-wide remedy of capping with institutional controls will be acceptable to mitigate potential future Composite Worker risks resulting from on-site soil conditions. Site-specific health and safety controls will be implemented to mitigate Construction Worker risks within the sub-parcel. This includes using modified Level D PPE. The modified Level D PPE requirements will be implemented throughout the project duration in accordance with the PPE SOP provided as **Appendix C**. Institutional controls will also be required to be established for the protection of future Construction Workers in the event of any future long-term construction projects which could include ground intrusive activities.

The proposed VCP capping remedy with institutional controls was evaluated for consistency with the RCRA Threshold Criteria and Balancing Criteria. The Threshold Criteria assess the overall protection of human health and the environment, 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 potentially impacted materials in place. The capping and institutional control remedy would eliminate risk to current and future industrial workers by preventing exposure to on-site media and areas of the Site where processed slag aggregate has been placed. Groundwater does not present a direct human health hazard since there is no groundwater use on the property. Implementation of the proposed use restrictions will address the residual risk and will also protect future workers by eliminating or controlling potential exposure pathways, thus, reducing potential intake and contact of 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 current/future Composite Workers and Construction Workers from potential exposures to constituents present in slag aggregate and on-site media at levels that may result in risks of adverse health effects. Given the controlled access and use restrictions, the proposed remedy will attain soil and groundwater objectives. The activity use restrictions will eliminate current and future unacceptable exposures to both soil and groundwater.

**Control the Source of Releases:** In its 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. 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 soil boring B24-034-SB and piezometer B14-037-PZ (as described in Section 3.2.3). 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 for ground intrusive activities.

### **Balancing Criteria:**

**Long-Term Reliability and Effectiveness:** The assessment against this criterion evaluates the long-term effectiveness of the remedy in maintaining protection of human health and the environment after the response objectives have been met. The primary focus of this criterion is the extent and effectiveness of the controls that may be required to manage the risk posed by slag aggregate, treatment residuals, and/or untreated wastes. The proposed capping remedies have been proven to be effective in the long-term at similar sites with similar conditions. The capping remedy will permanently contain the slag aggregate and other potentially contaminated media in place.

Institutional controls will be implemented to protect future Composite and Construction Workers against inadvertent contact with potentially impacted media. The anticipated institutional controls are specified in Section 5.4. The proposed remedy will maintain protection of human health and the environment over time by controlling exposures to the hazardous constituents potentially remaining in slag aggregate or existing on-site media. The long-term effectiveness is high, as use restrictions are readily implementable and easily maintained. Given the historical, heavily industrial uses of the Site and the surrounding

area, including the presence of landfills, land and groundwater use restrictions are expected to continue in the long term.

**Reduction of Toxicity, Mobility, or Volume of Waste:** The assessment against this criterion evaluates the anticipated performance of specific technologies that a remedial action alternative may employ. The capping remedy will prevent the spread of contaminants in wind-blown dust or stormwater and will prevent infiltration through the unsaturated zone from carrying contaminants to the groundwater. Thus, the mobility of contaminants will be reduced by the capping remedy.

**Short-term Effectiveness:** The assessment against this criterion examines how well the proposed remedy protects human health and the environment during the construction and implementation until response objectives have been met. This criterion also includes an estimate of the time required to achieve protection for either the entire site or individual elements associated with specific site areas or threats. The risks to the Construction Worker during remedy implementation are mitigated by executing the Modified Level D PPE requirements outlined in **Appendix C**. The short-term risk to site workers following these upgraded health and safety measures during implementation of the remedy will be low, leading to a high level of short-term effectiveness for protection of on-site workers 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 will use readily available, typically acceptable, and proven technologies.

**Cost Effectiveness:** The assessment against this criterion evaluates the capital costs, annual Operating and Maintenance (O&M) costs, and the net present value (NPV) of this remedy relative to alternatives. The capping remedy remedial costs would be incurred as part of the proposed site development, regardless of the findings of the SLRA or the placement of slag aggregate on the Site.

**State Support / Agency Acceptance:** MDE has been involved throughout the Site investigation process. The proposed use restrictions included in the proposed remedy are

generally recognized as commonly employed measures for long-term stewardship. Ultimately State/MDE support will be evaluated based on comments received during the public comment period.

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

## 4.0 PROPOSED SITE DEVELOPMENT PLAN

Tradepoint Atlantic is proposing to construct a lined Stormwater Management Regional Pond on Sub-Parcel B24-1. The proposed development will include permanent improvements on approximately 13.4 acres of land within Parcel B8, Parcel B14, and Parcel B24. The proposed future use of Sub-Parcel B24-1 is Tier 3 – Industrial. The remainder of these parcels will be addressed in separate plans in accordance with the requirements of the ACO that will include RADWPs, if necessary. The temporary stockpile area outside of the boundary of the Site is not intended to be the basis for the issuance of a NFA or a COC. The portion of the Site (approximately 0.68 acres) that will be used to install underground utilities will be capped under the forthcoming Sub-Parcel B14-1 RADWP. As shown on **Figure 6**, the Site will be fully capped by surface engineering controls.

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

Construction Workers may contact impacted surface and/or subsurface soil during earth movement activities associated with construction activities. The findings of the Construction Worker SLRA using the selected exposure frequency for the site-wide EU (50 days) indicated the estimate of Construction Worker cancer risk was less than  $1E-5$  and no HI values above 1 were identified for any target organ system (the acceptable thresholds for no further action). This evaluation indicates that site-specific health and safety protocols or further action would be required only if this duration were exceeded.

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

A restriction prohibiting the use of groundwater will be included as an institutional control in the NFA and COC issued by the MDE, and a deed restriction prohibiting the use of groundwater will be filed. The groundwater use restriction will protect future Composite Workers from potential direct exposures. Proper water management is required to prevent unacceptable discharges or risks to Construction Workers during development. Work practices and health and safety plans governing groundwater encountered during excavation activities will provide protection for Construction Workers involved with development at the Site.

The development plan for the Site is shown on **Figure 2**, and the detailed development drawings (provided by Bohler Engineering) are included as **Appendix D**. The various types of surface engineering controls proposed to be installed on the Site are summarized on **Figure 6**. The process of constructing the Stormwater Management Regional Pond will involve the tasks listed below. Documentation of the outlined tasks and procedures will be provided in a Sub-Parcel B24-1 Development Completion Report.

#### **4.1 RESPONSE PHASE – GROUNDWATER NETWORK ABANDONMENT**

Abandonment of several groundwater monitoring wells and piezometers located within Parcel B14 will be required as part of the proposed development work. The locations of these wells and piezometers are shown on **Figure 7**. All abandonments will be completed in accordance with COMAR 26.04.04.34 through 36. Piezometers located on Parcel B24 and Parcel B8 have already been properly abandoned.

The abandonment of any permitted groundwater wells will be reported to the Water Management Administration as per COMAR 26.04.04, and records of all groundwater well and piezometer abandonments (including abandonment forms, if available) will be included in the Development Completion Report. It is understood that the agencies may require the installation of additional permanent monitoring wells in the future following site development.

**Figure 7** also shows that several monitoring wells are located in Parcel B14 adjacent to the TMC and in proximity to the temporary stockpile area. As indicated, these wells will not be abandoned under this development plan. To ensure that the locations are not damaged or destroyed, these wells should be protected using sonotubes, flagging, and/or barriers as needed.

#### **4.2 DEVELOPMENT PHASE**

##### **4.2.1 Erosion and Sediment Control Installation**

Installation of erosion and sediment controls will be completed in accordance with the requirements of the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control prior to any construction at the Site. Any soils which are disturbed during the installation of erosion and sediment controls will be placed on-site below the cap.

#### 4.2.2 Grading and Site Preparation

As indicated on the development plans in **Appendix D**, grading activities including both cut and fill will occur within the Sub-Parcel B24-1 boundary. 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 and will be documented prior to transport to the Site. Fill sources shall be free of organic material, frozen material, or other deleterious material.

In the case that there is excess material (not anticipated), the spoils will be stockpiled at a suitable location in accordance with the Materials Management Plan (MMP) for the Sparrows Point Facility (Papadopoulos & 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.

#### 4.2.3 Installation of Structures and Underground Utilities

The Stormwater Management Regional Pond and associated utilities will be installed as shown on the development plans in **Appendix D**. Excavated soils may be placed on-site below the cap. All utility trenches will be backfilled with bedding and backfill approved by the MDE for industrial use (which may include approved utility trench spoils). Additional protocols for the installation of utilities at the Site are provided in Section 5.1.2. Any water removed will be managed as detailed in Section 5.2.

#### 4.2.4 Landscaping

The portion of the Site that is not capped with an impermeable liner will be covered with landscaping caps as indicated on **Figure 6**. The required minimum thicknesses of all site-wide landscaping sections which will serve as surface engineering controls are shown in the minimum capping section details provided in **Appendix E**. All landscaped areas will require a minimum of 24 inches of VCP clean fill, with a geotextile marker fabric between the VCP clean fill and the existing underlying material.

#### 4.2.5 Stormwater Management

The purpose of the development project is to construct a lined Stormwater Management Regional Pond on the Site as indicated on **Figure 6**. According to the development plans, provided as **Appendix D**, the pond will be installed with an impermeable PVC liner, or an equivalent alternative approved by the MDE, on all sides and bottom. Perforated PVC dewatering pipes will also be installed to facilitate pond drainage. The pond section will meet the minimum capping requirements as specified in **Appendix E**.

Tradepoint Atlantic is working with the MDE Industrial & General Permits Division to renew the property-wide NPDES permit. The stormwater management systems for each parcel are reviewed and approved by Baltimore County for each individual development project.

## 5.0 DEVELOPMENT IMPLEMENTATION PROTOCOLS

### 5.1 DEVELOPMENT PHASE

This plan presents protocols for the handling of soils and fill materials in association with the development of Sub-Parcel B24-1. In particular, this plan highlights the minimum standards for construction practices and managing potentially contaminated materials to reduce potential risks to workers and the environment.

Several exceedances of the PALs were identified in soil samples across the Site. The PALs are set based on 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. There were no locations within the proposed development boundary with soil exceedances of the special management criteria for PCBs (50 mg/kg), lead (10,000 mg/kg), or TPH (6,200 mg/kg). However, as described in Section 3.2.3, Oil & Grease PAL exceedances were observed in two soil borings (B14-034-SB and B24-037-SB). Additionally, NAPL was identified in one soil boring (B24-034-SB) and one NAPL screening piezometer (B14-037-PZ). These are identified as locations of potential concern on **Figure 5**.

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

Based on the characterization of surface and subsurface soils and the associated SLRA findings, surface engineering controls are an acceptable remedy to be protective of potential Composite Workers who could potentially contact impacted materials at the Site. The proposed capping sections will meet the required minimum thicknesses for surface engineering controls, which are provided in **Appendix E**.

### 5.1.1 Erosion/Sediment Control

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

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

### 5.1.2 Soil Excavation and Utility Trenching

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

The Utility Excavation NAPL Contingency Plan (discussed below) must also be reviewed during the pre-excavation meeting. There were four locations identified from prior investigations with confirmed or potential presence of NAPL. Oil & Grease PAL exceedances were observed in two soil borings (B14-034-SB and B24-037-SB). NAPL was identified in one soil boring (B24-034-SB) and one NAPL screening piezometer (B14-037-PZ). These four locations are plotted with respect to the development plan and utilities on **Figure 5**. Soil screening will be especially important during any excavation of existing soil in these areas.

The EP will provide oversight of soil excavation/trenching activities as described in Section 5.6. Soil excavation/trenching will occur during various phases of construction. In general, and based on the existing sampling information, all excavated materials are expected to be suitable for replacement on the Site, with the possible exception of the potentially NAPL-impacted materials described above (if encountered). The EP will monitor the soil excavation activities for signs of significantly contaminated material which may not be suitable for reuse (as described below). The EP will also be responsible for monitoring organic vapor concentrations in the worker breathing zone within utility trenches and excavations to determine whether any increased level of health and safety protection is required.

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

All utility trenches will be backfilled with bedding and backfill materials approved by the MDE. A general utility cross section is provided as **Appendix F**. Additional preventative measures will be required if evidence of petroleum contamination is encountered, to prevent the discharge to, or migration of, petroleum product along a utility conduit. Contingency measures have been developed to ensure that utilities will be constructed in a manner that will prevent the migration of any encountered NAPL, and that excavated materials will be properly managed. The Utility Excavation NAPL Contingency Plan (**Appendix G**) provides protocols to be followed if NAPL is encountered during the construction activities. Preventative measures to inhibit the spread of petroleum product will be conducted in accordance with this plan.

The EP will monitor all soil excavation and utility trenching activities for signs of potential contamination. In particular, soils will be monitored with a hand-held PID for potential VOCs and will also be visually inspected for the presence of staining, petroleum waste materials, or other indications of significant contamination. If screening of excavated materials by the EP indicates the presence of conditions of potential concern (i.e., sustained PID readings greater than 10 ppm, visual staining, unsuitable waste materials, etc.), such materials shall be segregated for additional sampling and special management.

Excavated material exhibiting evidence of significant contamination (including NAPL) shall be placed in stockpiles (not to exceed 500 cubic yards) on polyethylene sheeting and covered with polyethylene sheeting to minimize potential exposures and erosion when not in use. Materials stockpiled due to evidence of contamination will be sampled in accordance with reuse and/or waste disposal requirements. If not suitable for reuse, the material will be disposed of onsite at Greys Landfill or at an appropriate offsite permitted disposal facility. Plans for analysis of segregated soils for any use other than disposal must be submitted to the MDE for approval. The quantities of all materials that require disposal, if any, will be recorded and identified in the Development Completion Report.

### 5.1.3 Soil Sampling and Disposal

Excavated materials that are determined by the EP to warrant sampling and analysis because of elevated PID readings or other indications of potential contamination shall be sampled and analyzed to determine how the materials should be managed. If excavated and stockpiled, such materials should be covered with a polyethylene tarp to minimize potential exposures and erosion. All stockpiled soil may be considered for use as fill at this Site or on other areas of the property depending on the analytical results. A sampling Work Plan including a description of the material, estimated volume, and sampling parameters will be submitted to the MDE for approval. The resulting analytical data will be submitted to the MDE to determine the suitability of the material for reuse. If the MDE determines that the materials are unsuitable for reuse, the materials will be sampled to determine if they require regulated disposal.

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

### 5.1.4 Fill

Materials approved by the MDE for industrial use will be used as structural fill. The Site will be capped by surface engineering controls. Soil excavated on the sub-parcel has been determined to be suitable for re-use at the Site below the surface engineering controls, unless such materials are determined by the EP/MDE to be unsuitable for use as outlined in Section 5.1.2 and Section 5.1.3.

All utility trenches will be backfilled with bedding and backfill approved by the MDE for industrial use (which may include approved utility trench spoils). Any utility backfill which will extend into the cap (i.e., top 2 feet of backfill in landscaped areas) must meet the VCP clean fill requirements, and a geotextile marker fabric will be placed between the VCP clean fill and any underlying material. A general utility detail drawing is provided as **Appendix F**. Material imported to the Site will be screened according to MDE guidance for suitability.

### 5.1.5 Dust Control

General construction operations, including soil excavation and transport, and trenching for utilities will be performed at the Site. These activities are anticipated to be performed in areas of soil impacted with COPCs. Best management practices should be undertaken at the Sparrows Point property as a whole to prevent the generation of dust which could impact other areas of the property outside of the immediate work zone. To limit worker exposure to contaminants borne on dust and windblown particulates, dust monitoring will be performed in the immediate work zone and at the

upwind and downwind perimeter of the Site, and dust control measures will be implemented if warranted based on the monitoring results. The action level proposed for the purpose of determining the need for dust suppression techniques (e.g. watering and/or misting) during the development activities at the Site will be  $3.0 \text{ mg/m}^3$ . The lowest of the site-specific dust action levels, OSHA PELs, and ACGIH TLV was selected as the proposed action level.

The EP will be responsible for the dust monitoring program. Air monitoring will be performed using Met One Instruments, Inc. E-Sampler dust monitors or equivalent real-time air monitoring devices. The EP will set-up dust monitoring equipment at the outset of ground intrusive work or other dust-generating activities, and continuous dust monitoring will be performed during this work. In addition to work area monitoring, a dust monitor will be placed at selected perimeter locations that will correspond to the upwind and downwind boundaries based on the prevailing wind direction predicted for that day. The prevailing wind direction will be assessed during the day, and the positions of the perimeter monitors will be adjusted if there is a substantial shift in the prevailing wind direction.

Once all dust-generating activities are complete (which may occur at a later stage of the project once ground intrusive work has been completed or after the Site has been capped), the dust monitoring program may be discontinued. If additional dust-generating activities commence, additional dust monitoring activities will be performed.

If sustained dust concentrations exceed the action level ( $3.0 \text{ mg/m}^3$ ) at any of the monitoring locations as a result of conditions occurring at the Site, operations will be stopped temporarily until dust suppression can be implemented. Operations may be resumed once monitoring indicates that dust concentrations are below the action level. The background dust concentration will be utilized to evaluate whether Site activities are the source of the action level exceedance. The background dust concentration will be based on measurements over a minimum of a 1-hour period at the upwind Site boundary. The upwind data will be used to calculate a time weighted average background dust concentration. As noted above, the locations of the perimeter dust monitors may be adjusted periodically if there is a substantial shift in the prevailing wind direction.

As applicable, air monitoring will be conducted during development implementation activities to assess levels of exposure to Site workers, establish that the work zone designations are valid, and verify that respiratory protection being worn by personnel, if needed, is adequate. Concurrent with the work zone air monitoring, perimeter air monitoring will also be performed at the upwind and downwind Site boundaries to ensure contaminants are not migrating off-site. The concentration measured at the downwind perimeter shall not exceed the action level of  $3.0 \text{ mg/m}^3$ , unless caused by background dust from upwind of the Site. If exceedances of the action level are identified downwind for more than five minutes, the background dust concentration shall be evaluated to determine whether the action level exceedances are attributable to Site conditions. If on-site activities are the source of the exceedances, dust control measures and additional monitoring will

be implemented. The dust suppression measures may include wetting or misting using a hose connected to a water supply or a water truck stationed at the Site.

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

## 5.2 WATER MANAGEMENT

This plan presents the protocols for handling any groundwater or surface water that needs to be removed to facilitate construction of the proposed Sub-Parcel B24-1 development.

### 5.2.1 Groundwater PAL Exceedances

Groundwater samples were collected during the preceding Phase II Investigations from six temporary groundwater sample collection points (piezometers) and one permanent monitoring well within and surrounding the Site. Aqueous PAL exceedances in groundwater in the vicinity of the Site included both inorganic and organic compounds. The aqueous PAL exceedances obtained during the preceding Phase II Investigations are summarized on **Figure GW1** through **Figure GW4**.

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

### 5.2.2 Dewatering

Dewatering may be necessary during pond construction or the installation of underground utilities and within excavations/trenches. **Figure 8** displays the groundwater elevations underlying the Site for the shallow aquifer zone, based on prior investigation data. Any dewatering shall be done in accordance with all local, state, and federal regulations. Water that collects in excavations/trenches due to intrusion of groundwater, stormwater, and/or dust control waters will be transported to the HCWWTP. The water will be treated and discharged in accordance with NPDES Permit No. 90-DP-0064A; I. Special Conditions; A.4; Effluent Limitations and Monitoring Requirements.

It is the intent to take any water removed from the site and put it in the TMC by pumping or truck where it will be treated at the HCWWTP. Prior to removal, the dewatering fluids will be evaluated and then tested (if required) pursuant to the HCWWTP Constituent Threshold Limits for Dewatering Activities related to Remediation, Development, and Capping Protocol. If the groundwater does not meet the constituent threshold limits specified in the protocol, the groundwater will be pre-treated. The HCWWTP discharges to Bear Creek. Any water discharged to the TMC will be pumped through a filter bag or equivalent to remove suspended solids prior to discharge.

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

The 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.

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

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

### **5.3 HEALTH AND SAFETY**

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

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

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

#### **5.4 INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS)**

Long-term conditions related to future use of the Site will be placed on the RADWP approval, NFA, and COC. These conditions are anticipated to include the following:

- A restriction prohibiting the use of groundwater for any purpose at the Site and a requirement to characterize, containerize, and properly dispose of groundwater in the event of deep excavations encountering groundwater.
- Notice to the MDE at least 30 days prior to any future soil disturbances that are expected to breach the approved capping remedy (i.e., through the pond liner or marker fabric in landscaped areas).
- Notice to the USEPA at least 30 days prior to any future soil disturbances that are expected to breach the approved capping remedy, only if the proposed duration of ground intrusive activity would exceed the allowable exposure duration determined in the SLRA and the contractor will not use the modified Level D PPE specified in the approved SOP.
- Requirement for a HASP in the event of any future excavations at the Site.
- Complete appropriate characterization and disposal of any material excavated/pumped at the Site in accordance with applicable local, state, and federal requirements.
- Implementation of inspection procedures and maintenance of the containment remedies.

The owner/operator will file the above deed restrictions as defined by the MDE-VCP in the NFA and COC.

## 5.5 POST REMEDIATION REQUIREMENTS

Post remediation requirements will include compliance with the conditions specified in the NFA, COC, and the deed restrictions recorded for the Site. Deed restrictions will be recorded within 30 days after receipt of the final NFA. In addition, the MDE and USEPA will be provided with a written notice of any future excavations (as applicable) in accordance with the requirements given in Section 5.4. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation, health and safety protocols (as required), clean fill source (as required), and proposed characterization and disposal requirements. Written notice may consist of email correspondence and/or hard copy correspondence.

Additional requirements will include inspection procedures and maintenance of the containment remedies to minimize degradation which could lead to future exposures. An Operations and Maintenance Plan (O&M Plan) will be submitted for MDE approval. This O&M Plan will include long-term inspection and maintenance requirements for the capped areas of the Site. The responsible party will perform cap inspections, perform maintenance of the cap, and retain inspection records, as required by the O&M Plan.

## 5.6 CONSTRUCTION OVERSIGHT

Construction Oversight by an EP will ensure and document that the project is built as designed and appropriate environmental and safety protocols are followed. Upon completion, the EP will certify that the project is constructed in accordance with this RADWP.

The EP will monitor all soil excavation and utility trenching activities for signs of contamination that may indicate materials that are not suitable for reuse. In particular, soils will be monitored with a hand-held PID for potential VOCs, and will also be visually inspected for staining, petroleum waste materials, or other indications of significant contamination. If screening of excavated materials by the EP indicates the presence of conditions of potential concern (i.e., sustained PID readings greater than 10 ppm, visual staining, unsuitable waste materials, etc.), such materials shall be segregated for additional sampling and special management (as described in Section 5.1.2; Soil Excavation and Utility Trenching). The EP will also perform routine periodic breathing zone monitoring and PPE spot checks during ground intrusive activities. The EP will also inspect any water that collects in the excavations/trenches on an as-needed basis to coordinate appropriate sampling prior to disposal (as described in Section 5.2.2; Dewatering).

Daily inspections, as necessary, will be performed during general site grading and cap construction activities to verify that appropriate fill materials are being used (as described in Section 5.1.4; Fill), dust monitoring and control measures are being implemented as appropriate (as described in Section 5.1.5; Dust Control), the requirements of the HASP and the PPE SOP are being enforced as applicable (as described in Section 5.3; Health and Safety), and surface engineering controls are being installed with the appropriate thicknesses (shown on the RADWP attachments). Oversight

by an EP will not be required during construction activities which do not have a significant environmental component, such as above-grade construction.

Records will be developed by the EP to document:

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

## 6.0 PERMITS, NOTIFICATIONS AND CONTINGENCIES

The participant and their contractors will comply with all local, state, and federal laws and regulations by obtaining any necessary approvals and permits to conduct the activities contained herein. Any permits or permit modifications from State or local authorities will be provided as addenda to this RADWP.

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

Contingency measures will include the following:

1. The MDE will be notified immediately of any previously undiscovered contamination, previously undiscovered storage tanks and other oil-related issues, and citations from regulatory entities related to health and safety practices.
2. Any significant change to the implementation schedule will be noted in the progress reports to MDE.
3. Modified Level D PPE will be used for the entire scope of ground intrusive work covered by this RADWP as a protective measure to ensure that there are no unacceptable exposures for Construction Workers during project implementation. The modified Level D PPE requirements which will be applied during this project are outlined in the PPE SOP provided as **Appendix C**. If it is not possible to implement the PPE SOP as provided, the agencies will be notified and a RADWP Addendum will be submitted to detail any appropriate mitigative measures.

## 7.0 IMPLEMENTATION SCHEDULE

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

- Development Progress
- 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:

<b>Task</b>	<b>Proposed Completion Date</b>
Anticipated RADWP Approval	July 15, 2021
<b><i>Response:</i></b>	
Groundwater Network Abandonments	September 2021
<b><i>Development:</i></b>	
Installation of Erosion and Sediment Controls	October 2021
Site Preparation	October 2021
Slag (or Alternative Fill) Delivery and Placement	October 2021
Site Grading	October 2021
Utility Installations	November 2021
Submittal of Development Completion Report/ Notice of Completion of Remedial Actions*	May 2022
Request for NFA from the MDE	August 2022

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

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## **FIGURES**

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Tradepoint Atlantic  
Area A and Area B Parcels

April 19, 2021

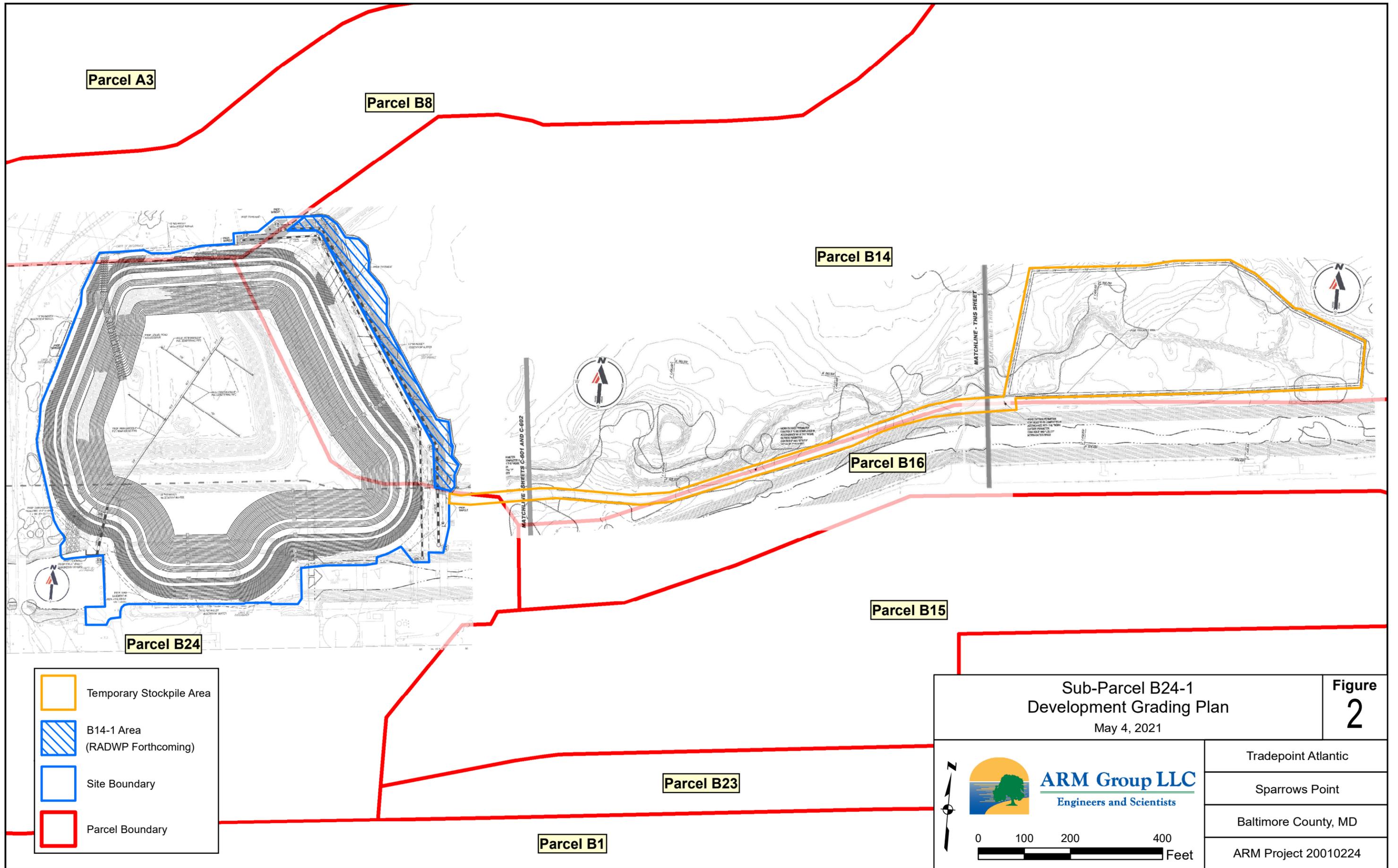
Figure

1

**ARM Group LLC**  
Engineers and Scientists

0 500 1,000 2,000  
Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
Area A: Project 200101 Area B: Project 200102 Sub-Parcel B24-1: 20010224



Parcel A3

Parcel B8

Parcel B14

Parcel B16

Parcel B15

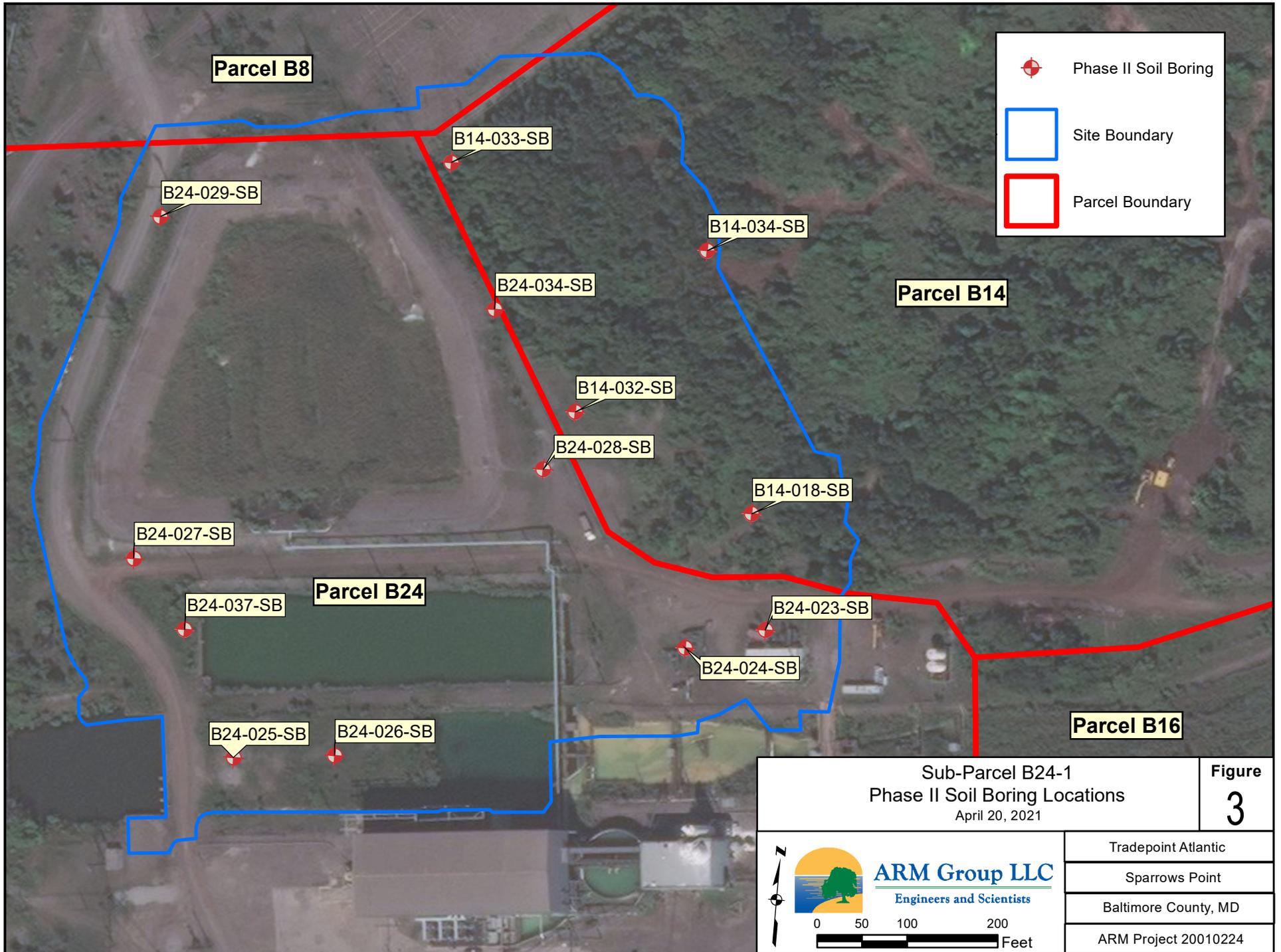
Parcel B24

Parcel B23

Parcel B1

-  Temporary Stockpile Area
-  B14-1 Area (RADWP Forthcoming)
-  Site Boundary
-  Parcel Boundary

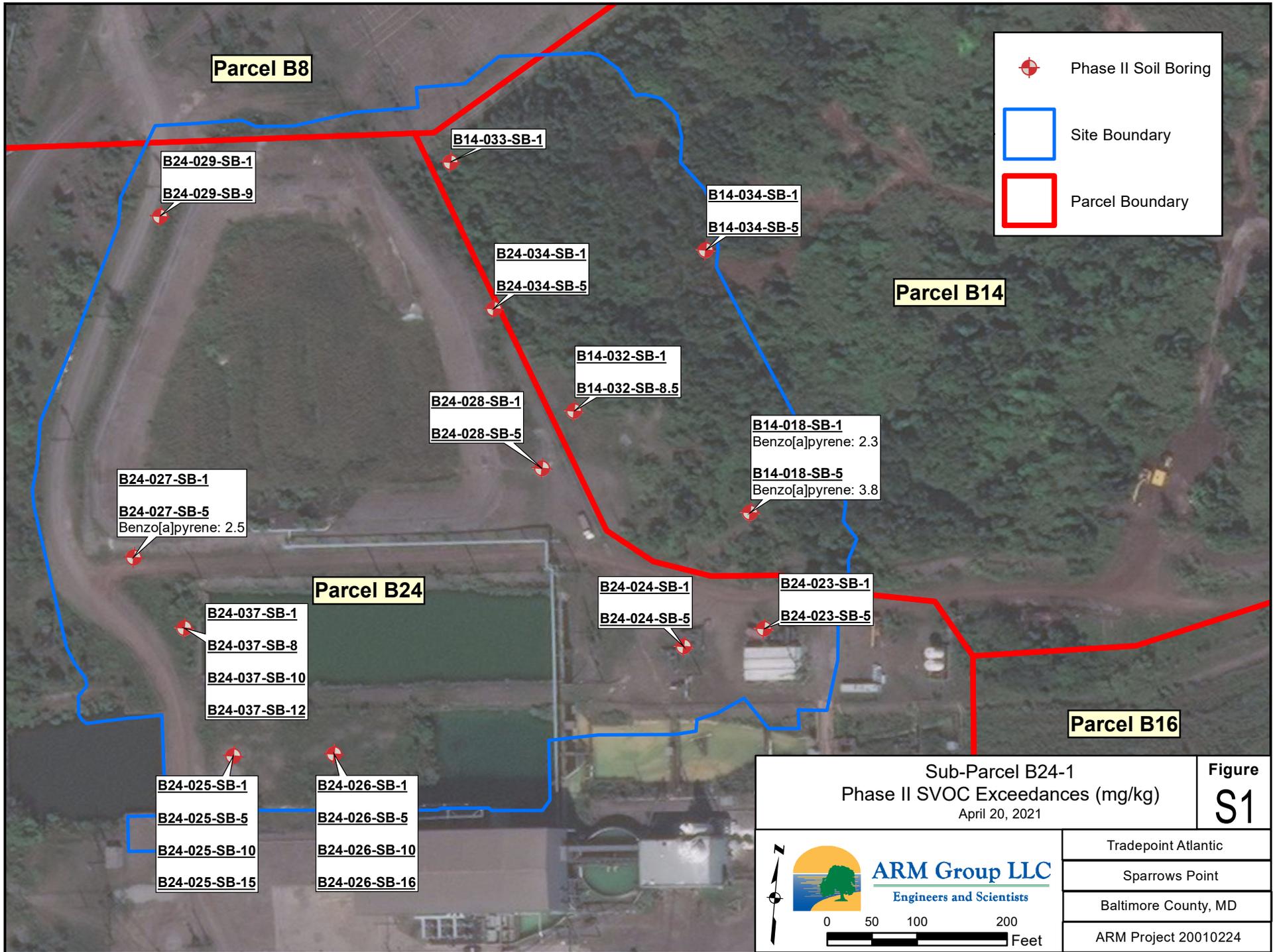
<p><b>Sub-Parcel B24-1 Development Grading Plan</b> May 4, 2021</p>		<p><b>Figure 2</b></p>
 <p><b>ARM Group LLC</b> Engineers and Scientists</p>		<p>Tradepoint Atlantic</p>
		<p>Sparrows Point</p>
		<p>Baltimore County, MD</p>
		<p>ARM Project 20010224</p>



	Phase II Soil Boring
	Site Boundary
	Parcel Boundary

<b>Sub-Parcel B24-1</b> <b>Phase II Soil Boring Locations</b> April 20, 2021		<b>Figure</b> <span style="font-size: 2em;">3</span>
 <b>ARM Group LLC</b> Engineers and Scientists		Tradepoint Atlantic
		Sparrows Point
		Baltimore County, MD
		ARM Project 20010224





 Phase II Soil Boring  
 Site Boundary  
 Parcel Boundary

Sub-Parcel B24-1 Phase II SVOC Exceedances (mg/kg) April 20, 2021		<b>Figure</b>  <b>S1</b>
 <b>ARM Group LLC</b> Engineers and Scientists		
Tradepoint Atlantic Sparrows Point Baltimore County, MD		
ARM Project 20010224		



 Phase II Soil Boring  
 Site Boundary  
 Parcel Boundary

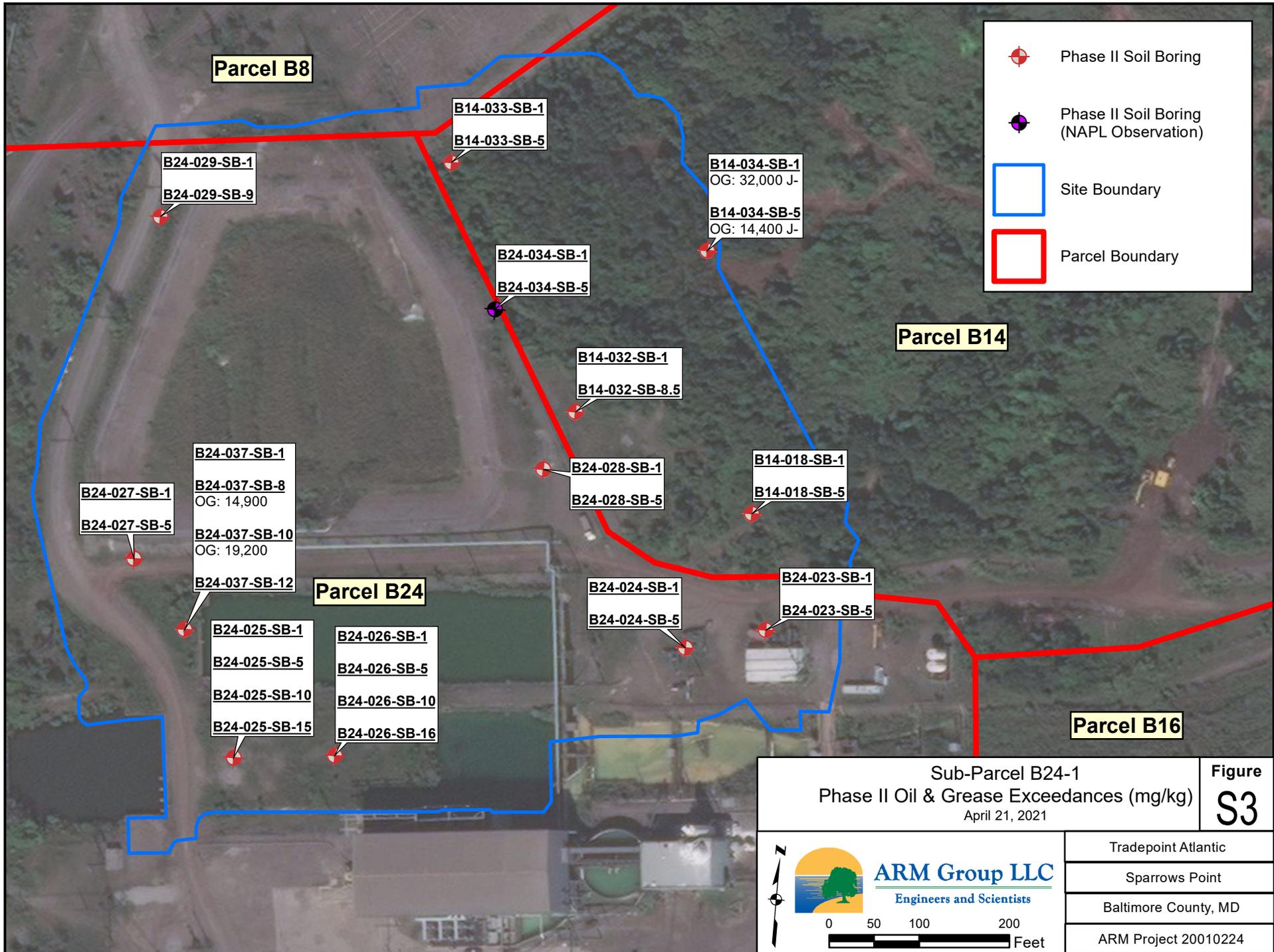
Sub-Parcel B24-1  
 Phase II PCB Exceedances (mg/kg)  
 April 21, 2021

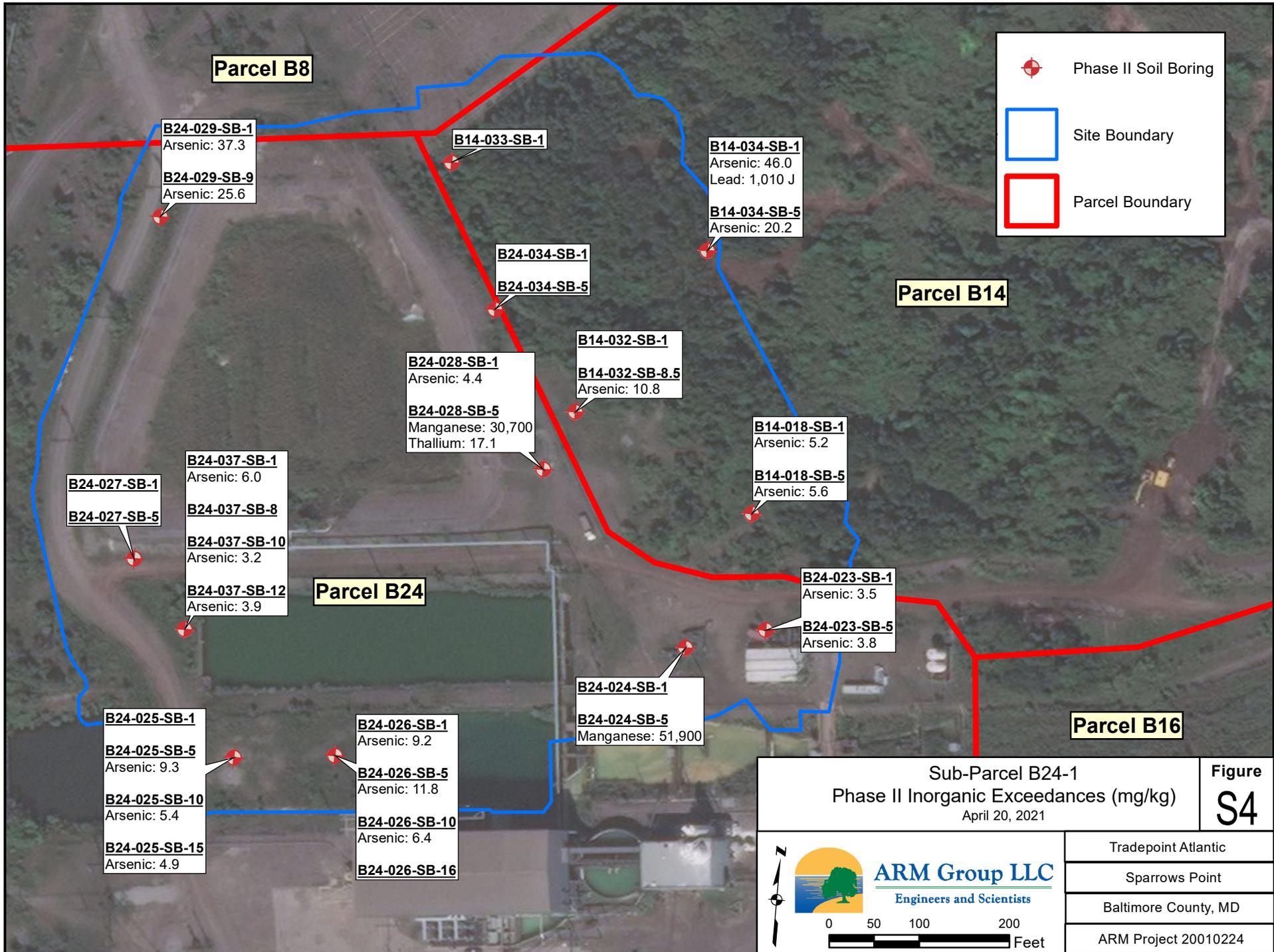
Figure  
**S2**



**ARM Group LLC**  
 Engineers and Scientists  
 0 50 100 200  
 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010224





 Phase II Soil Boring  
 Site Boundary  
 Parcel Boundary

**Parcel B8**

**Parcel B14**

**Parcel B24**

**Parcel B16**

**B24-029-SB-1**  
Arsenic: 37.3  
**B24-029-SB-9**  
Arsenic: 25.6

**B14-033-SB-1**

**B14-034-SB-1**  
Arsenic: 46.0  
Lead: 1,010 J  
**B14-034-SB-5**  
Arsenic: 20.2

**B24-034-SB-1**  
**B24-034-SB-5**

**B14-032-SB-1**  
**B14-032-SB-8.5**  
Arsenic: 10.8

**B24-028-SB-1**  
Arsenic: 4.4  
**B24-028-SB-5**  
Manganese: 30,700  
Thallium: 17.1

**B14-018-SB-1**  
Arsenic: 5.2  
**B14-018-SB-5**  
Arsenic: 5.6

**B24-027-SB-1**  
**B24-027-SB-5**

**B24-037-SB-1**  
Arsenic: 6.0  
**B24-037-SB-8**  
**B24-037-SB-10**  
Arsenic: 3.2  
**B24-037-SB-12**  
Arsenic: 3.9

**B24-023-SB-1**  
Arsenic: 3.5  
**B24-023-SB-5**  
Arsenic: 3.8

**B24-025-SB-1**  
**B24-025-SB-5**  
Arsenic: 9.3  
**B24-025-SB-10**  
Arsenic: 5.4  
**B24-025-SB-15**  
Arsenic: 4.9

**B24-026-SB-1**  
Arsenic: 9.2  
**B24-026-SB-5**  
Arsenic: 11.8  
**B24-026-SB-10**  
Arsenic: 6.4  
**B24-026-SB-16**

**B24-024-SB-1**  
**B24-024-SB-5**  
Manganese: 51,900

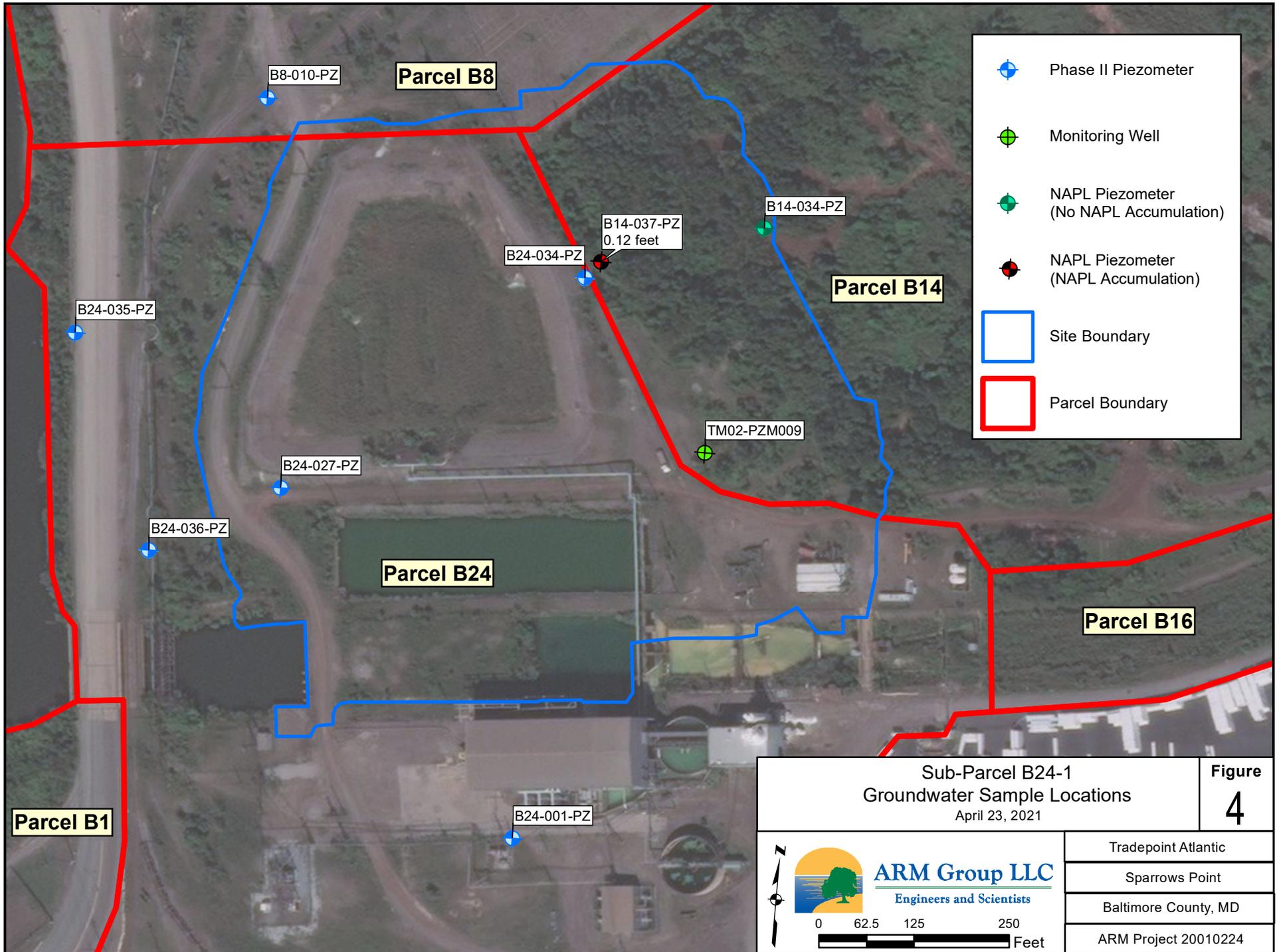
Sub-Parcel B24-1  
Phase II Inorganic Exceedances (mg/kg)  
April 20, 2021

Figure  
**S4**



**ARM Group LLC**  
 Engineers and Scientists  
 0 50 100 200  
 Feet

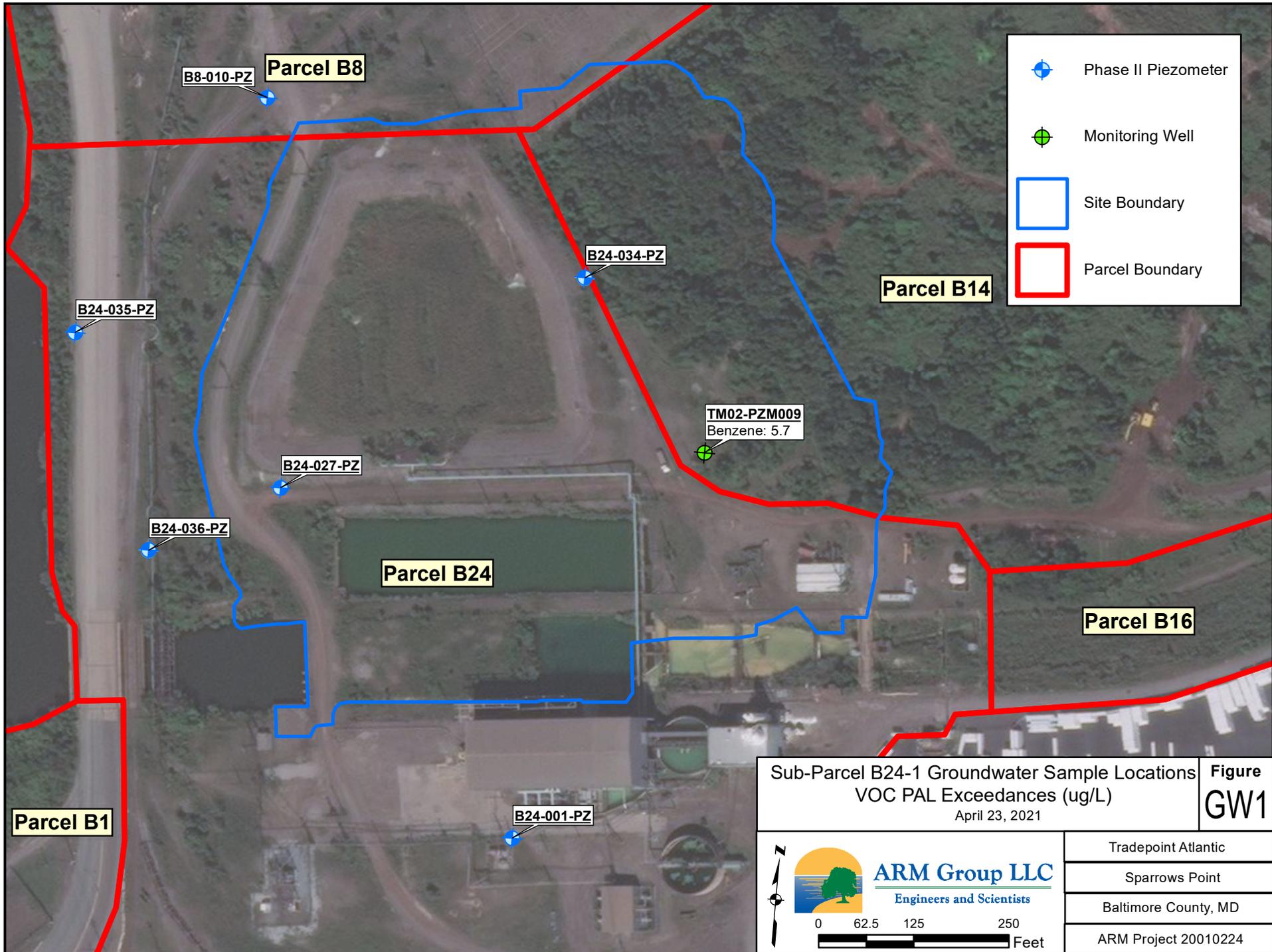
Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010224



	Phase II Piezometer
	Monitoring Well
	NAPL Piezometer (No NAPL Accumulation)
	NAPL Piezometer (NAPL Accumulation)
	Site Boundary
	Parcel Boundary

Sub-Parcel B24-1 Groundwater Sample Locations April 23, 2021	<b>Figure</b> <b>4</b>
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 <b>ARM Group LLC</b> Engineers and Scientists 0 62.5 125 250 Feet	Tradepoint Atlantic
	Sparrows Point
	Baltimore County, MD
	ARM Project 20010224



-  Phase II Piezometer
-  Monitoring Well
-  Site Boundary
-  Parcel Boundary

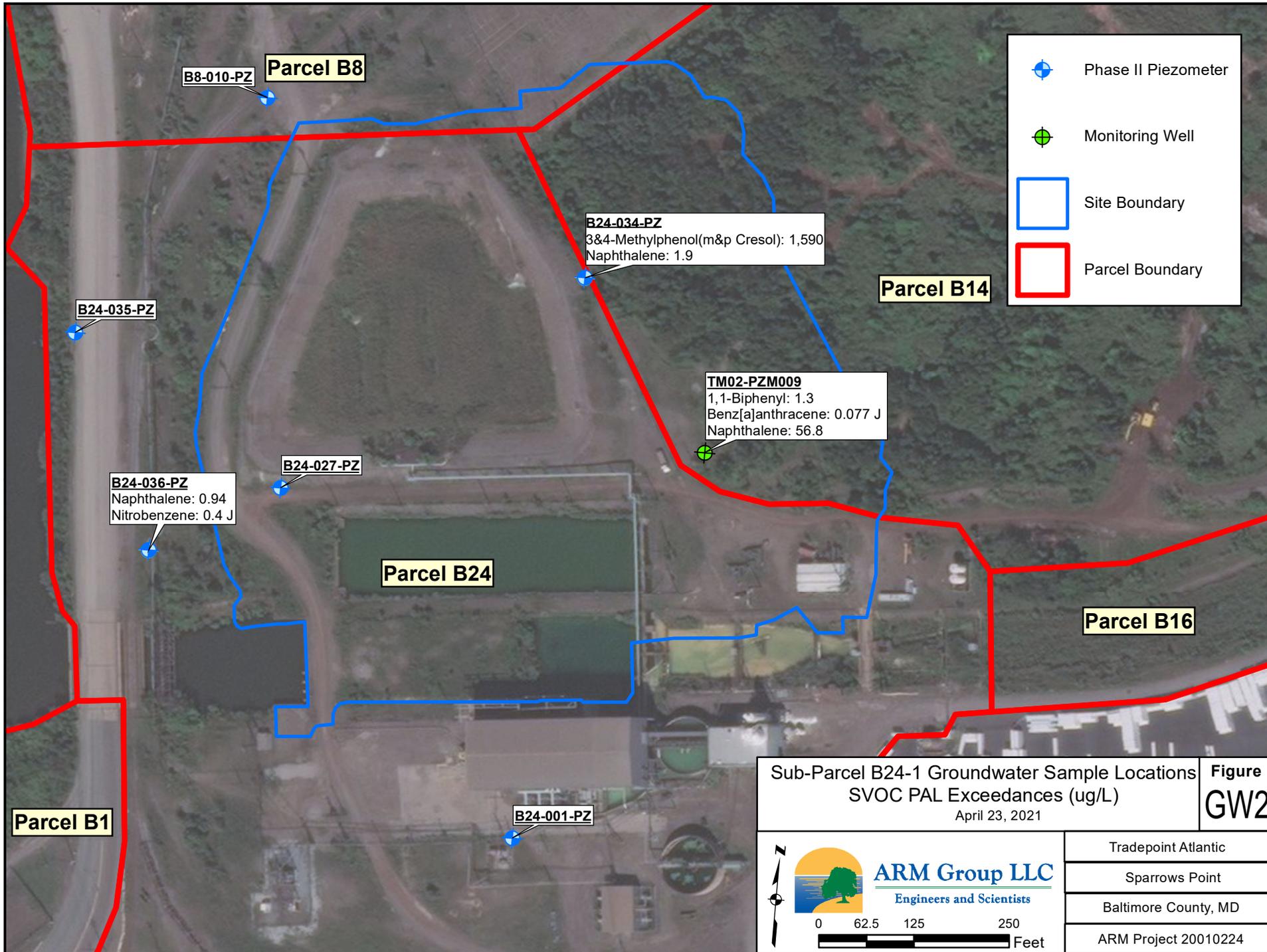
Sub-Parcel B24-1 Groundwater Sample Locations  
 VOC PAL Exceedances (ug/L)  
 April 23, 2021

Figure  
 GW1

 **ARM Group LLC**  
 Engineers and Scientists

0 62.5 125 250  
 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010224

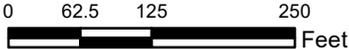


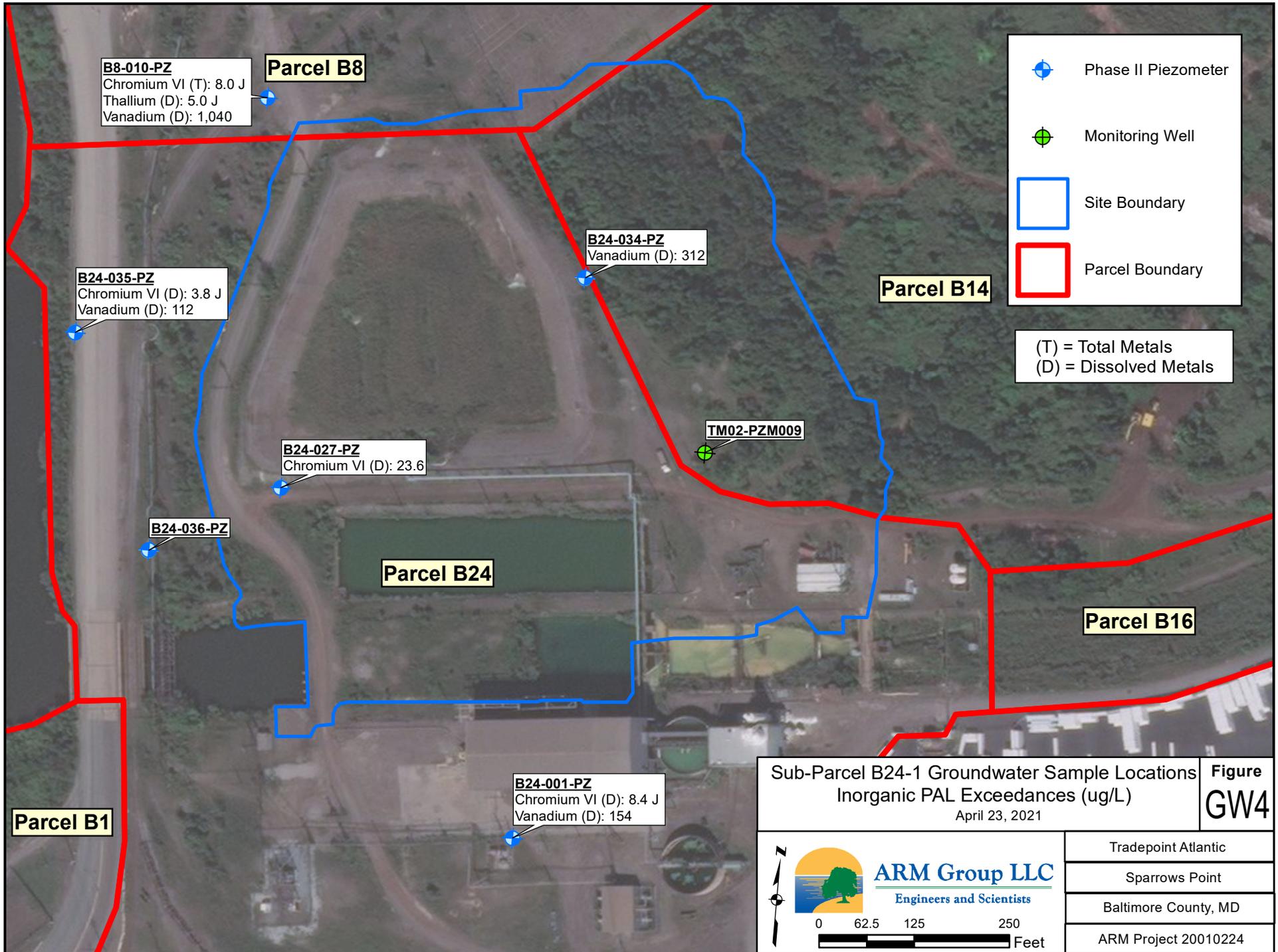


-  Phase II Piezometer
-  Monitoring Well
-  Site Boundary
-  Parcel Boundary

**Sub-Parcel B24-1 Groundwater Sample Locations**  
 TPH/O&G PAL Exceedances (ug/L)  
 April 23, 2021

**Figure GW3**

 <b>ARM Group LLC</b> Engineers and Scientists 	Tradepoint Atlantic
	Sparrows Point
	Baltimore County, MD
	ARM Project 20010224



**B8-010-PZ**  
 Chromium VI (T): 8.0 J  
 Thallium (D): 5.0 J  
 Vanadium (D): 1,040

**Parcel B8**

**B24-035-PZ**  
 Chromium VI (D): 3.8 J  
 Vanadium (D): 112

**B24-034-PZ**  
 Vanadium (D): 312

**Parcel B14**

**B24-027-PZ**  
 Chromium VI (D): 23.6

**TM02-PZM009**

**B24-036-PZ**

**Parcel B24**

**Parcel B16**

**B24-001-PZ**  
 Chromium VI (D): 8.4 J  
 Vanadium (D): 154

**Parcel B1**

Phase II Piezometer  
 Monitoring Well  
 Site Boundary  
 Parcel Boundary

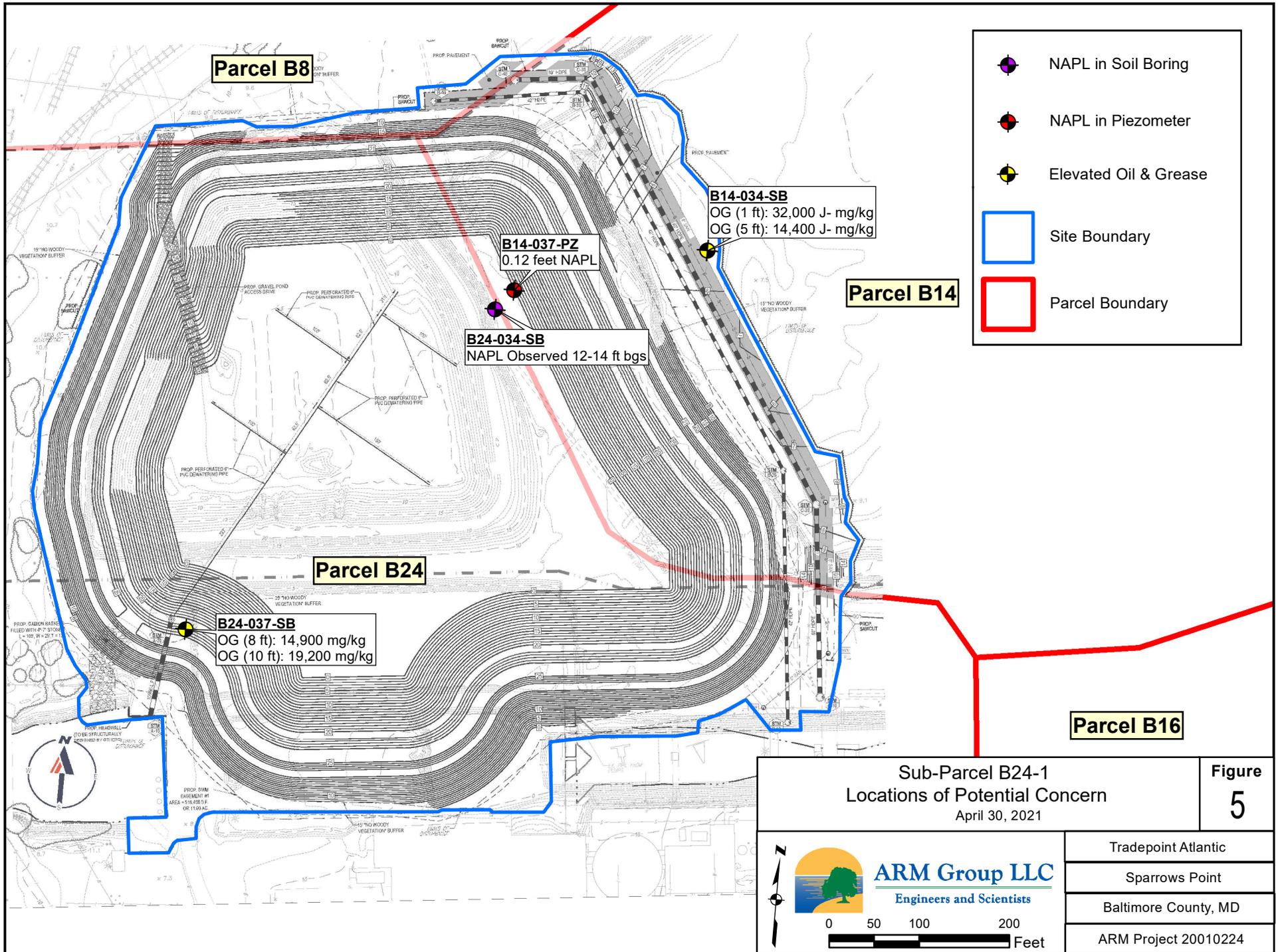
(T) = Total Metals  
 (D) = Dissolved Metals

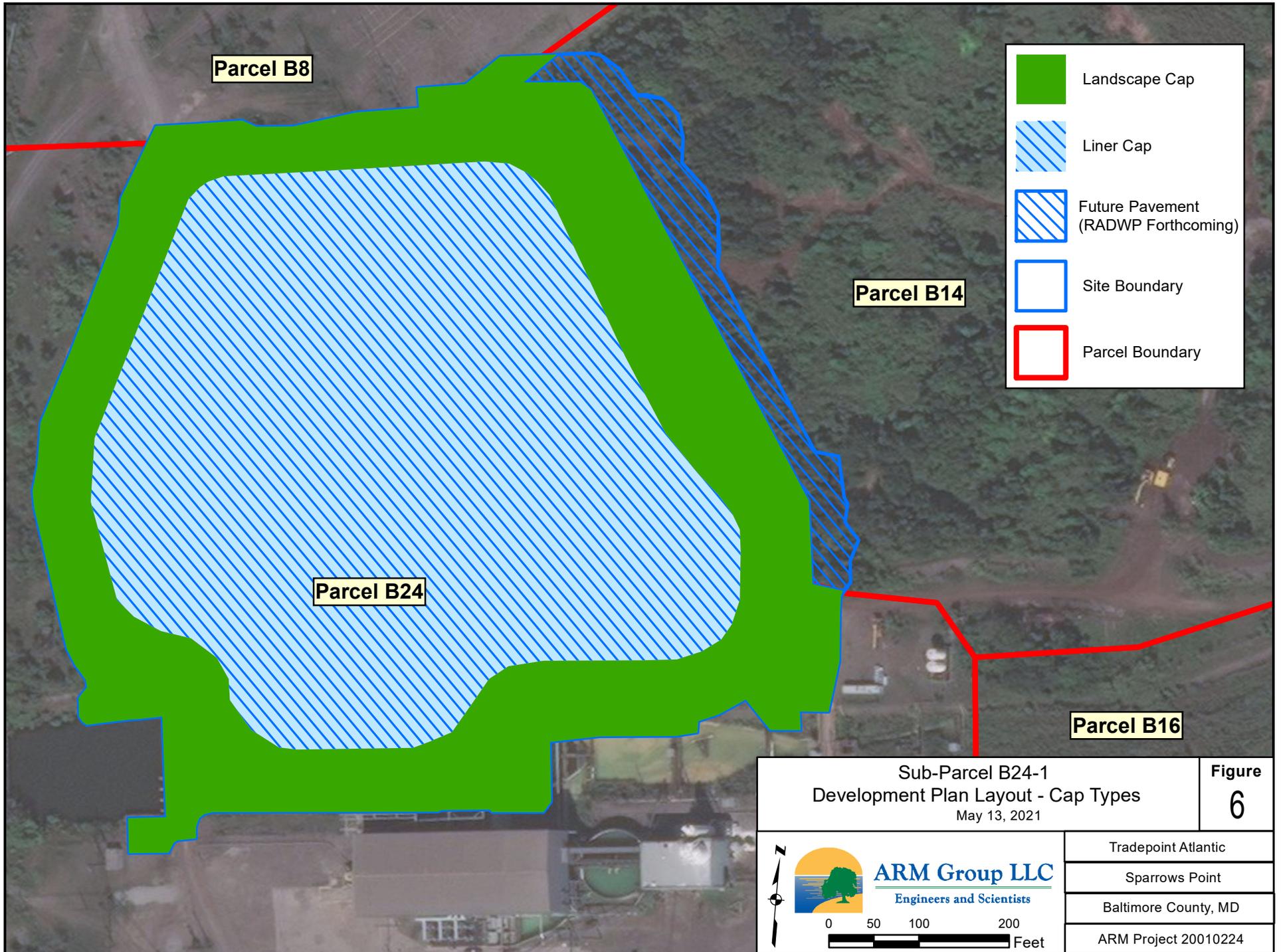
Sub-Parcel B24-1 Groundwater Sample Locations  
 Inorganic PAL Exceedances (ug/L)  
 April 23, 2021

**Figure  
 GW4**

**ARM Group LLC**  
 Engineers and Scientists  
 0 62.5 125 250  
 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010224





Parcel B8

Parcel B14

Parcel B24

Parcel B16

-  Landscape Cap
-  Liner Cap
-  Future Pavement (RADWP Forthcoming)
-  Site Boundary
-  Parcel Boundary

Sub-Parcel B24-1  
 Development Plan Layout - Cap Types  
 May 13, 2021

Figure  
 6



**ARM Group LLC**  
 Engineers and Scientists

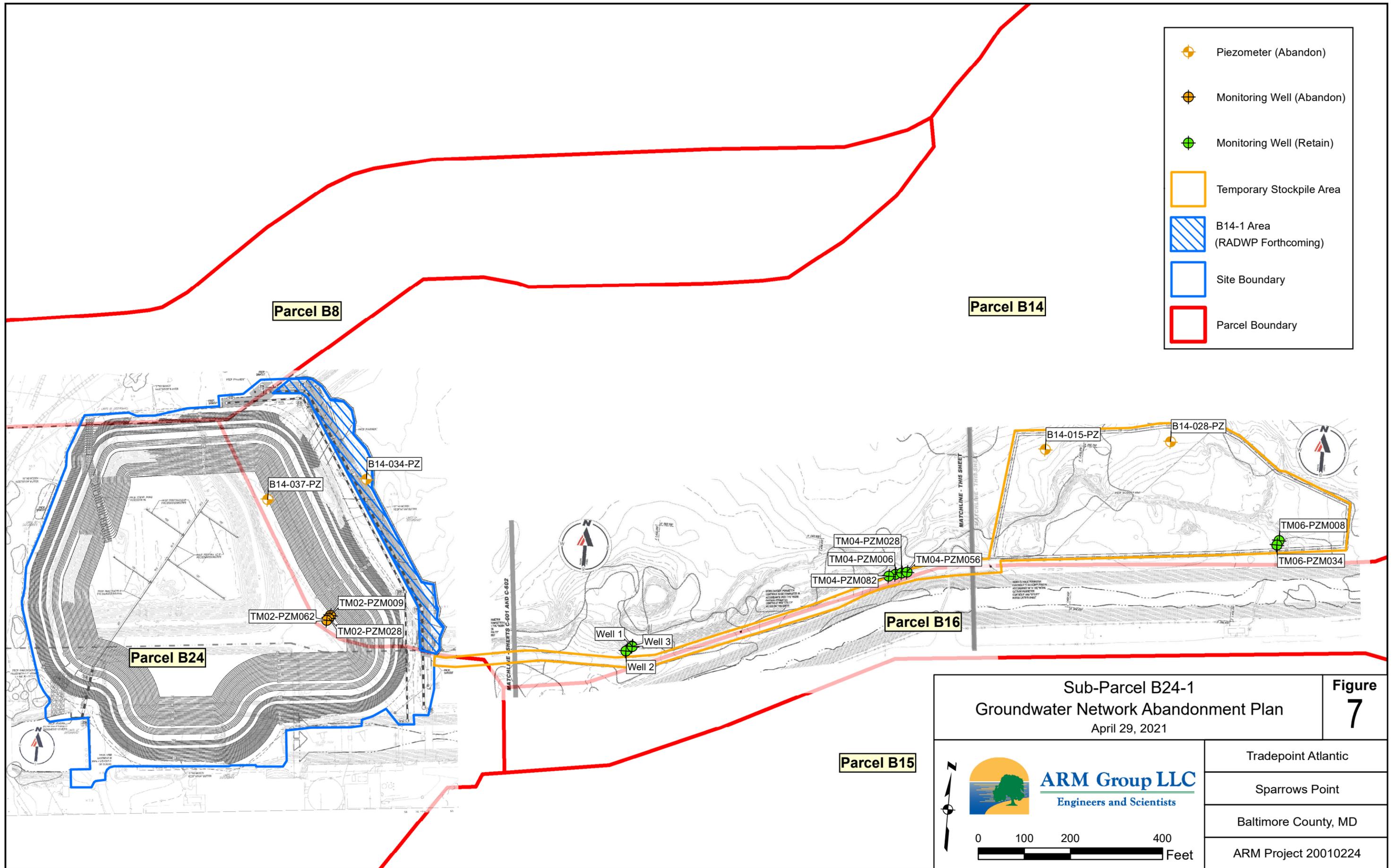
0 50 100 200  
 Feet

Tradepoint Atlantic

Sparrows Point

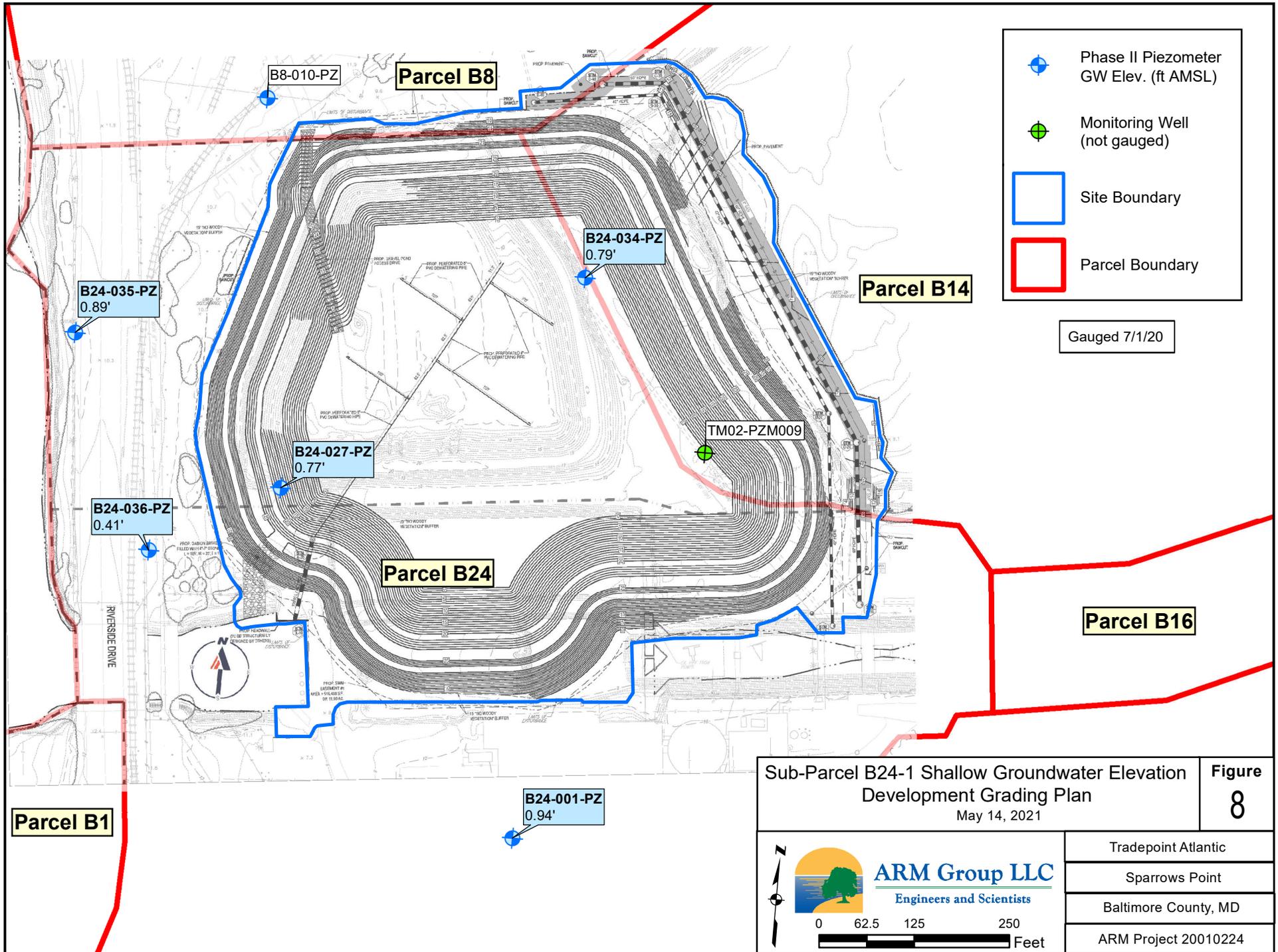
Baltimore County, MD

ARM Project 20010224



-  Piezometer (Abandon)
-  Monitoring Well (Abandon)
-  Monitoring Well (Retain)
-  Temporary Stockpile Area
-  B14-1 Area  
(RADWP Forthcoming)
-  Site Boundary
-  Parcel Boundary

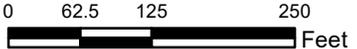
<b>Sub-Parcel B24-1</b> <b>Groundwater Network Abandonment Plan</b> April 29, 2021		<b>Figure</b> <span style="font-size: 2em; font-weight: bold;">7</span>
 <b>ARM Group LLC</b> Engineers and Scientists	Tradepoint Atlantic	
	Sparrows Point	
	Baltimore County, MD	
	ARM Project 20010224	



-  Phase II Piezometer GW Elev. (ft AMSL)
-  Monitoring Well (not gauged)
-  Site Boundary
-  Parcel Boundary

Gauged 7/1/20

Sub-Parcel B24-1 Shallow Groundwater Elevation  
Development Grading Plan  
May 14, 2021 Figure 8

 <b>ARM Group LLC</b> Engineers and Scientists 	Tradepoint Atlantic
	Sparrows Point
	Baltimore County, MD
	ARM Project 20010224

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## **TABLES**

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Table 1 - Sub-Parcel B24-1  
Summary of Organics Detected in Soil

Parameter	Units	PAL	B14-018-SB-1	B14-018-SB-5	B14-032-SB-1	B14-032-SB-8.5	B14-033-SB-1*	B14-034-SB-1	B14-034-SB-5	B24-023-SB-1*	B24-023-SB-5*	B24-024-SB-1*	B24-024-SB-5*	B24-025-SB-1*	B24-025-SB-5*	B24-025-SB-10*	B24-025-SB-15*	B24-026-SB-1*	B24-026-SB-5*	B24-026-SB-10*	
			9/14/2017	9/14/2017	9/6/2017	9/6/2017	9/15/2017	9/6/2017	9/6/2017	9/6/2017	9/6/2017	4/21/2020	4/21/2020	4/21/2020	4/21/2020	4/14/2020	4/14/2020	4/14/2020	4/15/2020	4/14/2020	4/14/2020
<b>Volatile Organic Compounds</b>																					
2-Butanone (MEK)	mg/kg	190,000	N/A	N/A	N/A	0.012 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Acetone	mg/kg	670,000	N/A	N/A	N/A	0.012 UJ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Benzene	mg/kg	5.1	N/A	N/A	N/A	0.006 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Carbon disulfide	mg/kg	3,500	N/A	N/A	N/A	0.006 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Cyclohexane	mg/kg	27,000	N/A	N/A	N/A	0.012 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Ethylbenzene	mg/kg	25	N/A	N/A	N/A	0.006 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Toluene	mg/kg	47,000	N/A	N/A	N/A	0.006 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Semi-Volatile Organic Compounds<sup>^</sup></b>																					
1,1-Biphenyl	mg/kg	200	1.5 U	1.5 U	<b>0.075</b>	0.098 U	0.36 U	2.5 U	0.11 U	<b>0.027 J</b>	<b>0.11</b>	<b>0.022 J</b>	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
1,2,4,5-Tetrachlorobenzene	mg/kg	350	1.5 U	1.5 U	<b>0.029 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2,3,4,6-Tetrachlorophenol	mg/kg	25,000	1.5 U	1.5 U	<b>0.037 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2,4,5-Trichlorophenol	mg/kg	82,000	3.6 U	3.7 U	<b>0.034 J</b>	0.25 U	0.89 U	6.2 U	0.26 U	0.17 U	0.19 U	0.18 U	0.18 U	1.9 U	0.18 U	0.19 U	0.19 U	0.18 U	0.2 U	0.2 U	
2,4,6-Trichlorophenol	mg/kg	210	1.5 U	1.5 U	<b>0.031 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2,4-Dichlorophenol	mg/kg	2,500	1.5 U	1.5 U	<b>0.029 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2,4-Dimethylphenol	mg/kg	16,000	1.5 U	1.5 U	<b>0.028 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2,4-Dinitrophenol	mg/kg	1,600	3.6 U	3.7 U	<b>0.049 J</b>	0.25 R	0.89 U	6.2 R	0.26 R	0.17 U	0.19 U	0.18 U	0.18 U	1.9 U	0.18 U	0.19 U	0.19 U	0.18 U	0.2 U	0.2 U	
2,4-Dinitrotoluene	mg/kg	7.4	1.5 U	1.5 U	<b>0.037 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2,6-Dinitrotoluene	mg/kg	1.5	1.5 U	1.5 U	<b>0.034 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2-Chloronaphthalene	mg/kg	60,000	1.5 U	1.5 U	<b>0.028 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2-Chlorophenol	mg/kg	5,800	1.5 U	1.5 U	<b>0.026 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2-Methylnaphthalene	mg/kg	3,000	<b>0.075</b>	<b>0.23</b>	<b>0.088 J</b>	<b>0.088</b>	<b>0.082 J</b>	<b>0.016 J</b>	<b>0.12 J</b>	<b>0.013 J</b>	<b>0.23</b>	<b>0.22</b>	<b>0.059</b>	<b>0.033</b>	<b>0.029</b>	<b>0.013</b>	<b>0.006 J</b>	<b>0.077 U</b>	<b>0.062</b>	<b>0.028</b>	<b>0.014</b>
2-Methylphenol	mg/kg	41,000	1.5 U	1.5 U	<b>0.03 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
2-Nitroaniline	mg/kg	8,000	3.6 U	3.7 U	<b>0.033 J</b>	0.25 U	0.89 U	6.2 U	0.26 U	0.17 U	0.19 U	0.18 U	0.18 U	1.9 U	0.18 U	0.19 U	0.19 U	0.18 U	0.2 U	0.2 U	
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	2.9 U	3 U	<b>0.03 J</b>	0.2 U	0.71 U	5 U	0.21 U	0.14 U	0.15 U	0.14 U	0.14 U	1.5 U	0.15 U	0.15 U	0.15 U	0.15 U	0.16 U	0.16 U	
3,3'-Dichlorobenzidine	mg/kg	5.1	1.5 U	1.5 UJ	0.073 U	0.098 U	0.36 U	2.5 U	0.11 UJ	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
Acenaphthene	mg/kg	45,000	<b>0.24</b>	<b>0.2</b>	<b>0.08</b>	<b>0.0022 J</b>	0.073 U	0.25 U	0.11 U	<b>0.025</b>	<b>0.026</b>	<b>0.049</b>	<b>0.0048 J</b>	<b>0.012</b>	<b>0.0025 J</b>	<b>0.0018 J</b>	<b>0.0069 J</b>	<b>0.012</b>	<b>0.0066 J</b>	<b>0.0048 J</b>	
Acenaphthylene	mg/kg	45,000	<b>0.083</b>	<b>0.53</b>	<b>0.075</b>	<b>0.024</b>	<b>0.013 J</b>	0.27	<b>0.0098 J</b>	<b>0.045</b>	<b>0.09</b>	<b>0.066</b>	<b>0.012</b>	<b>0.18</b>	<b>0.017</b>	<b>0.012</b>	<b>0.0076 J</b>	<b>0.063</b>	<b>0.082</b>	<b>0.045</b>	
Acetophenone	mg/kg	120,000	1.5 U	1.5 U	<b>0.031 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
Anthracene	mg/kg	230,000	<b>0.21</b>	<b>1.4</b>	<b>0.16</b>	<b>0.023</b>	<b>0.013 J</b>	<b>0.21 J</b>	<b>0.04 J</b>	<b>0.029</b>	<b>0.077</b>	<b>0.093</b>	<b>0.026</b>	<b>0.24</b>	<b>0.054</b>	<b>0.013</b>	<b>0.025 J</b>	<b>0.098</b>	<b>0.14</b>	<b>0.073</b>	
Benzo[a]anthracene	mg/kg	21	<b>1.3</b>	<b>3.7</b>	<b>0.58</b>	<b>0.1</b>	<b>0.089</b>	<b>0.12 J</b>	<b>0.04 J</b>	<b>0.21</b>	<b>0.38</b>	<b>0.33</b>	<b>0.13</b>	<b>1.7</b>	<b>0.088</b>	<b>0.087</b>	<b>0.074 J</b>	<b>0.39</b>	<b>0.95</b>	<b>0.33</b>	
Benzaldehyde	mg/kg	120,000	1.5 R	1.5 R	<b>0.028 J</b>	0.098 R	0.36 U	<b>2.5 R</b>	<b>0.1 J</b>	0.069 U	<b>0.017 J</b>	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
Benzo[a]pyrene	mg/kg	2.1	<b>2.3</b>	<b>3.8</b>	<b>0.73</b>	<b>0.11</b>	<b>0.097</b>	<b>0.088 J</b>	<b>0.018 J</b>	<b>0.35</b>	<b>0.47</b>	<b>0.44</b>	<b>0.11</b>	<b>1.6</b>	<b>0.087</b>	<b>0.084</b>	<b>0.057 J</b>	<b>0.39</b>	<b>0.79</b>	<b>0.28</b>	
Benzo[b]fluoranthene	mg/kg	21	<b>3.8</b>	<b>8.9</b>	<b>0.87</b>	<b>0.18</b>	<b>0.18</b>	<b>0.11 J</b>	<b>0.052 J</b>	<b>0.44</b>	<b>0.68</b>	<b>0.52</b>	<b>0.18</b>	<b>2.4</b>	<b>0.16</b>	<b>0.15</b>	<b>0.14</b>	<b>0.66</b>	<b>1.5</b>	<b>0.51</b>	
Benzo[g,h,i]perylene	mg/kg		<b>1.6</b>	<b>2.9</b>	<b>0.54</b>	<b>0.066</b>	<b>0.054 J</b>	<b>0.27</b>	<b>0.039 J</b>	<b>0.26</b>	<b>0.4</b>	<b>0.41</b>	<b>0.067</b>	<b>0.77</b>	<b>0.067</b>	<b>0.05</b>	<b>0.044 J</b>	<b>0.21</b>	<b>0.43</b>	<b>0.13</b>	
Benzo[k]fluoranthene	mg/kg	210	<b>3</b>	<b>6.9</b>	<b>0.32</b>	<b>0.16</b>	<b>0.14</b>	<b>0.093 J</b>	<b>0.046 J</b>	<b>0.11</b>	<b>0.2</b>	<b>0.2</b>	<b>0.057</b>	<b>1</b>	<b>0.061</b>	<b>0.052</b>	<b>0.11</b>	<b>0.25</b>	<b>0.53</b>	<b>0.17</b>	
bis(2-chloroethoxy)methane	mg/kg	2,500	1.5 U	1.5 U	<b>0.027 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
bis(2-Chloroethyl)ether	mg/kg	1	1.5 U	1.5 U	<b>0.022 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
bis(2-Chloroisopropyl)ether	mg/kg	22	1.5 U	1.5 U	<b>0.024 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.069 U	0.075 U	0.072 U	0.07 U	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
bis(2-Ethylhexyl)phthalate	mg/kg	160	1.5 U	1.5 UJ	<b>0.041 J</b>	0.098 U	0.36 U	2.5 U	<b>0.14 J</b>	<b>0.13</b>	<b>0.037 J</b>	<b>0.022 J</b>	<b>0.021 J</b>	0.74 U	<b>0.1</b>	<b>0.07 J</b>	0.076 U	<b>0.063 J</b>	<b>0.04 J</b>	<b>0.047 J</b>	
Caprolactam	mg/kg	400,000	3.6 U	3.7 U	<b>0.039 J</b>	0.25 U	0.89 U	6.2 U	0.26 U	<b>0.032 J</b>	<b>0.03 J</b>	0.18 U	<b>0.023 J</b>	1.9 U	<b>0.029 J</b>	<b>0.028 J</b>	0.19 U	0.18 U	0.2 U	0.2 U	
Carbazole	mg/kg	1.5 U	<b>0.7 J</b>	<b>0.088</b>	0.098 U	0.36 U	2.5 U	0.11 U	<b>0.022 J</b>	<b>0.044 J</b>	0.072 U	<b>0.02 J</b>	0.74 U	<b>0.021 J</b>	0.077 U	<b>0.035 J</b>	<b>0.15</b>	<b>0.12</b>	<b>0.044 J</b>		
Chrysene	mg/kg	2,100	<b>1.3</b>	<b>3.9</b>	<b>0.51</b>	<b>0.1</b>	<b>0.085</b>	<b>0.053 J</b>	<b>0.021 J</b>	<b>0.2</b>	<b>0.42</b>	<b>0.34</b>	<b>0.13</b>	<b>1.8</b>	<b>0.11</b>	<b>0.1</b>	<b>0.078</b>	<b>0.39</b>	<b>0.96</b>	<b>0.35</b>	
Dibenz[a,h]anthracene	mg/kg	2.1	<b>0.42</b>	<b>0.82</b>	<b>0.16</b>	<b>0.023</b>	<b>0.017 J</b>	0.25 U	0.11 U	<b>0.076</b>	<b>0.12</b>	<b>0.11</b>	<b>0.023</b>	<b>0.36</b>	<b>0.024</b>	0.077 U	<b>0.087</b>	<b>0.2</b>	<b>0.06</b>		
Diethylphthalate	mg/kg	660,000	1.5 U	1.5 U	<b>0.041 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	<b>0.021 J</b>	<b>0.016 J</b>	0.072 U	0.07 U	0.74 U	<b>0.02 J</b>	<b>0.016 J</b>	0.076 U	0.073 U	0.079 U	0.079 U	
Di-n-butylphthalate	mg/kg	82,000	1.5 U	1.5 U	<b>0.043 J</b>	0.098 U	0.36 U	2.5 U	0.11 U	0.065 B	0.058 B	0.041 B	0.065 B	0.74 U	<b>0.093</b>	<b>0.071 J</b>	<b>0.049 J</b>	<b>0.06 J</b>	<b>0.047 J</b>	<b>0.048 J</b>	
Di-n-octylphthalate	mg/kg	8,200	1.5 U	1.5 UJ	<b>0.085 J</b>	0.098 U	0.36 U	2.5 UJ	0.11 UJ	0.069 U	<b>0.093</b>	0.072 U	<b>0.026 J</b>	0.74 U	0.073 U	0.077 U	0.076 U	0.073 U	0.079 U	0.079 U	
Fluoranthene	mg/kg	30,000	<b>1.6</b>	<b>7.1</b>	<b>0.86</b>	<b>0.12</b>	<b>0.86</b>	<b>0.13</b>	<b>0.081 J</b>	<b>0.022 J</b>	<b>0.21</b>	<b>0.46</b>	<b>0.52</b>	<b>0.21</b>	<b>1.9</b>	<b>0.12</b>	<b>0.14</b>	<b>0.13</b>	<b>0.62</b>	<b>1.4</b>	<b>0.49</b>
Fluorene	mg/kg	30,000	<																		

Table 1 - Sub-Parcel B24-1  
Summary of Organics Detected in Soil

Parameter	Units	PAL	B24-026-SB-16*	B24-027-SB-1*	B24-027-SB-5*	B24-028-SB-1*	B24-028-SB-5*	B24-029-SB-1 (O&G Rerun) 4/20/2020	B24-029-SB-1 4/20/2020	B24-029-SB-9 4/20/2020	B24-034-SB-1*	B24-034-SB-5*	B24-037-SB-1*	B24-037-SB-8*	B24-037-SB-10*	B24-037-SB-12*
			4/14/2020	4/16/2020	4/16/2020	4/21/2020	4/21/2020				4/21/2020	4/21/2020	4/16/2020	4/16/2020	4/16/2020	4/16/2020
<b>Volatile Organic Compounds</b>																
2-Butanone (MEK)	mg/kg	190,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.011 U	N/A	N/A	N/A	<b>0.02</b>	N/A	N/A
Acetone	mg/kg	670,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0069 B	N/A	N/A	N/A	<b>0.012 J</b>	N/A	N/A
Benzene	mg/kg	5.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0057 U	N/A	N/A	N/A	<b>0.0024 J</b>	N/A	N/A
Carbon disulfide	mg/kg	3,500	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0057 U	N/A	N/A	N/A	<b>0.0039 J</b>	N/A	N/A
Cyclohexane	mg/kg	27,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.011 U	N/A	N/A	N/A	<b>0.013</b>	N/A	N/A
Ethylbenzene	mg/kg	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0057 U	N/A	N/A	N/A	<b>0.0019 J</b>	N/A	N/A
Toluene	mg/kg	47,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0057 U	N/A	N/A	N/A	<b>0.0032 J</b>	N/A	N/A
<b>Semi-Volatile Organic Compounds^</b>																
1,1-Biphenyl	mg/kg	200	0.072 U	0.7 U	<b>2.1</b>	<b>0.21</b>	<b>0.047 J</b>	N/A	0.75 U	0.72 U	0.75 U	<b>0.051 J</b>	0.72 U	0.73 U	0.71 U	0.73 U
1,2,4,5-Tetrachlorobenzene	mg/kg	350	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2,3,4,6-Tetrachlorophenol	mg/kg	25,000	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2,4,5-Trichlorophenol	mg/kg	82,000	0.18 U	1.8 U	1.8 U	0.18 U	0.18 U	N/A	1.9 U	1.8 U	1.9 U	0.18 U	1.8 U	1.8 U	1.8 U	1.8 U
2,4,6-Trichlorophenol	mg/kg	210	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2,4-Dichlorophenol	mg/kg	2,500	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2,4-Dimethylphenol	mg/kg	16,000	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2,4-Dinitrophenol	mg/kg	1,600	0.18 U	1.8 U	1.8 U	0.18 U	0.18 U	N/A	1.9 U	1.8 U	1.9 U	0.18 U	1.8 U	1.8 U	1.8 U	1.8 U
2,4-Dinitrotoluene	mg/kg	7.4	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2,6-Dinitrotoluene	mg/kg	1.5	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2-Chloronaphthalene	mg/kg	60,000	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2-Chlorophenol	mg/kg	5,800	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2-Methylnaphthalene	mg/kg	3,000	0.0073 U	<b>0.041 J</b>	<b>0.14</b>	<b>0.15</b>	<b>0.28</b>	N/A	<b>0.031</b>	<b>0.14</b>	<b>0.18</b>	<b>0.1</b>	<b>0.097</b>	<b>0.024 J</b>	0.07 U	<b>0.044 J</b>
2-Methylphenol	mg/kg	41,000	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
2-Nitroaniline	mg/kg	8,000	0.18 U	1.8 U	1.8 U	0.18 U	0.18 U	N/A	1.9 U	1.8 U	1.9 U	0.18 U	1.8 U	1.8 U	1.8 U	1.8 U
3&4-Methylphenol(m&p Cresol)	mg/kg	41,000	0.14 U	1.4 U	1.4 U	0.15 U	0.15 U	N/A	1.5 U	1.4 U	1.5 U	0.14 U	1.4 U	1.5 U	1.4 U	1.5 U
3,3'-Dichlorobenzidine	mg/kg	5.1	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	<b>0.016 J</b>	0.72 U	0.73 U	<b>0.18 J</b>	0.73 U
Acenaphthene	mg/kg	45,000	<b>0.0093 J</b>	<b>0.057 J</b>	<b>0.23</b>	<b>0.1</b>	<b>0.13</b>	N/A	<b>0.12</b>	<b>0.024</b>	<b>0.066</b>	<b>0.082</b>	<b>0.014 J</b>	<b>0.018 J</b>	<b>0.023 J</b>	<b>0.057 J</b>
Acenaphthylene	mg/kg	45,000	<b>0.0029 J</b>	<b>0.06 J</b>	<b>0.035 J</b>	<b>0.14</b>	<b>0.11</b>	N/A	<b>0.051</b>	<b>0.033</b>	<b>0.059</b>	<b>0.13</b>	<b>0.083</b>	<b>0.028 J</b>	<b>0.026 J</b>	<b>0.033 J</b>
Acetophenone	mg/kg	120,000	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Anthracene	mg/kg	230,000	<b>0.0052 J</b>	<b>0.12</b>	<b>0.23</b>	<b>0.14</b>	<b>0.33</b>	N/A	<b>0.26</b>	<b>0.077</b>	<b>0.084</b>	<b>0.53</b>	<b>0.094</b>	<b>0.11</b>	<b>0.035 J</b>	<b>0.19</b>
Benzo[a]anthracene	mg/kg	21	<b>0.019</b>	<b>0.44</b>	<b>1.3</b>	<b>0.69</b>	<b>1.2</b>	N/A	<b>1.5</b>	<b>0.16</b>	<b>0.52</b>	<b>0.66</b>	<b>0.38</b>	<b>0.41</b>	<b>0.13</b>	<b>0.32</b>
Benzaldehyde	mg/kg	120,000	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Benzo[a]pyrene	mg/kg	2.1	<b>0.016</b>	<b>0.72</b>	<b>2.5</b>	<b>0.82</b>	<b>1.1</b>	N/A	<b>1.4</b>	<b>0.17</b>	<b>0.68</b>	<b>0.9</b>	<b>0.44</b>	<b>0.42</b>	<b>0.15</b>	<b>0.26</b>
Benzo[b]fluoranthene	mg/kg	21	<b>0.032</b>	<b>1.4</b>	<b>3.9</b>	<b>1.1</b>	<b>1.4</b>	N/A	<b>2.1</b>	<b>0.26</b>	<b>0.88</b>	<b>1.2</b>	<b>0.97</b>	<b>1</b>	<b>0.59</b>	<b>0.49</b>
Benzo[g,h,i]perylene	mg/kg	1	<b>0.0081</b>	<b>0.2</b>	<b>1.5</b>	<b>0.6</b>	<b>0.1</b>	N/A	<b>1</b>	<b>0.1</b>	<b>0.46</b>	<b>0.59</b>	<b>0.2</b>	<b>0.1</b>	<b>0.063 J</b>	<b>0.14</b>
Benzo[k]fluoranthene	mg/kg	210	<b>0.0089</b>	<b>1.1</b>	<b>3</b>	<b>0.33</b>	<b>0.51</b>	N/A	<b>0.51</b>	<b>0.061</b>	<b>0.29</b>	<b>0.39</b>	<b>0.75</b>	<b>0.77</b>	<b>0.46</b>	<b>0.38</b>
bis(2-chloroethoxy)methane	mg/kg	2,500	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
bis(2-Chloroethyl)ether	mg/kg	1	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
bis(2-Chloroisopropyl)ether	mg/kg	22	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
bis(2-Ethylhexyl)phthalate	mg/kg	160	<b>0.077</b>	0.7 U	0.71 U	<b>0.028 J</b>	<b>0.028 J</b>	N/A	0.75 U	0.72 U	0.75 U	<b>0.032 J</b>	0.72 U	0.73 U	0.71 U	0.73 U
Caprolactam	mg/kg	400,000	<b>0.035 J</b>	1.8 U	1.8 U	0.18 U	<b>0.028 J</b>	N/A	1.9 U	1.8 U	1.9 U	<b>0.027 J</b>	1.8 U	1.8 U	1.8 U	1.8 U
Carbazole	mg/kg	0.072 U	0.7 U	0.71 U	<b>0.072 J</b>	<b>0.065 J</b>	N/A	0.75 U	0.72 U	0.75 U	<b>0.11</b>	0.72 U	0.73 U	0.71 U	0.73 U	
Chrysene	mg/kg	2,100	<b>0.021</b>	<b>0.42</b>	<b>1.2</b>	<b>0.62</b>	<b>0.92</b>	N/A	<b>1.3</b>	<b>0.17</b>	<b>0.5</b>	<b>0.79</b>	<b>0.41</b>	<b>0.44</b>	<b>0.31</b>	<b>0.37</b>
Dibenz[a,h]anthracene	mg/kg	2.1	<b>0.0036 J</b>	<b>0.086</b>	<b>0.46</b>	<b>0.18</b>	<b>0.21</b>	N/A	<b>0.3</b>	<b>0.034</b>	<b>0.13</b>	<b>0.18</b>	<b>0.088</b>	<b>0.049 J</b>	<b>0.029 J</b>	<b>0.045 J</b>
Diethylphthalate	mg/kg	660,000	<b>0.02 J</b>	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Di-n-butylphthalate	mg/kg	82,000	<b>0.078</b>	0.7 U	0.71 U	0.072 B	0.058 B	N/A	0.75 U	0.72 U	0.75 U	<b>0.09</b>	0.72 U	0.73 U	0.71 U	0.73 U
Di-n-octylphthalate	mg/kg	8,200	0.072 U	0.7 U	0.71 U	0.073 U	<b>0.027 J</b>	N/A	0.75 U	0.72 U	0.75 U	<b>0.073</b>	0.72 U	0.73 U	0.71 U	0.73 U
Fluoranthene	mg/kg	30,000	<b>0.029</b>	<b>0.62</b>	<b>1.5</b>	<b>0.72</b>	<b>1.9</b>	N/A	<b>2.4</b>	<b>0.25</b>	<b>0.68</b>	<b>1.2</b>	<b>0.48</b>	<b>0.78</b>	<b>0.21</b>	<b>0.93</b>
Fluorene	mg/kg	30,000	<b>0.00095 J</b>	<b>0.047 J</b>	<b>0.051 J</b>	<b>0.038</b>	<b>0.027 J</b>	N/A	<b>0.093</b>	<b>0.035</b>	<b>0.024</b>	<b>0.051</b>	<b>0.015 J</b>	<b>0.036 J</b>	<b>0.02 J</b>	<b>0.075</b>
Hexachlorobenzene	mg/kg	0.96	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Hexachlorobutadiene	mg/kg	5.3	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Hexachlorocyclopentadiene	mg/kg	7.5	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Hexachloroethane	mg/kg	8	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Indeno[1,2,3-c,d]pyrene	mg/kg	21	<b>0.0093</b>	<b>0.23</b>	<b>1.5</b>	<b>0.72</b>	<b>0.91</b>	N/A	<b>0.84</b>	<b>0.12</b>	<b>0.51</b>	<b>0.84</b>	<b>0.21</b>	<b>0.1</b>	<b>0.05 J</b>	<b>0.14</b>
Isophorone	mg/kg	2,400	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Naphthalene	mg/kg	8.6	<b>0.0032 J</b>	<b>0.094</b>	<b>0.78</b>	<b>0.55</b>	<b>0.85</b>	N/A	<b>0.048</b>	<b>0.75</b>	<b>0.69</b>	<b>0.36</b>	<b>0.073</b>	<b>0.026 J</b>	<b>0.018 J</b>	<b>0.075</b>
Nitrobenzene	mg/kg	22	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
N-Nitroso-di-n-propylamine	mg/kg	0.33	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
N-Nitrosodiphenylamine	mg/kg	470	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.75 U	0.72 U	0.75 U	0.072 U	0.72 U	0.73 U	0.71 U	0.73 U
Pentachlorophenol	mg/kg	4	0.18 U	1.8 U	1.8 U	0.18 U	0.18 U	N/A	1.9 U	1.8 U	1.9 U	0.18 U	1.8 U	1.8 U	1.8 U	1.8 U
Phenanthrene	mg/kg	<b>0.018</b>	<b>0.37</b>	<b>0.79</b>	<b>0.43</b>	<b>1.5</b>	<b>1.5</b>	N/A	<b>1</b>	<b>0.27</b>	<b>0.35</b>	<b>0.53</b>	<b>0.14</b>	<b>0.42</b>	<b>0.12</b>	<b>0.6</b>
Phenol	mg/kg	250,000	0.072 U	0.7 U	0.71 U	0.073 U	0.073 U	N/A	0.							

**Table 2 - Sub-Parcel B24-1  
Summary of Inorganics Detected in Soil**

Parameter	Units	PAL	B14-018-SB-1	B14-018-SB-5	B14-032-SB-1	B14-032-SB-8.5	B14-033-SB-1*	B14-034-SB-1	B14-034-SB-5	B24-023-SB-1*
			9/14/2017	9/14/2017	9/6/2017	9/6/2017	9/15/2017	9/6/2017	9/6/2017	4/21/2020
<b>Metals</b>										
Aluminum	mg/kg	1,100,000	<b>10,500</b>	<b>8,760</b>	<b>13,200</b>	<b>21,800</b>	<b>23,200</b>	<b>4,580</b>	<b>11,800</b>	<b>10,400</b>
Antimony	mg/kg	470	2.6 UJ	2.7 UJ	2.6 UJ	3.5 UJ	2.5 U	4.4 UJ	3.6 UJ	3 U
Arsenic	mg/kg	3	<b>5.2</b>	<b>5.6</b>	<b>2.4</b>	<b>10.8</b>	<b>1.7 J</b>	<b>46</b>	<b>20.2</b>	<b>3.5</b>
Barium	mg/kg	220,000	<b>176 J</b>	<b>193 J</b>	<b>135 J</b>	<b>58.3 J</b>	<b>143</b>	<b>381 J</b>	<b>90.2 J</b>	<b>111</b>
Beryllium	mg/kg	2,300	0.52 B	0.36 B	<b>1.2</b>	<b>1.2</b>	<b>2.3</b>	1.5 U	<b>3.2</b>	<b>0.89 J</b>
Cadmium	mg/kg	980	<b>1.1 J</b>	<b>1.7</b>	<b>1.3</b>	1.7 U	<b>0.85 J</b>	<b>109</b>	<b>45.8</b>	<b>1.8</b>
Chromium	mg/kg	120,000	<b>622 J</b>	<b>751</b>	<b>915</b>	<b>50.9</b>	<b>115</b>	<b>6,240</b>	<b>7,270</b>	<b>916</b>
Chromium VI	mg/kg	6.3	0.6 B	0.51 B	0.71 B	0.8 B	0.64 B	1.7 B	1.1 B	<b>0.55 J</b>
Cobalt	mg/kg	350	<b>9.1</b>	<b>10.9</b>	<b>10.3</b>	<b>11.5</b>	<b>15</b>	<b>25.9</b>	<b>35</b>	<b>14.4</b>
Copper	mg/kg	47,000	<b>79.7</b>	<b>104</b>	<b>57.3 J</b>	<b>22.7 J</b>	<b>21.1</b>	<b>841 J</b>	<b>386 J</b>	<b>67</b>
Iron	mg/kg	820,000	<b>124,000</b>	<b>164,000</b>	<b>128,000</b>	<b>37,800</b>	<b>30,900</b>	<b>318,000</b>	<b>233,000</b>	<b>134,000</b>
Lead	mg/kg	800	<b>148 J</b>	<b>273</b>	<b>88.7 J</b>	<b>27 J</b>	<b>45</b>	<b>1,010 J</b>	<b>627 J</b>	<b>204</b>
Manganese	mg/kg	26,000	<b>16,000</b>	<b>14,100</b>	<b>24,800</b>	<b>485</b>	<b>1,230</b>	<b>2,970</b>	<b>1,580</b>	<b>20,100</b>
Mercury	mg/kg	350	<b>0.083 J</b>	<b>0.17</b>	<b>0.059 J</b>	<b>0.071 J</b>	<b>0.026 J</b>	<b>1.1</b>	<b>0.83</b>	<b>0.15</b>
Nickel	mg/kg	22,000	<b>41.9</b>	<b>174 J</b>	<b>38.7</b>	<b>26.8</b>	<b>92.5</b>	<b>339</b>	<b>180</b>	<b>41.6</b>
Selenium	mg/kg	5,800	3.5 U	3.6 U	3.5 U	4.7 U	3.3 U	<b>3.6 J</b>	4.8 U	3.9 U
Silver	mg/kg	5,800	<b>43.4 J</b>	<b>29.7 J</b>	<b>63.2 J</b>	<b>2.9 J</b>	<b>9.8</b>	<b>12.9 J</b>	<b>8.2 J</b>	3 U
Thallium	mg/kg	12	8.8 U	8.9 U	8.8 U	11.6 U	8.3 U	14.7 U	12 U	<b>7.6 J</b>
Vanadium	mg/kg	5,800	<b>1,650 J</b>	<b>1,430</b>	<b>2,070</b>	<b>73.6</b>	<b>47.8</b>	<b>67.4</b>	<b>46.4</b>	<b>2,220</b>
Zinc	mg/kg	350,000	<b>300</b>	<b>490</b>	<b>276</b>	<b>149</b>	<b>236</b>	<b>21,400</b>	<b>10,400</b>	<b>621</b>
<b>Other</b>										
Cyanide	mg/kg	150	<b>0.81 J-</b>	<b>1.2 J-</b>	<b>1.6</b>	1.2 U	<b>0.27 J</b>	<b>12.9</b>	<b>11.3</b>	<b>2.3</b>

**Detections in bold**

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

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\*indicates non-validated data

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

R: The result for this analyte is unreliable. Additional data is needed to confirm or disprove the presence of this analyte in the sample.

**Table 2 - Sub-Parcel B24-1  
Summary of Inorganics Detected in Soil**

Parameter	Units	PAL	B24-023-SB-5*	B24-024-SB-1*	B24-024-SB-5*	B24-025-SB-1*	B24-025-SB-5*	B24-025-SB-10*	B24-025-SB-15*	B24-026-SB-1*
			4/21/2020	4/21/2020	4/21/2020	4/14/2020	4/14/2020	4/14/2020	4/15/2020	4/14/2020
<b>Metals</b>										
Aluminum	mg/kg	1,100,000	<b>6,630</b>	<b>21,700</b>	<b>9,430</b>	<b>8,190</b>	<b>7,730</b>	<b>7,950</b>	<b>14,800</b>	<b>13,900</b>
Antimony	mg/kg	470	3.1 U	3 U	2.9 U	3.2 U	3 U	3.2 U	3.5 U	3.2 U
Arsenic	mg/kg	3	<b>3.8</b>	2.5 U	2.4 U	2.6 U	<b>9.3</b>	<b>5.4</b>	<b>4.9</b>	<b>9.2</b>
Barium	mg/kg	220,000	<b>77.8</b>	<b>256</b>	<b>162</b>	<b>79.2</b>	<b>151</b>	<b>106</b>	<b>305</b>	<b>191</b>
Beryllium	mg/kg	2,300	<b>0.44 J</b>	<b>2.5</b>	<b>0.68 J</b>	<b>0.56 J</b>	<b>0.38 J</b>	<b>0.46 J</b>	<b>1.1 J</b>	<b>1.4</b>
Cadmium	mg/kg	980	<b>1.4 J</b>	<b>1.1 J</b>	<b>2.2</b>	<b>1.3 J</b>	<b>2.6</b>	<b>3.4</b>	<b>4.6</b>	<b>1.7</b>
Chromium	mg/kg	120,000	<b>503</b>	<b>839</b>	<b>1,100</b>	<b>518</b>	<b>416</b>	<b>386</b>	<b>264</b>	<b>188</b>
Chromium VI	mg/kg	6.3	<b>0.65 J</b>	<b>0.67 J</b>	<b>0.95 J</b>	<b>0.66 J</b>	<b>0.73 J</b>	<b>0.84 J</b>	<b>0.81 J</b>	1.1 U
Cobalt	mg/kg	350	<b>10.5</b>	<b>8.6</b>	<b>9.4</b>	<b>4.4 J</b>	<b>6.3</b>	<b>7.6</b>	<b>4.6 J</b>	<b>19.3</b>
Copper	mg/kg	47,000	<b>151</b>	<b>2,180</b>	<b>91.9</b>	<b>43.6</b>	<b>69.6</b>	<b>70.6</b>	<b>57.5</b>	<b>126</b>
Iron	mg/kg	820,000	<b>111,000</b>	<b>129,000</b>	<b>131,000</b>	<b>108,000</b>	<b>128,000</b>	<b>127,000</b>	<b>72,700</b>	<b>60,300</b>
Lead	mg/kg	800	<b>201</b>	<b>172</b>	<b>150</b>	<b>158</b>	<b>489</b>	<b>305</b>	<b>293</b>	<b>176</b>
Manganese	mg/kg	26,000	<b>11,900</b>	<b>16,400</b>	<b>51,900</b>	<b>10,800</b>	<b>8,410</b>	<b>9,000</b>	<b>8,190</b>	<b>14,100</b>
Mercury	mg/kg	350	<b>0.11 J</b>	<b>0.049 J</b>	<b>0.029 J</b>	<b>0.034 J</b>	<b>0.14</b>	<b>0.14</b>	<b>0.053 J</b>	<b>0.18</b>
Nickel	mg/kg	22,000	<b>34.7</b>	<b>39.1</b>	<b>33.9</b>	<b>26.4</b>	<b>33.6</b>	<b>39.6</b>	<b>22</b>	<b>47.1</b>
Selenium	mg/kg	5,800	4.1 U	4 U	3.9 U	4.2 U	4 U	4.3 U	4.6 U	4.3 U
Silver	mg/kg	5,800	3.1 U	3 U	2.9 U	3.2 U	3 U	3.2 U	3.5 U	3.2 U
Thallium	mg/kg	12	<b>4.6 J</b>	<b>3.5 J</b>	9.7 U	10.6 U	10.1 U	10.6 U	11.6 U	10.7 U
Vanadium	mg/kg	5,800	<b>1,240</b>	<b>1,500</b>	<b>2,600</b>	<b>570</b>	<b>394</b>	<b>380</b>	<b>290</b>	<b>173</b>
Zinc	mg/kg	350,000	<b>945</b>	<b>257</b>	<b>348</b>	<b>372</b>	<b>1,010</b>	<b>649</b>	<b>554</b>	<b>552</b>
<b>Other</b>										
Cyanide	mg/kg	150	<b>1.4</b>	<b>1.1 J</b>	<b>0.81 J</b>	<b>0.63 J</b>	<b>0.73 J</b>	<b>1.2</b>	<b>1.1</b>	<b>1.5</b>

**Detections in bold**

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**Table 2 - Sub-Parcel B24-1  
Summary of Inorganics Detected in Soil**

Parameter	Units	PAL	B24-026-SB-5*	B24-026-SB-10*	B24-026-SB-16*	B24-027-SB-1*	B24-027-SB-5*	B24-028-SB-1*	B24-028-SB-5*	B24-029-SB-1
			4/14/2020	4/14/2020	4/14/2020	4/16/2020	4/16/2020	4/21/2020	4/21/2020	4/20/2020
<b>Metals</b>										
Aluminum	mg/kg	1,100,000	<b>12,400</b>	<b>14,200</b>	<b>18,500</b>	<b>10,800</b>	<b>7,960</b>	<b>9,010</b>	<b>6,580</b>	<b>12,800</b>
Antimony	mg/kg	470	3.3 U	3.5 U	3.3 U	3 U	3 U	3 U	3 U	3 UJ
Arsenic	mg/kg	3	<b>11.8</b>	<b>6.4</b>	2.8 U	2.5 U	2.5 U	<b>4.4</b>	2.5 U	<b>37.3</b>
Barium	mg/kg	220,000	<b>145</b>	<b>75</b>	<b>200</b>	<b>161</b>	<b>128</b>	<b>118</b>	<b>142</b>	<b>209</b>
Beryllium	mg/kg	2,300	<b>0.68 J</b>	<b>0.61 J</b>	<b>2.6</b>	<b>0.85 J</b>	<b>0.36 J</b>	<b>0.72 J</b>	<b>0.71 J</b>	<b>1.8</b>
Cadmium	mg/kg	980	<b>8.1</b>	<b>4.8</b>	<b>2</b>	<b>1.3 J</b>	<b>1.1 J</b>	<b>4.4</b>	<b>0.54 J</b>	1.5 U
Chromium	mg/kg	120,000	<b>146</b>	<b>90.6</b>	<b>409</b>	<b>646</b>	<b>1,080</b>	<b>987</b>	<b>1,560</b>	<b>34.3</b>
Chromium VI	mg/kg	6.3	1.2 U	<b>0.64 J</b>	<b>0.62 J</b>	1.1 U	<b>0.81 J</b>	1.1 U	<b>0.94 J</b>	1.1 R
Cobalt	mg/kg	350	<b>14.3</b>	<b>8</b>	<b>9.2</b>	<b>9.1</b>	<b>9.6</b>	<b>10.8</b>	<b>4.3 J</b>	<b>10.5</b>
Copper	mg/kg	47,000	<b>143</b>	<b>44.5</b>	<b>33</b>	<b>56.2</b>	<b>59</b>	<b>83.9</b>	<b>42.5</b>	<b>45.7</b>
Iron	mg/kg	820,000	<b>54,700</b>	<b>57,700</b>	<b>54,700</b>	<b>118,000</b>	<b>183,000</b>	<b>145,000</b>	<b>166,000</b>	<b>29,000</b>
Lead	mg/kg	800	<b>750</b>	<b>230</b>	<b>98.3</b>	<b>84.3</b>	<b>86.7</b>	<b>240</b>	<b>37.6</b>	<b>31.5</b>
Manganese	mg/kg	26,000	<b>2,970</b>	<b>1,810</b>	<b>3,370</b>	<b>16,800</b>	<b>25,700</b>	<b>18,600</b>	<b>30,700</b>	<b>651</b>
Mercury	mg/kg	350	<b>0.1 J</b>	<b>0.081 J</b>	0.11 U	<b>0.081 J</b>	<b>0.054 J</b>	<b>0.09 J</b>	<b>0.13</b>	<b>0.012 J</b>
Nickel	mg/kg	22,000	<b>53.8</b>	<b>26.4</b>	<b>36.1</b>	<b>24.7</b>	<b>26.4</b>	<b>52</b>	<b>13.3</b>	<b>22.1</b>
Selenium	mg/kg	5,800	4.4 U	4.7 U	4.4 U	4 U	3.9 U	4 U	4 U	4 U
Silver	mg/kg	5,800	3.3 U	3.5 U	3.3 U	3 U	3 U	3 U	3 U	3 U
Thallium	mg/kg	12	11.1 U	11.7 U	11.1 U	9.9 U	9.9 U	<b>9.6 J</b>	<b>17.1</b>	10.1 U
Vanadium	mg/kg	5,800	<b>273</b>	<b>82.4</b>	<b>144</b>	<b>1,430</b>	<b>2,480</b>	<b>2,280</b>	<b>4,250</b>	<b>75.4 J</b>
Zinc	mg/kg	350,000	<b>1,760</b>	<b>753</b>	<b>521</b>	<b>366</b>	<b>253</b>	<b>774</b>	<b>112</b>	<b>140 J</b>
<b>Other</b>										
Cyanide	mg/kg	150	<b>1.5</b>	<b>0.61 J</b>	<b>0.54 J</b>	<b>1.8</b>	<b>1.1</b>	<b>1.8</b>	<b>0.67 J</b>	<b>0.5 J-</b>

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**Table 2 - Sub-Parcel B24-1  
Summary of Inorganics Detected in Soil**

Parameter	Units	PAL	B24-029-SB-9	B24-034-SB-1*	B24-034-SB-5*	B24-037-SB-1*	B24-037-SB-8*	B24-037-SB-10*	B24-037-SB-12*
			4/20/2020	4/21/2020	4/21/2020	4/16/2020	4/16/2020	4/16/2020	4/16/2020
<b>Metals</b>									
Aluminum	mg/kg	1,100,000	<b>7,220</b>	<b>9,190</b>	<b>8,810</b>	<b>18,300</b>	<b>15,300</b>	<b>18,800</b>	<b>13,700</b>
Antimony	mg/kg	470	<b>4.1 J</b>	3.2 U	2.9 U	3 U	3.1 U	3 U	3 U
Arsenic	mg/kg	3	<b>25.6</b>	2.6 U	2.4 U	<b>6</b>	2.6 U	<b>3.2</b>	<b>3.9</b>
Barium	mg/kg	220,000	<b>161</b>	<b>100</b>	<b>128</b>	<b>179</b>	<b>140</b>	<b>176</b>	<b>190</b>
Beryllium	mg/kg	2,300	<b>0.57 J</b>	<b>1 J</b>	<b>0.99</b>	<b>1.6</b>	<b>1.4</b>	<b>2.4</b>	<b>1.5</b>
Cadmium	mg/kg	980	<b>2.7</b>	<b>2</b>	<b>1.6</b>	<b>1.7</b>	<b>0.66 J</b>	<b>0.45 J</b>	<b>2.2</b>
Chromium	mg/kg	120,000	<b>192</b>	<b>957</b>	<b>961</b>	<b>321</b>	<b>248</b>	<b>27.7</b>	<b>749</b>
Chromium VI	mg/kg	6.3	1.1 R	1.1 U	<b>0.55 J</b>	<b>0.66 J</b>	<b>0.56 J</b>	1.1 U	<b>0.57 J</b>
Cobalt	mg/kg	350	<b>31</b>	<b>16.6</b>	<b>9.4</b>	<b>10.3</b>	<b>5.6</b>	<b>3.1 J</b>	<b>10</b>
Copper	mg/kg	47,000	<b>519</b>	<b>79.2</b>	<b>76.7</b>	<b>75.1</b>	<b>32.3</b>	<b>14.8</b>	<b>75.6</b>
Iron	mg/kg	820,000	<b>250,000</b>	<b>149,000</b>	<b>145,000</b>	<b>78,400</b>	<b>94,400</b>	<b>21,000</b>	<b>106,000</b>
Lead	mg/kg	800	<b>259</b>	<b>105</b>	<b>143</b>	<b>118</b>	<b>51.2</b>	<b>31.6</b>	<b>87.2</b>
Manganese	mg/kg	26,000	<b>3,780</b>	<b>20,400</b>	<b>18,200</b>	<b>21,300</b>	<b>6,680</b>	<b>1,090</b>	<b>23,000</b>
Mercury	mg/kg	350	<b>0.097 J</b>	<b>0.092 J</b>	<b>0.096 J</b>	<b>0.26</b>	<b>0.026 J</b>	<b>0.021 J</b>	<b>0.18</b>
Nickel	mg/kg	22,000	<b>94.5</b>	<b>61.2</b>	<b>42.4</b>	<b>28.3</b>	<b>29.7</b>	<b>12.5</b>	<b>33.5</b>
Selenium	mg/kg	5,800	4 U	4.2 U	3.9 U	4 U	4.1 U	4 U	4 U
Silver	mg/kg	5,800	3 U	3.2 U	2.9 U	3 U	3.1 U	3 U	3 U
Thallium	mg/kg	12	10 U	10.5 U	<b>3.8 J</b>	10.1 U	10.2 U	10.1 U	9.9 U
Vanadium	mg/kg	5,800	<b>440 J</b>	<b>1,280</b>	<b>1,480</b>	<b>278</b>	<b>375</b>	<b>47.6</b>	<b>1,100</b>
Zinc	mg/kg	350,000	<b>628 J</b>	<b>521</b>	<b>351</b>	<b>452</b>	<b>432</b>	<b>46.3</b>	<b>536</b>
<b>Other</b>									
Cyanide	mg/kg	150	<b>0.84 J-</b>	<b>2.2</b>	<b>2</b>	<b>4.9</b>	<b>0.59 J</b>	<b>3.5</b>	<b>1.4</b>

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**Table 3 - Sub-Parcel B24-1  
Summary of Organics Detected in Groundwater**

Parameter	Units	PAL	B24-001-PZ*	B24-027-PZ	B24-034-PZ	B24-035-PZ	B24-036-PZ*	B8-010-PZ	TM02-PZM009*
			5/1/2020	4/29/2020	4/29/2020	4/29/2020	5/1/2020	10/30/2015	9/17/2020
<b>Volatile Organic Compounds</b>									
2-Butanone (MEK)	µg/L	5,600	10 U	10 U	<b>5.1 J</b>	10 U	10 U	10 U	10 U
2-Hexanone	µg/L	38	10 U	10 U	<b>1.4 J</b>	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)	µg/L	1,200	10 U	10 U	<b>3.3 J</b>	10 U	10 U	10 U	10 U
Acetone	µg/L	14,000	10 U	10 U	<b>15.3</b>	10 U	10 U	10 U	<b>7.8 J</b>
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	<b>5.7</b>
Carbon disulfide	µg/L	810	1 U	1 U	1 U	1 U	<b>0.5 J</b>	1 U	1 U
Methyl Acetate	µg/L	20,000	5 U	5 U	<b>1.1 J</b>	5 U	5 U	5 R	5 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1,000	1 U	1 U	<b>118</b>	1 U	<b>0.46 J</b>	1 U	<b>3.1</b>
Xylenes	µg/L	10,000	3 U	3 U	3 U	3 U	3 U	3 U	<b>6.4</b>
<b>Semi-Volatile Organic Compounds^</b>									
1,1-Biphenyl	µg/L	0.83	0.97 U	0.99 U	1 U	1 U	0.99 U	1 U	<b>1.3</b>
2,3,4,6-Tetrachlorophenol	µg/L	240	0.97 U	0.99 U	<b>0.31 J</b>	1 U	0.99 U	1 U	0.98 U
2,4-Dimethylphenol	µg/L	360	<b>0.4 J</b>	0.99 U	<b>304</b>	1 U	0.99 U	1 U	<b>34.7</b>
2-Chloronaphthalene	µg/L	750	0.97 U	0.99 U	<b>5.4</b>	1 U	0.99 U	1 U	<b>4</b>
2-Methylnaphthalene	µg/L	36	0.097 U	0.099 U	<b>0.37 J</b>	0.099 U	<b>0.1</b>	0.1 U	<b>4.6</b>
2-Methylphenol	µg/L	930	0.97 U	0.99 U	1 U	1 U	0.99 U	1 U	<b>1.5</b>
3&4-Methylphenol(m&p Cresol)	µg/L	930	1.9 U	2 U	<b>1,590</b>	2 U	2 U	2.1 U	<b>14.9</b>
Acenaphthene	µg/L	530	<b>0.17</b>	<b>0.047 J</b>	1 U	0.099 U	<b>0.4</b>	0.1 U	<b>2.2</b>
Acenaphthylene	µg/L	530	0.097 U	<b>0.039 J</b>	1 U	0.099 U	0.099 U	0.1 U	<b>0.85</b>
Acetophenone	µg/L	1,900	0.97 U	0.99 U	1 U	1 U	0.99 U	1 U	<b>0.81 J</b>
Anthracene	µg/L	1,800	<b>0.082 J</b>	<b>0.055 J</b>	1 U	0.099 U	<b>0.038 J</b>	<b>0.027 J</b>	<b>0.6</b>
Benz[a]anthracene	µg/L	0.03	0.097 U	0.099 U	1 U	0.099 U	0.099 U	<b>0.016 J</b>	<b>0.077 J</b>
Benzo[a]pyrene	µg/L	0.2	<b>0.033 J</b>	0.099 U	1 U	<b>0.02 J</b>	0.099 U	0.1 U	<b>0.012 J</b>
Benzo[b]fluoranthene	µg/L	0.25	<b>0.061 J</b>	0.099 U	1 U	<b>0.038 J</b>	0.099 U	0.1 U	0.098 U
Benzo[k]fluoranthene	µg/L	2.5	<b>0.054 J</b>	0.099 U	1 U	<b>0.03 J</b>	0.099 U	0.1 U	0.098 U
bis(2-Ethylhexyl)phthalate	µg/L	6	0.97 U	0.99 U	<b>0.99 J</b>	1 U	0.99 U	<b>0.23 J</b>	0.98 U
Carbazole	µg/L		0.97 U	0.99 U	<b>0.31 J</b>	1 U	0.99 U	1 U	<b>4.5</b>
Chrysene	µg/L	25	<b>0.043 J</b>	0.099 U	1 U	0.099 U	0.099 U	0.1 U	<b>0.074 J</b>
Di-n-butylphthalate	µg/L	900	0.97 U	0.99 U	<b>1.5</b>	0.45 B	<b>0.38 J</b>	1 U	0.98 U
Fluoranthene	µg/L	800	<b>0.21</b>	<b>0.13</b>	1 U	0.099 U	<b>0.12</b>	<b>0.015 J</b>	<b>1.2</b>
Fluorene	µg/L	290	<b>0.098</b>	<b>0.039 J</b>	1 U	0.099 U	<b>0.23</b>	0.1 U	<b>2.4</b>
Naphthalene	µg/L	0.12	<b>0.038 J</b>	0.099 U	<b>1.9</b>	0.099 U	<b>0.94</b>	0.061 B	<b>56.8</b>
Nitrobenzene	µg/L	0.14	0.97 U	0.99 U	20.4 U	1 U	<b>0.4 J</b>	1 U	9.8 U
Phenanthrene	µg/L		<b>0.13</b>	0.099 U	1 U	0.099 U	<b>0.43</b>	<b>0.023 J</b>	<b>4</b>
Phenol	µg/L	5,800	0.97 U	0.99 U	<b>163</b>	1 U	0.99 U	1 U	0.98 U
Pyrene	µg/L	120	<b>0.29</b>	<b>0.13</b>	1 U	0.099 U	<b>0.073 J</b>	<b>0.017 J</b>	<b>0.81</b>
<b>TPH/Oil &amp; Grease</b>									
Diesel Range Organics	µg/L	47	<b>266</b>	<b>378 J</b>	<b>8,200 J</b>	99.5 UJ	<b>327</b>	N/A	<b>1,770</b>
Oil & Grease	µg/L	47	4,750 U	4,750 U	<b>3,800 J</b>	4,750 U	4,750 U	<b>2,100 J</b>	4,750 U

**Detections in bold**

**Values in red indicate exceedances of the Project Action Limit (PAL)**

\*Indicates non-validated data

^PAH compounds were analyzed via SIM

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

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

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

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

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

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 4 - Sub-Parcel B24-1  
Summary of Inorganics Detected in Groundwater**

Parameter	Units	PAL	B24-001-PZ*	B24-027-PZ	B24-034-PZ	B24-035-PZ	B24-036-PZ*	B8-010-PZ	TM02-PZM009*
			5/1/2020	4/29/2020	4/29/2020	4/29/2020	5/1/2020	10/30/2015	9/17/2020
<b>Total Metals</b>									
Aluminum	µg/L	20,000	N/A	N/A	N/A	N/A	N/A	N/A	<b>89.2</b>
Barium	µg/L	2,000	N/A	N/A	N/A	N/A	N/A	N/A	<b>64.2</b>
Chromium	µg/L	100	N/A	N/A	N/A	N/A	N/A	N/A	<b>1 J</b>
Chromium VI	µg/L	0.035	N/A	N/A	N/A	N/A	N/A	<b>8 J</b>	10 U
Copper	µg/L	1,300	N/A	N/A	N/A	N/A	N/A	N/A	<b>2.7 J</b>
Nickel	µg/L	390	N/A	N/A	N/A	N/A	N/A	N/A	<b>2.6 J</b>
Vanadium	µg/L	86	N/A	N/A	N/A	N/A	N/A	N/A	<b>61.3</b>
<b>Dissolved Metals</b>									
Aluminum, Dissolved	µg/L	20,000	<b>298</b>	<b>131</b>	<b>164</b>	<b>34.5 J</b>	<b>160</b>	25.4 B	<b>59.4</b>
Arsenic, Dissolved	µg/L	10	5 U	5 U	<b>6.9</b>	5 U	5 U	<b>5.8</b>	5 U
Barium, Dissolved	µg/L	2,000	<b>60.1</b>	<b>129</b>	<b>32.2</b>	<b>46.4</b>	<b>82.2</b>	<b>18.9</b>	<b>61.7</b>
Cadmium, Dissolved	µg/L	5	3 U	3 U	3 U	<b>0.91 J</b>	3 U	3 U	3 U
Chromium VI, Dissolved	µg/L	0.035	<b>8.4 J</b>	<b>23.6</b>	10 U	<b>3.8 J</b>	100 U	N/A	10 U
Chromium, Dissolved	µg/L	100	<b>14.2</b>	<b>30.4</b>	<b>30.8</b>	<b>5</b>	0.91 B	<b>6.9</b>	<b>0.99 J</b>
Cobalt, Dissolved	µg/L	6	5 U	5 U	<b>1.4 J</b>	10 U	5 U	5 U	5 U
Copper, Dissolved	µg/L	1,300	5 U	5 U	5 U	5 U	5 U	<b>1.5 J</b>	5 U
Iron, Dissolved	µg/L	14,000	70 U	70 U	<b>65.2 J</b>	70 U	70 U	<b>87.2</b>	70 U
Manganese, Dissolved	µg/L	430	<b>1.3 J</b>	5 U	<b>2.7 J</b>	5 U	5 U	<b>59</b>	5 U
Nickel, Dissolved	µg/L	390	10 U	10 U	<b>7.5 J</b>	10 U	10 U	10 U	<b>2.5 J</b>
Thallium, Dissolved	µg/L	2	10 U	10 U	10 U	20 U	10 U	<b>5 J</b>	10 U
Vanadium, Dissolved	µg/L	86	<b>154</b>	<b>27.4</b>	<b>312</b>	<b>112</b>	<b>3.8 J</b>	<b>1,040</b>	<b>57.6</b>
Zinc, Dissolved	µg/L	6,000	10 U	10 U	<b>3.6 J</b>	10 U	10 U	4.7 B	10 U
<b>Other</b>									
Available Cyanide	µg/L	200	5 U	<b>2 J</b>	<b>9</b>	<b>4 J</b>	5 U	N/A	N/A
Amenable Cyanide	µg/L	200	N/A	N/A	N/A	N/A	N/A	N/A	<b>16</b>
Total Cyanide	µg/L	200	<b>5 J</b>	<b>4.9 J</b>	<b>24</b>	<b>7.3 J</b>	10 U	10 U	<b>26 / 16.2</b>

**Detections in bold**

**Values in red indicate exceedances of the Project Action Limit (PAL)**

\*Indicates non-validated data

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

Total Cyanide was run by both Pace and Alpha Laboratories

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

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

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

**Table 5 - Sub-Parcel B24-1  
Cumulative Vapor Intrusion Criteria Comparison**

				B24-001-PZ 5/1/2020		B24-027-PZ 4/29/2020		B24-034-PZ 4/29/2020		B24-035-PZ 4/29/2020	
Parameter	Type	Organ Systems	VI Screening Criteria	Conc. (ug/L)	Risk/Hazard	Conc. (ug/L)	Risk/Hazard	Conc. (ug/L)	Risk/Hazard	Conc. (ug/L)	Risk/Hazard
<b>Cancer Risk</b>											
1,4-Dioxane	SVOC		130,000	0.097 U	0	0.099 U	0	0.1 U	0	0.099 U	0
Naphthalene	SVOC		200	0.038 J	1.9E-09	0.099 U	0	1.9	9.5E-08	0.099 U	0
Nitrobenzene	SVOC		3,100	0.97 U	0	0.99 U	0	20.4 U	0	1 U	0
Benzene	VOC		69	1 U	0	1 U	0	1 U	0	1 U	0
Ethylbenzene	VOC		150	1 U	0	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Risk =				2E-09		0		1E-07		0	
<b>Non-Cancer Hazard</b>											
Cumulative Vapor Intrusion Non-Cancer Hazard =				0		0		0		0	

				B24-036-PZ 5/1/2020		B8-010-PZ 10/30/2015		TM02-PZM009 9/17/2020	
Parameter	Type	Organ Systems	VI Screening Criteria	Conc. (ug/L)	Risk/Hazard	Conc. (ug/L)	Risk/Hazard	Conc. (ug/L)	Risk/Hazard
<b>Cancer Risk</b>									
1,4-Dioxane	SVOC		130,000	0.099 U	0	0.1 U	0	0.098 U	0
Naphthalene	SVOC		200	0.94	4.7E-08	0.061 B	0	56.8	2.8E-06
Nitrobenzene	SVOC		3,100	0.4 J	1.3E-09	1 U	0	9.8 U	0
Benzene	VOC		69	1 U	0	1 U	0	5.7	8.3E-07
Ethylbenzene	VOC		150	1 U	0	1 U	0	1U	0
Cumulative Vapor Intrusion Risk =				5E-08		0		4E-06	
<b>Non-Cancer Hazard</b>									
Cumulative Vapor Intrusion Non-Cancer Hazard =				0		0		0	

Highlighted values indicate an exceedance of the cumulative vapor intrusion criteria:

TCR > 1E-05

THI > 1

Conc. = Concentration

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

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

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

**Table 6 - Sub-Parcel B24-1  
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	B24-027-SB-5	2.1		0.022	0.33	31	25.81	410	20	no
1,2,4,5-Tetrachlorobenzene	95-94-3	B14-032-SB-1	0.029	J	0.029	0.03	31	3.23		35	no
2,3,4,6-Tetrachlorophenol	58-90-2	B14-032-SB-1	0.037	J	0.037	0.04	31	3.23		2,500	no
2,4,5-Trichlorophenol	95-95-4	B14-032-SB-1	0.034	J	0.034	0.03	31	3.23		8,200	no
2,4,6-Trichlorophenol	88-06-2	B14-032-SB-1	0.031	J	0.031	0.03	31	3.23	210	82	no
2,4-Dichlorophenol	120-83-2	B14-032-SB-1	0.029	J	0.029	0.03	31	3.23		250	no
2,4-Dimethylphenol	105-67-9	B14-032-SB-1	0.028	J	0.028	0.03	31	3.23		1,600	no
2,4-Dinitrophenol	51-28-5	B14-032-SB-1	0.049	J	0.049	0.05	28	3.57		160	no
2,4-Dinitrotoluene	121-14-2	B14-032-SB-1	0.037	J	0.037	0.04	31	3.23	7.4	160	no
2,6-Dinitrotoluene	606-20-2	B14-032-SB-1	0.034	J	0.034	0.03	31	3.23	1.5	25	no
2-Butanone (MEK)	78-93-3	B24-037-SB-8	0.02		0.02	0.02	3	33.33		19,000	no
2-Chloronaphthalene	91-58-7	B14-032-SB-1	0.028	J	0.028	0.03	31	3.23		6,000	no
2-Chlorophenol	95-57-8	B14-032-SB-1	0.026	J	0.026	0.03	31	3.23		580	no
2-Methylnaphthalene	91-57-6	B24-028-SB-5	0.28		0.006	0.09	31	90.32		300	no
2-Methylphenol	95-48-7	B14-032-SB-1	0.03	J	0.03	0.03	31	3.23		4,100	no
2-Nitroaniline	88-74-4	B14-032-SB-1	0.033	J	0.033	0.03	31	3.23		800	no
3,3'-Dichlorobenzidine	91-94-1	B24-037-SB-10	0.18	J	0.016	0.10	31	6.45	5.1		no
Acenaphthene	83-32-9	B14-018-SB-1	0.24		0.00093	0.06	31	90.32		4,500	no
Acenaphthylene	208-96-8	B14-018-SB-5	0.53		0.0029	0.08	31	100.00			no
Acetone	67-64-1	B24-037-SB-8	0.012	J	0.012	0.01	3	33.33		67,000	no
Acetophenone	98-86-2	B14-032-SB-1	0.031	J	0.02	0.03	31	6.45		12,000	no
Aluminum	7429-90-5	B14-033-SB-1	23,200		4,580	12,198	31	100.00		110,000	no
Anthracene	120-12-7	B14-018-SB-5	1.4		0.0052	0.17	31	100.00		23,000	no
Antimony	7440-36-0	B24-029-SB-9	4.1	J	4.1	4.10	31	3.23		47	no
Aroclor 1248	12672-29-6	B24-027-SB-1	0.093		0.052	0.07	13	30.77	0.95		no
Aroclor 1254	11097-69-1	B24-034-SB-1	0.087	J	0.06	0.07	13	30.77	1	1.5	no
Aroclor 1260	11096-82-5	B14-034-SB-1	3.1	J	0.014	0.40	13	69.23	0.99		YES (C)
Arsenic	7440-38-2	B14-034-SB-1	46		1.7	10.8	31	67.74	3	48	YES (C)
Barium	7440-39-3	B14-034-SB-1	381	J	58.3	157	31	100.00		22,000	no
Benz[a]anthracene	56-55-3	B14-018-SB-5	3.7		0.019	0.62	32	100.00	21		no
Benzaldehyde	100-52-7	B14-034-SB-5	0.1	J	0.017	0.04	27	14.81	820	12,000	no
Benzene	71-43-2	B24-037-SB-8	0.0024	J	0.0024	0.002	3	33.33	5.1	42	no
Benzo[a]pyrene	50-32-8	B14-018-SB-5	3.8		0.016	0.72	34	100.00	2.1	22	YES (C)

**Table 6 - Sub-Parcel B24-1  
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?
Benzo[b]fluoranthene	205-99-2	B14-018-SB-5	8.9		0.032	1.20	35	100.00	21		no
Benzo[g,h,i]perylene	191-24-2	B14-018-SB-5	2.9		0.0081	0.45	31	100.00			no
Benzo[k]fluoranthene	207-08-9	B14-018-SB-5	6.9		0.0089	0.71	31	100.00	210		no
Beryllium	7440-41-7	B14-034-SB-5	3.2		0.36	1.22	31	90.32	6,900	230	no
bis(2-chloroethoxy)methane	111-91-1	B14-032-SB-1	0.027	J	0.027	0.03	31	3.23		250	no
bis(2-Chloroethyl)ether	111-44-4	B14-032-SB-1	0.022	J	0.022	0.02	31	3.23	1		no
bis(2-Chloroisopropyl)ether	108-60-1	B14-032-SB-1	0.024	J	0.024	0.02	31	3.23		4,700	no
bis(2-Ethylhexyl)phthalate	117-81-7	B14-034-SB-5	0.14	J	0.021	0.06	31	48.39	160	1,600	no
Cadmium	7440-43-9	B14-034-SB-1	109		0.45	7.36	31	93.55	9,300	98	YES (NC)
Caprolactam	105-60-2	B14-032-SB-1	0.039	J	0.023	0.03	31	29.03		40,000	no
Carbazole	86-74-8	B14-018-SB-5	0.7	J	0.02	0.11	31	41.94			no
Carbon disulfide	75-15-0	B24-037-SB-8	0.0039	J	0.0039	0.004	3	33.33		350	no
Chromium	7440-47-3	B14-034-SB-5	7,270		27.7	952	31	100.00		180,000	no
Chromium VI	18540-29-9	B24-024-SB-5	0.95	J	0.55	0.70	29	55.17	6.3	350	no
Chrysene	218-01-9	B14-018-SB-5	3.9		0.021	0.62	33	100.00	2,100		no
Cobalt	7440-48-4	B14-034-SB-5	35		3.1	11.8	31	100.00	1,900	35	YES (NC)
Copper	7440-50-8	B24-024-SB-1	2180		14.8	185	31	100.00		4,700	no
Cyanide	57-12-5	B14-034-SB-1	12.9		0.27	2.09	31	96.77		120	no
Cyclohexane	110-82-7	B24-037-SB-8	0.013		0.013	0.01	3	33.33		2,700	no
Dibenz[a,h]anthracene	53-70-3	B14-018-SB-5	0.82		0.0036	0.15	31	90.32	2.1		no
Diethylphthalate	84-66-2	B14-032-SB-1	0.041	J	0.016	0.02	31	19.35		66,000	no
Di-n-butylphthalate	84-74-2	B24-025-SB-5	0.093		0.043	0.06	31	29.03		8,200	no
Di-n-ocetylphthalate	117-84-0	B24-023-SB-5	0.093		0.026	0.06	31	16.13		820	no
Ethylbenzene	100-41-4	B24-037-SB-8	0.0019	J	0.0019	0.00	3	33.33	25	2,000	no
Fluoranthene	206-44-0	B14-018-SB-5	7.1		0.022	0.93	34	100.00		3,000	no
Fluorene	86-73-7	B14-018-SB-5	0.17		0.00095	0.03	31	90.32		3,000	no
Hexachlorobenzene	118-74-1	B14-032-SB-1	0.041	J	0.041	0.04	31	3.23	0.96	93	no
Hexachlorobutadiene	87-68-3	B14-032-SB-1	0.028	J	0.028	0.03	31	3.23	5.3	120	no
Hexachlorocyclopentadiene	77-47-4	B14-032-SB-1	0.019	J	0.019	0.02	31	3.23		0.75	no
Hexachloroethane	67-72-1	B14-032-SB-1	0.026	J	0.026	0.03	31	3.23	8	46	no
Indeno[1,2,3-c,d]pyrene	193-39-5	B14-018-SB-5	2.7		0.0093	0.51	33	96.97	21		no
Iron	7439-89-6	B14-034-SB-1	318,000		21,000	118,987	31	100.00		82,000	YES (NC)
Isonphorone	78-59-1	B14-032-SB-1	0.027	J	0.027	0.03	31	3.23	2,400	16,000	no

**Table 6 - Sub-Parcel B24-1  
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?
Lead <sup>^</sup>	7439-92-1	B14-034-SB-1	1,010	J	27	217	31	100.00		800	YES (NC)
Manganese	7439-96-5	B24-024-SB-5	51,900		485	13,130	31	100.00		2,600	YES (NC)
Mercury	7439-97-6	B14-034-SB-1	1.1		0.012	0.15	31	96.77		35	no
Naphthalene	91-20-3	B14-018-SB-5	1.2		0.0032	0.31	33	90.91	8.6	59	no
Nickel	7440-02-0	B14-034-SB-1	339		12.5	57.0	31	100.00	64,000	2,200	no
Nitrobenzene	98-95-3	B14-032-SB-1	0.026	J	0.026	0.03	31	3.23	22	130	no
N-Nitroso-di-n-propylamine	621-64-7	B14-032-SB-1	0.027	J	0	0.03	31	3.23	0.33		no
N-Nitrosodiphenylamine	86-30-6	B14-032-SB-1	0.029	J	0.029	0.03	31	3.23	470		no
PCBs (total)*	1336-36-3	B14-034-SB-1	3.1		0.048	0.59	13	46.15	0.94		YES (C)
Pentachlorophenol	87-86-5	B14-032-SB-1	0.038	J	0.038	0.04	31	3.23	4	280	no
Phenanthrene	85-01-8	B14-018-SB-5	4.4		0.018	0.49	31	100.00			no
Phenol	108-95-2	B14-034-SB-5	0.1	J	0.029	0.06	31	6.45		25,000	no
Pyrene	129-00-0	B14-018-SB-5	9.6		0.023	0.95	34	100.00		2,300	no
Selenium	7782-49-2	B14-034-SB-1	3.6	J	3.6	3.60	31	3.23		580	no
Silver	7440-22-4	B14-032-SB-1	63.2	J	2.9	24.3	31	22.58		580	no
Thallium	7440-28-0	B24-028-SB-5	17.1		3.5	7.70	31	19.35		1.2	YES (NC)
Toluene	108-88-3	B24-037-SB-8	0.0032	J	0.0032	0.003	3	33.33		4,700	no
Vanadium	7440-62-2	B24-028-SB-5	4,250		46.4	993	31	100.00		580	YES (NC)
Zinc	7440-66-6	B14-034-SB-1	21,400		46.3	1,490	31	100.00		35,000	no

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

COPC = Constituent of Potential Concern

C = Compound was identified as a cancer COPC

TR = Target Risk

NC = Compound was identified as a non-cancer COPC

HQ = Hazard Quotient

\*PCBs (total) include the sum of all detected aroclor mixtures, including those without RSLs (e.g. Aroclor 1262, Aroclor 1268) which are not displayed.

<sup>^</sup>Lead is assessed separately through the ALM and IEUBK models.

**Table 7 - Sub-Parcel B24-1  
Assessment of Lead**

<b>Exposure Unit</b>	<b>Surface/Sub-Surface</b>	<b>Maximum Concentration (mg/kg)</b>	<b>Arithmetic Mean (mg/kg)</b>
Site-Wide EU1 (13.4 ac.)	Surface	1,010	199
	Sub-Surface	750	230
	Pooled	1,010	217

**Table 8 - Sub-Parcel B24-1  
Soil Exposure Point Concentrations**

Site-Wide EU1 (13.4 ac.)						
Parameter	EPCs - Surface Soils		EPCs - Sub-Surface Soils		EPCs - Pooled Soils	
	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)	EPC Type	EPC (mg/kg)
Arsenic	95% KM Bootstrap t UCL	48.2	95% KM (t) UCL	9.70	KM H-UCL	10.9
Cadmium	95% KM (Chebyshev) UCL	46.0	95% KM (Chebyshev) UCL	15.5	95% KM (Chebyshev) UCL	23.1
Cobalt	95% Student's-t UCL	15.4	95% H-UCL	15.1	95% H-UCL	14.3
Iron	95% Adjusted Gamma UCL	173,147	95% Student's-t UCL	145,156	95% Student's-t UCL	139,310
Manganese	95% Student's-t UCL	18,099	95% Adjusted Gamma UCL	21,173	95% Student's-t UCL	16,572
Thallium	Maximum Value	<b>9.60</b>	Maximum Value	<b>17.1</b>	95% KM (t) UCL	7.50
Vanadium	95% Student's-t UCL	1,482	95% Adjusted Gamma UCL	1,737	95% Adjusted Gamma UCL	1,481
Total PCBs	99% KM (Chebyshev) UCL	2.75	NA	NA	99% KM (Chebyshev) UCL	2.75
Benzo[a]pyrene	95% Adjusted Gamma UCL	1.32	95% Adjusted Gamma UCL	1.23	95% Adjusted Gamma UCL	1.03

**Bold indicates maximum value used as the EPC**

NA = No Detections

**Table 9 - Sub-Parcel B24-1  
Surface Soils  
Composite Worker Risk Ratios**

Parameter	Target Organs	Site-Wide EU1 (13.4 ac.)				
		EPC (mg/kg)	Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
			Cancer	Non-Cancer	Risk	HQ
Arsenic	Cardiovascular; Dermal	48.2	3.00	480	1.6E-05	0.1
Cadmium	Urinary	46.0	9,300	980	4.9E-09	0.05
Cobalt	Thyroid	15.4	1,900	350	8.1E-09	0.04
Iron	Gastrointestinal	173,147		820,000		0.2
Manganese	Nervous	18,099		26,000		0.7
Thallium	Dermal	<b>9.60</b>		12.0		0.8
Vanadium	Dermal	1,482		5,800		0.3
PCBs (Total)		2.75	0.94		2.9E-06	
Benzo(a)pyrene	Developmental	1.32	2.10	220	6.3E-07	0.006
					<b>2E-05</b>	<b>↓</b>

**Bold indicates maximum value used as the EPC**

RSLs were obtained from the EPA Regional Screening Levels at  
[https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl\\_search](https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search)

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

**Table 10 - Sub-Parcel B24-1  
Sub-Surface Soils  
Composite Worker Risk Ratios**

Parameter	Target Organs	Site-Wide EU1 (13.4 ac.)				
		EPC (mg/kg)	Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
			Cancer	Non-Cancer	Risk	HQ
Arsenic	Cardiovascular; Dermal	9.70	3.00	480	3.2E-06	0.02
Cadmium	Urinary	15.5	9,300	980	1.7E-09	0.02
Cobalt	Thyroid	15.1	1,900	350	7.9E-09	0.04
Iron	Gastrointestinal	145,156		820,000		0.2
Manganese	Nervous	21,173		26,000		0.8
Thallium	Dermal	<b>17.1</b>		12.0		1
Vanadium	Dermal	1,737		5,800		0.3
PCBs (Total)		NA	0.94			
Benzo(a)pyrene	Developmental	1.23	2.10	220	5.9E-07	0.006
					<b>4E-06</b>	<b>↓</b>

**Bold indicates maximum value used as the EPC**

NA = No Detections

RSLs were obtained from the EPA Regional Screening Levels at  
[https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl\\_search](https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search)

Total HI	Cardiovascular	0
	Dermal	2
	Thyroid	0
	Gastrointestinal	0
	Nervous	1
	Developmental	0
	Urinary	0

**Table 11 - Sub-Parcel B24-1  
Pooled Soils  
Composite Worker Risk Ratios**

Parameter	Target Organs	Site-Wide EU1 (13.4 ac.)				
		EPC (mg/kg)	Composite Worker			
			RSLs (mg/kg)		Risk Ratios	
			Cancer	Non-Cancer	Risk	HQ
Arsenic	Cardiovascular; Dermal	10.9	3.00	480	3.6E-06	0.02
Cadmium	Urinary	23.1	9,300	980	2.5E-09	0.02
Cobalt	Thyroid	14.3	1,900	350	7.5E-09	0.04
Iron	Gastrointestinal	139,310		820,000		0.2
Manganese	Nervous	16,572		26,000		0.6
Thallium	Dermal	7.50		12.0		0.6
Vanadium	Dermal	1,481		5,800		0.3
PCBs (Total)		2.75	0.94		2.9E-06	
Benzo(a)pyrene	Developmental	1.03	2.10	220	4.9E-07	0.005
					<b>7E-06</b>	<b>↓</b>

RSLs were obtained from the EPA Regional Screening Levels at [https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl\\_search](https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search)

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

**Table 12 - Sub-Parcel B24-1  
Surface Soils  
Construction Worker Risk Ratios**

<b>50 Day</b>		<b>Site-Wide EU1 (13.4 ac.)</b>				
<b>Parameter</b>	<b>Target Organs</b>	<b>EPC (mg/kg)</b>	<b>Construction Worker</b>			
			<b>SSLs (mg/kg)</b>		<b>Risk Ratios</b>	
			<b>Cancer</b>	<b>Non-Cancer</b>	<b>Risk</b>	<b>HQ</b>
<b>Arsenic</b>	<b>Cardiovascular; Dermal</b>	48.2	75.6	479	6.4E-07	0.1
<b>Cadmium</b>	<b>Urinary</b>	46.0	76,136	1,462	6.0E-10	0.03
<b>Cobalt</b>	<b>Thyroid</b>	15.4	15,227	4,555	1.0E-09	0.003
<b>Iron</b>	<b>Gastrointestinal</b>	173,147		1,202,707		0.1
<b>Manganese</b>	<b>Nervous</b>	18,099		19,448		0.9
<b>Thallium</b>	<b>Dermal</b>	<b>9.60</b>		68.7		0.1
<b>Vanadium</b>	<b>Dermal</b>	1,482		7,886		0.2
<b>PCBs (Total)</b>		2.75	20.4		1.3E-07	
<b>Benzo(a)pyrene</b>	<b>Developmental</b>	1.32	84.4	25.7	1.6E-08	0.05
					<b>8E-07</b>	<b>↓</b>

**Bold indicates maximum value used as the EPC**

SSLs calculated using equations in 2002 EPA Supplemental Guidance

Guidance Equation Input Assumptions:

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

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

**Table 13 - Sub-Parcel B24-1  
Sub-Surface Soils  
Construction Worker Risk Ratios**

<b>50 Day</b>		<b>Site-Wide EU1 (13.4 ac.)</b>				
<b>Parameter</b>	<b>Target Organs</b>	<b>EPC (mg/kg)</b>	<b>Construction Worker</b>			
			<b>SSLs (mg/kg)</b>		<b>Risk Ratios</b>	
			<b>Cancer</b>	<b>Non-Cancer</b>	<b>Risk</b>	<b>HQ</b>
<b>Arsenic</b>	<b>Cardiovascular; Dermal</b>	9.70	75.6	479	1.3E-07	0.02
<b>Cadmium</b>	<b>Urinary</b>	15.5	76,136	1,462	2.0E-10	0.01
<b>Cobalt</b>	<b>Thyroid</b>	15.1	15,227	4,555	9.9E-10	0.003
<b>Iron</b>	<b>Gastrointestinal</b>	145,156		1,202,707		0.1
<b>Manganese</b>	<b>Nervous</b>	21,173		19,448		1
<b>Thallium</b>	<b>Dermal</b>	<b>17.1</b>		68.7		0.2
<b>Vanadium</b>	<b>Dermal</b>	1,737		7,886		0.2
<b>PCBs (Total)</b>		NA	20.4			
<b>Benzo(a)pyrene</b>	<b>Developmental</b>	1.23	84.4	25.7	1.5E-08	0.05
					<b>1E-07</b>	<b>↓</b>

**Bold indicates maximum value used as the EPC**

NA = No Detections

SSLs calculated using equations in 2002 EPA Supplemental Guidance

Guidance Equation Input Assumptions:

5 cars/day (2 tons/car)

5 trucks/day (20 tons/truck)

3 meter source depth thickness

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

**Table 14 - Sub-Parcel B24-1  
Pooled Soils  
Construction Worker Risk Ratios**

<b>50 Day</b>		<b>Site-Wide EU1 (13.4 ac.)</b>				
<b>Parameter</b>	<b>Target Organs</b>	<b>EPC (mg/kg)</b>	<b>Construction Worker</b>			
			<b>SSLs (mg/kg)</b>		<b>Risk Ratios</b>	
			<b>Cancer</b>	<b>Non-Cancer</b>	<b>Risk</b>	<b>HQ</b>
<b>Arsenic</b>	<b>Cardiovascular; Dermal</b>	10.9	75.6	479	1.4E-07	0.02
<b>Cadmium</b>	<b>Urinary</b>	23.1	76,136	1,462	3.0E-10	0.02
<b>Cobalt</b>	<b>Thyroid</b>	14.3	15,227	4,555	9.4E-10	0.003
<b>Iron</b>	<b>Gastrointestinal</b>	139,310		1,202,707		0.1
<b>Manganese</b>	<b>Nervous</b>	16,572		19,448		0.9
<b>Thallium</b>	<b>Dermal</b>	7.50		68.7		0.1
<b>Vanadium</b>	<b>Dermal</b>	1,481		7,886		0.2
<b>PCBs (Total)</b>		2.75	20.4		1.3E-07	
<b>Benzo(a)pyrene</b>	<b>Developmental</b>	1.03	84.4	25.7	1.2E-08	0.04
					<b>3E-07</b>	<b>↓</b>

SSLs calculated using equations in 2002 EPA Supplemental Guidance

Guidance Equation Input Assumptions:

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

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

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## APPENDIX A

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**TRADEPOINT  
ATLANTIC**

1600 Sparrows Point Boulevard  
Baltimore, Maryland 21219

April 21, 2021

Maryland Department of Environment  
1800 Washington Boulevard  
Baltimore MD, 21230  
Attention: Ms. Barbara Brown

**Subject: Request to Enter Temporary CHS Review  
Tradepoint Atlantic Parcel B24-1; Stormwater Management Pond**

Dear Ms. Brown:

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

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

On September 11, 2014, Tradepoint Atlantic submitted an application to the Maryland Department of the Environment's (Department) Voluntary Cleanup Program (VCP).

In consultation with the Department, Tradepoint Atlantic affirms that it desires to accelerate the assessment, remediation, and redevelopment of certain sub-parcels within the larger site due to current market conditions. To that end, the Department and Tradepoint Atlantic agree that the Controlled Hazardous Substance (CHS) Act (Section 7-222 of the Environment Article) and the CHS Response Plan (COMAR 26.14.02) shall serve as the governing statutory and regulatory authority for completing the development activities on Sub-Parcel B24-1 and complement the statutory requirements of the Voluntary Cleanup Program (Section 7-501 of the Environment Article). Upon submission of a Site Response and Development Work Plan and completion of the remedial activities for the sub-parcel, the Department shall issue a "No Further Action" letter upon a recordation of an environmental covenant describing any necessary land use controls for the specific sub-parcel. At such time that all the sub-parcels within the larger parcel have completed remedial activities, Tradepoint Atlantic shall submit to the Department a request for issuing a Certificate of Completion (COC) as well as all pertinent information concerning completion of remedial activities conducted on the parcel. Once the VCP has completed its review of the



**TRADEPOINT  
ATLANTIC**

1600 Sparrows Point Boulevard  
Baltimore, Maryland 21219

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

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

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

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

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

Thank you,

Peter Haid

Vice President Environmental  
TRADEPOINT ATLANTIC  
1600 Sparrows Point Boulevard  
Baltimore, Maryland 21219  
T 443.649.5055 C 732.841.7935  
[phaid@tradepointatlantic.com](mailto:phaid@tradepointatlantic.com)

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## APPENDIX B

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**Construction Worker Soil Screening Levels  
Maximum Allowable Work Day Exposure  
Calculation Spreadsheet - Sub-Parcel B24-1**

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/cm <sup>2</sup> )	AF	0.3
Skin surface exposed (cm <sup>2</sup> )	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/cm <sup>3</sup> )	Ps	2.65
Total soil porosity	Lpore/Lsoil	0.43
Air-filled soil porosity	Lair/Lsoil	0.28

**Construction Worker Soil Screening Levels  
Maximum Allowable Work Day Exposure  
Calculation Spreadsheet - Sub-Parcel B24-1**

Area of site (ac)	Ac	13.4
Overall duration of construction (wk/yr)	EW	10
Exposure frequency (day/yr)	EF	50
Cars per day	Ca	5
Tons per car	CaT	2
Trucks per day	Tru	5
Tons per truck	TrT	20
Mean vehicle weight (tons)	w	11
Derivation of dispersion factor - particulate emission factor (g/m2-s per kg/m3)	Q/Csr	14.8
Overall duration of construction (hr)	tc	1,680
Overall duration of traffic (s)	Tt	1,440,000
Surface area (m2)	AR	54,228
Length (m)	LR	233
Distance traveled (km)	ΣVKT	116
Particulate emission factor (m3/kg)	PEFsc	89,396,586
Derivation of dispersion factor - volatilization (g/m2-s per kg/m3)	Q/Csa	8.03
Total time of construction (s)	Tcv	1,440,000

→ EU1

Input
Calculation

Chemical	RfD & RfC Sources	<sup>^</sup> Ingestion SF (mg/kg-day) <sup>-1</sup>	<sup>^</sup> Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	<sup>^</sup> Subchronic RfD (mg/kg-day)	<sup>^</sup> Subchronic RfC (mg/m <sup>3</sup> )	<sup>^</sup> GIABS	Dermally Adjusted RfD (mg/kg-day)	<sup>^</sup> ABS	<sup>^</sup> RBA	<sup>*</sup> Dia	<sup>*</sup> Diw	<sup>*</sup> Henry's Law Constant (unitless)	<sup>*</sup> Kd	<sup>*</sup> Koc	DA	Volatilization Factor - Unlimited Reservoir (m <sup>3</sup> /kg)	Carcinogenic Ingestion/ Dermal SL (SLing/der)	Carcinogenic Inhalation SL (SLinh)	Carcinogenic SL (mg/kg)	Non-Carcinogenic Ingestion/ Dermal SL (SLing/der)	Non-Carcinogenic Inhalation SL (SLinh)	Non-Carcinogenic SL (mg/kg)
Arsenic, Inorganic	I/C	1.50E+00	4.30E-03	3.00E-04	1.50E-05	1	3.00E-04	0.03	0.6			-	2.90E+01				75.8	31,871	75.6	487	29,367	479
Cadmium	A/I	-	1.80E-03	1.00E-03	1.00E-05	0.025	2.50E-05	0.001	1			-	7.50E+01					76,136	76,136	1,580	19,578	1,462
Cobalt	P	-	9.00E-03	3.00E-03	2.00E-05	1	3.00E-03	0.01	1			-	4.50E+01					15,227	15,227	5,154	39,156	4,555
Iron	P	-	-	7.00E-01	-	1	7.00E-01	0.01	1			-	2.50E+01							1,202,707		1,202,707
Manganese (Non-diet)	I	-	-	2.40E-02	5.00E-05	0.04	9.60E-04	0.01	1			-	6.50E+01							24,270	97,889	19,448
Thallium (Soluble Salts)	P	-	-	4.00E-05	-	1	4.00E-05	0.01	1			-	7.10E+01							68.7		68.7
Vanadium and Compounds	A	-	-	1.00E-02	1.00E-04	0.026	2.60E-04	0.01	1			-	1.00E+03							8,216	195,779	7,886
PCB Total	I	2.00E+00	5.71E-04	-	-	1		0.14	1	2.40E-02	6.30E-06	1.70E-02	4.68E+02	7.80E+04	4.66E-08	1.42E+4	43.6	38.2	20.4			
Benzo[a]pyrene	I	1.00E+00	6.00E-04	3.00E-04	2.00E-06	1	3.00E-04	0.13	1	4.80E-02	5.60E-06	1.87E-05	3.54E+03	5.90E+05	2.37E-11	6.32E+5	89.1	1,604	84.4	382	27.5	25.7

<sup>\*</sup>chemical specific parameters found in Chemical Specific Parameters Spreadsheet at <https://www.epa.gov/risk/regional-screening-levels-rsls>

<sup>^</sup>chemical specific parameters found in Unpaved Road Traffic calculator at [https://epa-prgs.orl.gov/cgi-bin/chemicals/csl\\_search](https://epa-prgs.orl.gov/cgi-bin/chemicals/csl_search)

I: chemical specific parameters found in the IRIS at <https://www.epa.gov/iris>

C: chemical specific parameters found in Cal EPA at <https://www.dtsc.ca.gov/AssessingRisk>

A: chemical specific parameters found in Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs) at [https://www.atsdr.cdc.gov/mrls/pdfs/atsdr\\_mrls.pdf](https://www.atsdr.cdc.gov/mrls/pdfs/atsdr_mrls.pdf)

P: chemical specific parameters found in the Database of EPA PPRTVs at <https://hhprt.v.orl.gov/quickview/pprtv.php>

NE = Not Evaluated

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## **APPENDIX C**

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# **Sparrows Point Development - PPE Standard**

## **Operational Procedure, Revision 3**

### **Planning, Tracking/Supervision, Enforcement, and Documentation**

#### **Planning**

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

#### **Tracking/Supervision**

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

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

### **Work Zones Delineation**

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

### **Documentation**

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

### **Enforcement**

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

### **Unknown and/or Unexpected Conditions**

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

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

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

### **Modified Level D PPE**

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

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

SP Development PPE Procedure 4-3-19

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## **APPENDIX D**

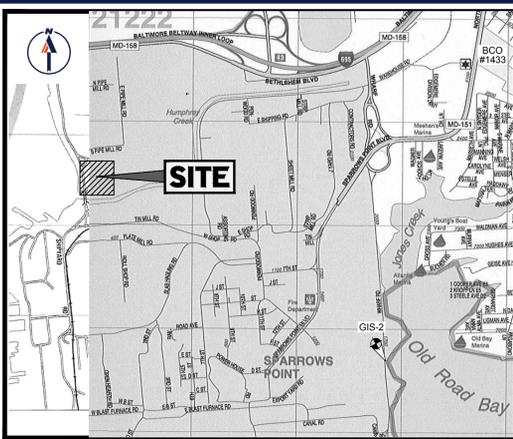
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**LOCATION MAP**  
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PERMIT USE NO. 20602153-5  
SCALE: 1"=2000'

**BENCHMARK INFORMATION**

ELEVATIONS ARE BASED ON NAVD 88. COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER THE FOLLOWING MONUMENTS:

BCO# 1433 (CAPPED REBAR)  
N 571 863.79, E 1 466 230.69, ELEV. 16.59  
IN MEDIAN OF NORTH POINT BLVD SOUTH OF NORTH SNYDER AVE.

GIS #2 (BRASS DISK)  
N 565 182.39, E 1 464 480.72, ELEV. 9.95  
EAST SIDE OF WHARF ROAD 420' NORTH OF LIGHT TOWER

**LEGEND**

EXISTING NOTE	TYPICAL NOTE TEXT	PROPOSED NOTE
---	ONSITE PROPERTY LINE / R.O.W. LINE	---
120	CONTOUR LINE	121
516.4	SPOT ELEVATIONS	516.00
---	SANITARY SEWER LINE	---
---	UNDERGROUND WATER LINE	---
---	INDUSTRIAL WATER LINE	---
---	UNDERGROUND ELECTRIC LINE	---
---	UNDERGROUND GAS LINE	---
---	OVERHEAD WIRE	---
---	UNDERGROUND TELEPHONE LINE	---
---	STORM SEWER	---
---	LIMIT OF DISTURBANCE	---
---	SAWCUT	---
---	CONCRETE CURB & GUTTER	---
---	SPILL CURB	---

**GENERAL GRADING NOTES**

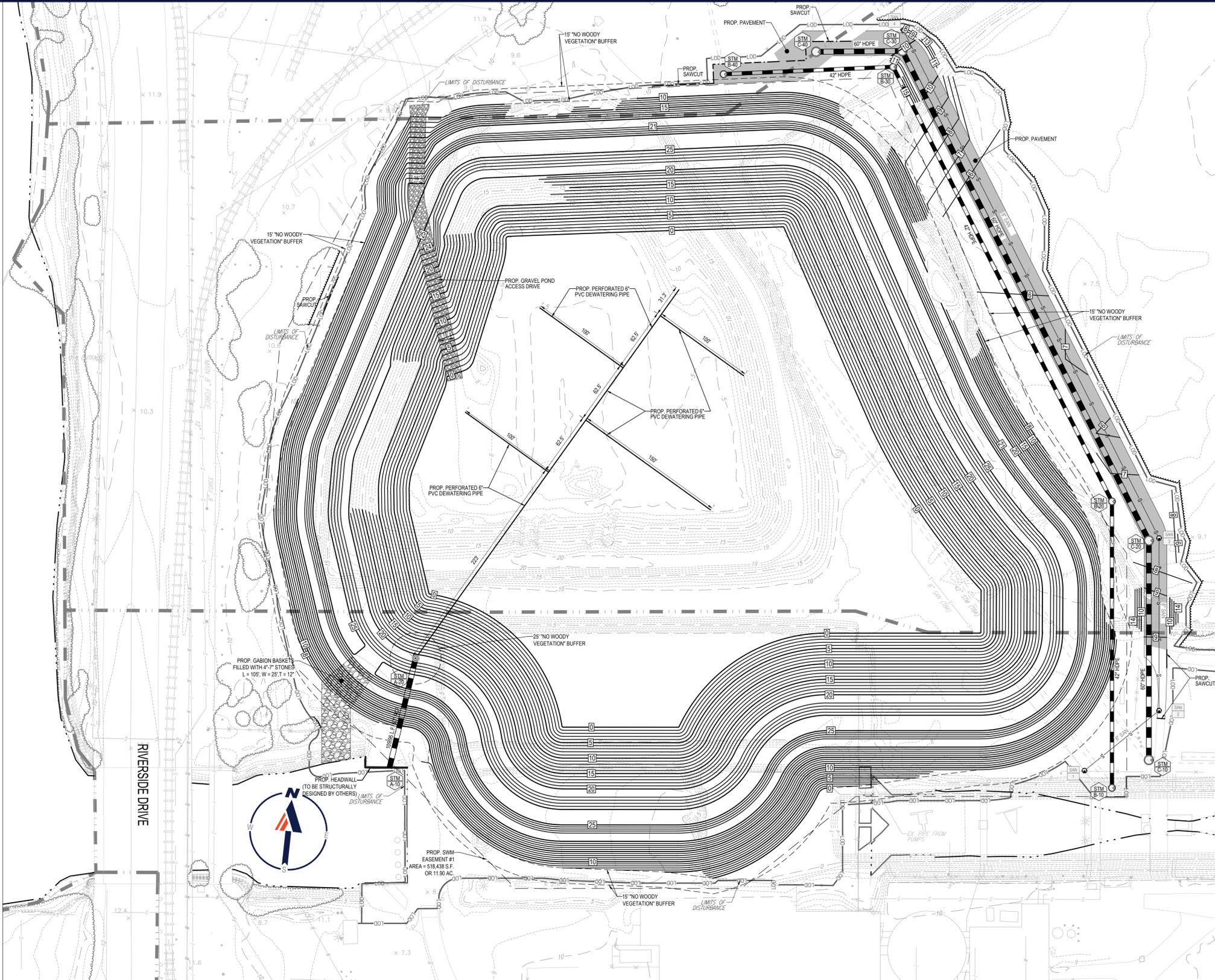
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW ALL CONSTRUCTION CONTRACT DOCUMENTS INCLUDING, BUT NOT LIMITED TO, ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE INITIATION AND COMMENCEMENT OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT AND/OR DISCREPANCY BETWEEN THE DOCUMENTS RELATIVE TO THE SPECIFICATIONS OR THE RELATIVE OR APPLICABLE CODES, REGULATIONS, LAWS, RULES, STATUTES AND/OR ORDINANCES, IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD, IN WRITING, OF SAID CONFLICT AND/OR DISCREPANCY PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR'S FAILURE TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE CONTRACTOR'S FULL AND COMPLETE ACCEPTANCE OF ALL RESPONSIBILITY TO COMPLETE THE SCOPE OF WORK AS DEFINED BY THE DRAWINGS AND IN FULL COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, LAWS, STATUTES, ORDINANCES AND CODES AND, FURTHER, CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH SAME.
- SITE GRADING MUST BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT REFERENCED IN THIS PLAN SET. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING AND REPLACING UNSUITABLE MATERIALS WITH SUITABLE MATERIALS AS SPECIFIED IN THE GEOTECHNICAL REPORT. ALL EXCAVATED OR FILLED AREAS MUST BE COMPACTED AS OUTLINED IN THE GEOTECHNICAL REPORT. MOISTURE CONTENT AT TIME OF PLACEMENT MUST BE SUBMITTED IN A COMPACTION REPORT PREPARED BY A QUALIFIED GEOTECHNICAL ENGINEER, REGISTERED WITH THE STATE WHERE THE WORK IS PERFORMED, VERIFYING THAT ALL FILLED AREAS AND SUBGRADE AREAS WITHIN THE BUILDING PAD AREA AND AREAS TO BE PAVED HAVE BEEN COMPACTED IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES. SUBBASE MATERIAL FOR SIDEWALKS, CURBS, OR ASPHALT MUST BE FREE OF ORGANICS AND OTHER UNSUITABLE MATERIALS. SHOULD SUBBASE BE DETERMINED UNSUITABLE BY OWNER/DEVELOPER, OR OWNER/DEVELOPER'S REPRESENTATIVE, SUBBASE IS TO BE REMOVED AND FILLED WITH APPROVED FILL MATERIAL COMPACTED AS DIRECTED BY THE GEOTECHNICAL REPORT. EARTHWORK ACTIVITIES INCLUDING, BUT NOT LIMITED TO, EXCAVATION, BACKFILL, AND COMPACTING MUST COMPLY WITH THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES. EARTHWORK ACTIVITIES MUST COMPLY WITH THE STANDARD STATE DOT SPECIFICATIONS FOR ROADWAY CONSTRUCTION LATEST EDITION AND ANY AMENDMENTS OR REVISIONS THERE TO.
- THE CONTRACTOR MUST COMPLY, TO THE FULLEST EXTENT, WITH THE LATEST OSHA STANDARDS AND REGULATIONS, AND/OR ANY OTHER AGENCY WITH JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE "MEANS AND METHODS" REQUIRED TO MEET THE INTENT AND PERFORMANCE CRITERIA OF OSHA, AS WELL AS ANY OTHER ENTITY THAT HAS JURISDICTION FOR EXCAVATION AND/OR TRENCHING PROCEDURES AND CONSULTANT SHALL HAVE NO RESPONSIBILITY FOR OR AS RELATED FOR OR AS RELATED TO EXCAVATION AND TRENCHING PROCEDURES.
- PAVEMENT MUST BE SAW CUT IN STRAIGHT LINES, AND EXCEPT FOR EDGE OF BUTT JOINTS, MUST EXTEND TO THE FULL DEPTH OF THE EXISTING PAVEMENT. ALL DEBRIS FROM REMOVAL OPERATIONS MUST BE REMOVED FROM THE SITE AT THE TIME OF EXCAVATION. STOCKPILING OF DEBRIS WILL NOT BE PERMITTED.
- THE TOPS OF EXISTING MANHOLES, INLET STRUCTURES, AND SANITARY CLEANOUT TOPS MUST BE ADJUSTED, AS NECESSARY, TO MATCH PROPOSED GRADES IN ACCORDANCE WITH ALL APPLICABLE STANDARDS, REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES.
- THE CONTRACTOR IS FULLY RESPONSIBLE FOR VERIFICATION OF EXISTING TOPOGRAPHIC INFORMATION AND UTILITY INVERT ELEVATIONS PRIOR TO COMMENCING ANY CONSTRUCTION. CONTRACTOR MUST CONFIRM AND ENSURE 0.2% MINIMUM SLOPE AGAINST ALL ISLANDS, GUTTERS, AND CURBS; 1.0% ON ALL CONCRETE SURFACES; AND 1.0% MINIMUM ON ASPHALT (EXCEPT WHERE ADA REQUIREMENTS LIMIT GRADES), TO PREVENT PONDING. CONTRACTOR MUST IMMEDIATELY NOTIFY, IN WRITING TO THE ENGINEER, ANY DISCREPANCIES THAT MAY OR COULD AFFECT THE PUBLIC SAFETY, HEALTH OR GENERAL WELFARE, OR PROJECT COST. IF CONTRACTOR PROCEEDS WITH CONSTRUCTION WITHOUT PROVIDING PROPER NOTIFICATION, MUST BE AT THE CONTRACTOR'S OWN RISK AND, FURTHER, CONTRACTOR SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS THE DESIGN ENGINEER FOR ANY DAMAGES, COSTS, INJURIES, ATTORNEY'S FEES AND THE LIKE WHICH RESULT FROM SAME.
- PROPOSED TOP OF CURB ELEVATIONS ARE GENERALLY 6" ABOVE EXISTING LOCAL ASPHALT GRADE UNLESS OTHERWISE NOTED. FIELD ADJUST TO CREATE A MINIMUM OF 0.75% GUTTER GRADE ALONG CURB FACE. IT IS CONTRACTOR'S OBLIGATION TO ENSURE THAT DESIGN ENGINEER APPROVES FINAL CURBING CUT SHEETS PRIOR TO INSTALLATION OF SAME.
- REFER TO SITE PLAN FOR ADDITIONAL NOTES.
- IN THE EVENT OF DISCREPANCIES AND/OR CONFLICTS BETWEEN PLANS OR RELATIVE TO OTHER PLANS, THE SITE PLAN WILL TAKE PRECEDENCE AND CONTROL. CONTRACTOR MUST IMMEDIATELY NOTIFY THE DESIGN ENGINEER, IN WRITING, OF ANY DISCREPANCIES AND/OR CONFLICTS.
- CONTRACTOR IS REQUIRED TO SECURE ALL NECESSARY AND/OR REQUIRED PERMITS AND APPROVALS FOR ALL OFF-SITE MATERIAL SOURCES AND DISPOSAL FACILITIES. CONTRACTOR MUST SUPPLY A COPY OF APPROVALS TO ENGINEER AND OWNER PRIOR TO INITIATING ANY WORK.
- WHERE RETAINING WALLS (WHETHER OR NOT THEY MEET THE JURISDICTIONAL DEFINITION) ARE IDENTIFIED ON PLANS, ELEVATIONS IDENTIFIED ARE FOR THE EXPOSED PORTION OF THE WALL. WALL FOOTING FOUNDATION ELEVATIONS ARE NOT IDENTIFIED HEREIN AND ARE TO BE DETERMINED BY THE CONTRACTOR BASED ON FINAL STRUCTURAL DESIGN SHOP DRAWINGS PREPARED BY THE APPROPRIATE PROFESSIONAL LICENSED IN THE STATE WHERE THE CONSTRUCTION OCCURS.
- CONSULTANT IS NEITHER LIABLE NOR RESPONSIBLE FOR ANY SUBSURFACE CONDITIONS AND FURTHER, SHALL HAVE NO LIABILITY FOR ANY HAZARDOUS MATERIALS, HAZARDOUS SUBSTANCES, OR POLLUTANTS ON, ABOUT OR UNDER THE PROPERTY.

**SITE SPECIFIC GRADING NOTES**

- ALL UTILITIES SHOWN ARE PRIVATE.
- THE SUBJECT DEVELOPMENT AREA IS LOCATED IN FLOOD ZONE 'X' (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) PER MAP ENTITLED "NATIONAL FLOOD INSURANCE PROGRAM, FIRM FLOOD INSURANCE RATE MAP BALTIMORE COUNTY, MARYLAND (UNINCORPORATED AREAS) PANEL 558 OF 587" MAP NUMBER 240010555G, MAP REVISED MAY 5, 2014, AND PLAN PREPARED BY PAI DEV. PLANS REVIEW, DATED SEPTEMBER 21, 2016, PER MAP 0655F, DATED SEPTEMBER 26, 2008.
- ADDITIONAL EXISTING UTILITIES AND SITE FEATURES LOCATED WITHIN THE LIMIT OF DISTURBANCE (L.O.D.) ARE TO BE REMOVED OR TO BE RELOCATED MAY REQUIRE REMOVAL OR RELOCATION AS DIRECTED BY THE GEOTECHNICAL ENGINEER.

**BALTIMORE COUNTY STANDARD GRADING PLAN NOTES**

- THE PROPOSED GRADING SHOWN ON THIS PLAN MEETS THE REQUIREMENTS SET FORTH BY BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY AND COMPLIES WITH ARTICLE 53, TITLE 5 OF THE BALTIMORE COUNTY CODE. HOWEVER, DUE TO BUILDING TYPES AND LAYOUT, SOME FIELD ADJUSTMENTS MAY BE REQUIRED. ALL CHANGES MUST COMPLY WITH THE ABOVE MENTIONED REQUIREMENTS.
- ALL SWALES HAVE BEEN DESIGNED BY THE ENGINEER TO CONVEY RUNOFF ACCORDING TO BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS DESIGN STANDARDS.
- THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION OR DISTURBANCE OF VEGETATION IN THE FOREST BUFFER EASEMENT OR OTHER FOREST RETENTION AREAS, EXCEPT AS PERMITTED BY THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY.



**OWNER'S/DEVELOPER'S CERTIFICATION - GRADING**

I/WE CERTIFY THAT ALL GRADING ON THIS SITE WILL BE DONE IN ACCORDANCE WITH THE CURRENT GRADING REQUIREMENTS AS SET FORTH BY THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY AND WITH THE REQUIREMENTS SPECIFIED IN ARTICLE 33, TITLE 5 OF THE BALTIMORE COUNTY CODE.

SIGNATURE OF OWNER/DEVELOPER	TITLE	DATE
PRINT NAME		

**LIMIT OF DISTURBANCE: ±803,250 S.F. OR 18.44 AC.**

**MARYLAND COORDINATE SYSTEM (MCS)**

**STORMWATER MANAGEMENT REQUIRED**

BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

**APPROVED FOR GRADING**

DATE

**OWNER/DEVELOPER**

TRADEPOINT DEVELOPMENT, LLC  
1600 SPARROWS POINT BLVD  
BALTIMORE, MD 21219  
CONTACT: JOHN M. MARTIN, III, P.E.  
PHONE: 301-651-3565

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

**PROFESSIONAL CERTIFICATION**

I, MICHAEL J. GESELL, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 44897, EXPIRATION DATE: 6/30/21.

**BOHLER**

SITE CIVIL AND CONSULTING ENGINEERING  
PROGRAM MANAGEMENT  
LANDSCAPE ARCHITECTURE  
SUSTAINABLE DESIGN  
PERMITTING SERVICES  
TRANSPORTATION SERVICES

**REVISIONS**

REV	DATE	COMMENT	DRAWN BY

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Know what's below.  
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ALWAYS CALL 811  
It's fast. It's free. It's the law.

**NOT APPROVED FOR CONSTRUCTION**

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

PROJECT No.:	MD16206639
DRAWN BY:	CPH
CHECKED BY:	MUG
DATE:	3/5/2021
CAD ID:	GRAD - 0

**WASTEWATER TREATMENT PLAN REPLACEMENT PLAN FOR**

**TRADEPOINT ATLANTIC**

SHIPYARD ROAD AT TRADEPOINT AVENUE  
BALTIMORE, MD 21219  
TM 111, GRID 14 PARCEL 318  
ELECTION DISTRICT 15  
COUNCILMANIC DISTRICT 7  
BALTIMORE COUNTY

**BOHLER**

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

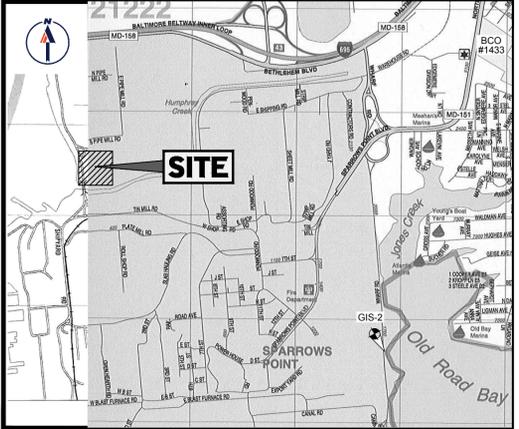
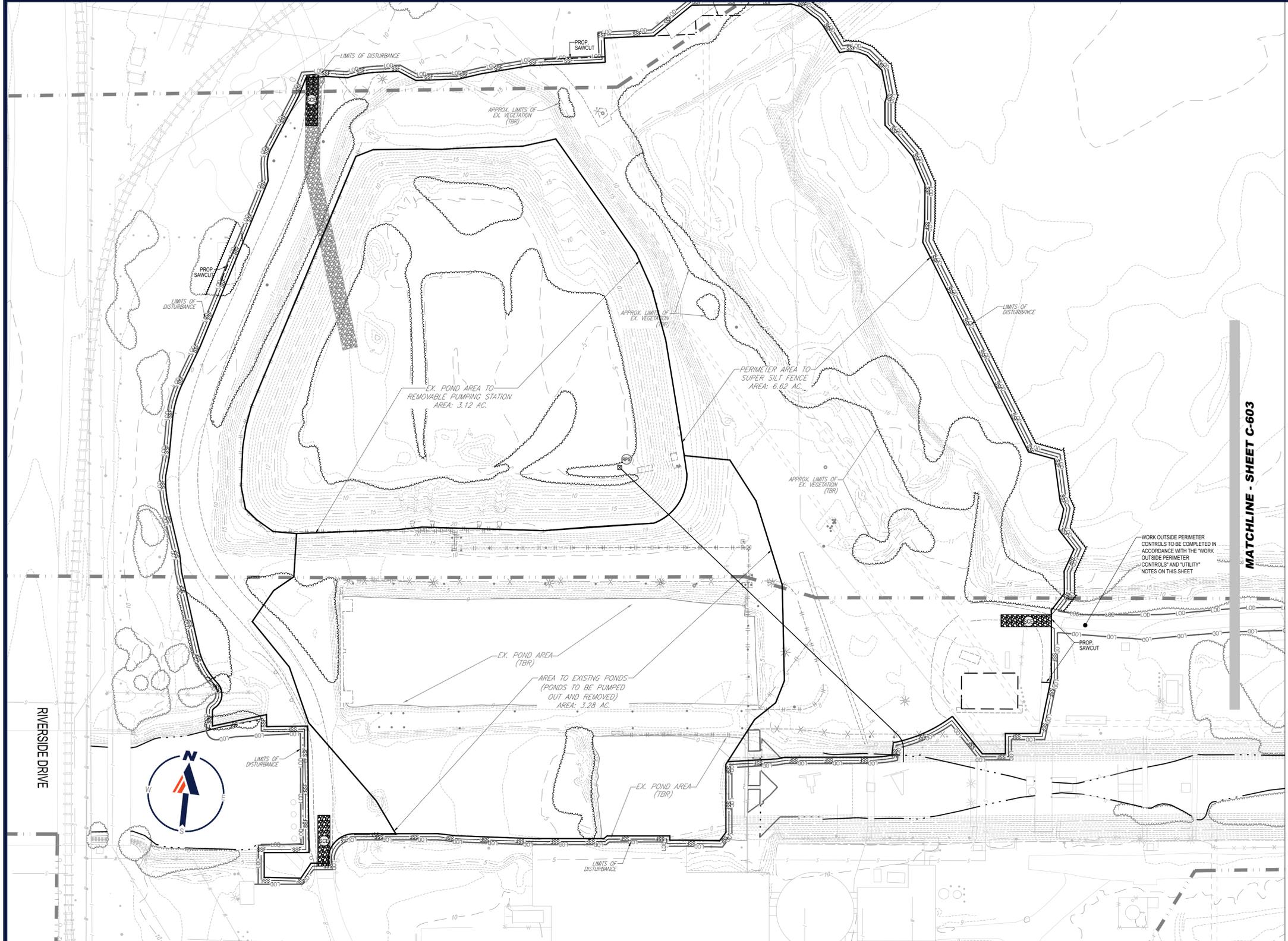
**M.J. GESELL**

PROFESSIONAL ENGINEER  
MAY 1994 LICENSE NO. 44897

SHEET TITLE:  
**FINAL GRADING PLAN**

SHEET NUMBER:  
**C-401**

ORG. DATE - 3/5/2021



**LOCATION MAP**  
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 PERMIT USE NO. 20602153-5  
 SCALE: 1"=2000'

**BENCHMARK INFORMATION**

ELEVATIONS ARE BASED ON NAVD 88. COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER THE FOLLOWING MONUMENTS:

BCO# 1433 (CAPPED REBAR)  
 N 571 683.75, E 1 486 230.69, ELEV. 16.59  
 IN MEDIAN OF NORTH POINT BLVD SOUTH OF NORTH SNYDER AVE.

GIS #2 (BRASS DISK)  
 N 565 182.39, E 1 484 480.72, ELEV. 9.95  
 EAST SIDE OF WHARF ROAD 420± NORTH OF LIGHT TOWER

**WORK OUTSIDE PERIMETER CONTROLS NOTES**

CONTRACTOR SHALL ONLY DISTURB THAT AREA WHICH CAN BE COMPLETED AND STABILIZED BY THE END OF EACH WORKING DAY. STABILIZATION SHALL BE AS FOLLOWS:

- FOR AREA TO BE PAVED, THE APPLICATION OF STONE BASE
- FOR AREAS TO BE VEGETATIVELY STABILIZED
  - PERMANENT SEED AND SOIL STABILIZATION MATTING OR SOD FOR ALL STEEP SLOPES, CHANNELS OR SWALES
  - PERMANENT SEED AND MULCH FOR ALL OTHER AREAS.

ANY AREAS WHICH CAN NOT BE STABILIZED BY THE END OF EACH WORKING DAY MUST HAVE SILT FENCE INSTALLED ON THE DOWN SLOPE SIDE.

WORK TO BE COMPLETED OUTSIDE THE SEDIMENT CONTROL MEASURES SHALL BE DONE PER THE "WORK OUTSIDE PERIMETER CONTROLS NOTES" AND "UTILITY NOTES" ON THIS SHEET.

**SITE SPECIFIC DEMOLITION NOTES**

- ADDITIONAL EXISTING UTILITIES OR EXISTING FEATURES LOCATED WITHIN THE LIMIT OF DISTURBANCE NOT IDENTIFIED AS "TO BE REMOVED" OR "TO BE RELOCATED" MAY REQUIRE REMOVAL OR RELOCATION AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR TRADEPOINT DEVELOPMENT.
- EXISTING UTILITIES NOTED AS "TO REMAIN" WITHIN THE LIMIT OF DISTURBANCE MUST BE MAINTAINED TO PROVIDE SERVICE FOR THE PROPOSED DEVELOPMENT.
- THE LOCATION OF ALL UTILITIES SHOWN ARE APPROXIMATE BASED ON BETHLEHEM STEEL RECORD DRAWINGS (BS#), BALTIMORE COUNTY RECORD DRAWINGS (DWG #), AND THE AERIAL SURVEY CAD FILES NOTED ON THE COVER SHEET. THE CONTRACTOR IS ADVISED EXCAVATION MAY BE NECESSARY.

**SAME DAY STABILIZATION NOTES**

- WHERE NO SCE IS PROVIDED, THE CONTRACTOR SHALL DESIGNATE PIECES OF CONSTRUCTION EQUIPMENT THAT SHALL BE ALLOWED WITHIN THE LOD. THIS EQUIPMENT SHALL BE KEPT WITHIN THE LOD UNTIL THE PROPOSED WORK IS COMPLETE AND SHALL HAVE TREADS/TIRES CLEANED PRIOR TO LEAVING THE LOD. ALL MATERIAL REMOVAL/LOAD OUT SHALL BE LIFTED FROM THE LOD.
- THE WORK SHOWN IN THIS AREA SHALL BE DONE USING THE METHOD OF "SAME DAY STABILIZATION": NO MORE LAND AREA (OR LENGTH OF TRENCH, SWALE, CHANNEL, ETC.) SHALL BE DISTURBED THAN CAN BE STABILIZED BY THE END OF THE WORKDAY. ALL DISTURBED AREAS THAT DO NOT DRAIN TO A SEDIMENT CONTROL DEVICE SHALL BE STABILIZED BY THE END OF THE WORKDAY. NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED OVERNIGHT UNLESS THE RUNOFF IS DIRECTED TO AN MDE APPROVED SEDIMENT CONTROL DEVICE. FOR WORK ACTIVITIES IN PAVED AREAS, THE STONE BASE COURSE LAYER MUST BE PLACED BY THE END OF THE SAME DAY TO QUALIFY AS SAME DAY STABILIZATION.

**SOIL STABILIZATION NOTE**

FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND SEVEN (7) DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.

**MAPPED SOIL TYPES**

UoB	URBAN LAND-UDORTHTS COMPLEX, 0 TO 8 PERCENT SLOPES	D	NO	NO

**UTILITY NOTE**

- CONTRACTOR SHOULD OPEN ONLY THAT SECTION OF TRENCH THAT CAN BE BACKFILLED AND STABILIZED EACH DAY. IF TRENCH MUST REMAIN OPEN LONGER THAN ONE DAY, SILT FENCE SHALL BE PLACED BELOW (DOWNSLOPE OF) THE TRENCH.
- PLACE ALL EXCAVATED MATERIAL ON UPHILL SIDE OF TRENCH.
- ANY SEDIMENT CONTROL DISTURBED BY UTILITY CONSTRUCTION ARE TO BE REPAIRED IMMEDIATELY.
- ALL UTILITIES AND STORM DRAIN SHOWN ON THIS PLAN WERE TO HAVE BEEN INSTALLED DURING MASS GRADING. CONTRACTOR IS TO VERIFY ALL UTILITIES AND STORM DRAIN ON THIS PLAN HAVE BEEN INSTALLED, AND IS TO NOTIFY BOHLER IN WRITING IF ANY DISCREPANCIES ARE FOUND.

**MAINTENANCE NOTE**

CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SEDIMENT CONTROL MEASURES AND DEVICES AFTER EVERY STORM EVENT. MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO, THE REMOVAL OF ALL ACCUMULATED SEDIMENT. GEOTEXTILE FABRIC SHALL BE REPLACED AS NEEDED TO ENSURE PROPER FUNCTION. SUPER SILT FENCE STORAGE AREAS SHALL BE DEWATERED AND SEDIMENT CLEARED OUT AFTER EVERY STORM EVENT.

**QUANTITY TAKEOFF OF SEDIMENT CONTROL MEASURES**

*ALL PHASES SUPER SILT FENCE:	5,200 L.F.
STABILIZED CONSTRUCTION ENTRANCE:	3 EA.
REMOVAL PUMPING STATION:	1 EA.
EARTH WORK (TOTAL DEVELOPMENT) CUT:	62,650 C.Y.
FILL:	76,850 C.Y.
NET:	14,200 C.Y. (FILL)

SPOIL MATERIAL SHALL BE DISCARDED AT A SITE WITH AN ACTIVE GRADING PERMIT AND APPROVED SEDIMENT CONTROL PLAN. BORROW MATERIAL SHALL BE OBTAINED FROM AN APPROVED SITE WITH AN ACTIVE GRADING PERMIT AND AN APPROVED SEDIMENT CONTROL PLAN.

EARTH QUANTITIES LISTED ABOVE ARE FOR SEDIMENT CONTROL USE ONLY. CONTRACTOR SHALL NOT RELY ON THESE FIGURES FOR ESTIMATING AND BONDING PURPOSES. EARTH QUANTITIES ARE DETERMINED BY COMPARING TOP OF EXISTING GRADE TO TOP OF FINAL GRADE.

**TEMPORARY STOCKPILE NOTES**

- TEMPORARY STOCKPILES SHALL BE:
- LOCATED WITHIN THE LIMIT OF DISTURBANCE (LOD).
  - DRAIN TO A FUNCTIONING SEDIMENT CONTROL DEVICE.
  - POSITIONED TO NOT IMPEDE UPON, OR IMPAIR THE FUNCTION OF SAID DEVICE.
  - POSITIONED TO NOT ALTER DRAINAGE DIVIDES.
- THESE ITEMS SHOULD BE INCORPORATED INTO ANY NOTE REFERENCING TEMPORARY STOCKPILES, AND WHEN ACTUALLY DELINEATING THEM ON PLAN VIEWS.

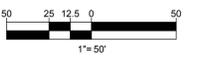
**INLET PROTECTION NOTE**

THE CONTRACTOR IS REQUIRED TO INSTALL INLET PROTECTION ON ALL STORM DRAIN INLETS WITH THE EXCEPTION OF THE FOLLOWING:

- ANY INLET OUTFALLING DIRECTLY INTO A SEDIMENT TRAPPING DEVICE.
- INLETS ON PRIVATE OR PUBLIC PAVED ROAD OPEN TO THE PUBLIC.

ALL INLET PROTECTION WILL BE INSTALLED AS DIRECTED BY THE INSPECTOR IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, PAGE E-23. THE REMOVAL OF ANY INLET PROTECTION DEVICES WILL REQUIRE APPROVAL FROM THE INSPECTOR.

\*STORM DRAIN TO BE FLUSHED PRIOR TO TRAPPING DEVICE REMOVAL.



REVIEWED AND APPROVED FOR SEDIMENT CONTROL UNDER SECTION 4-105

BY \_\_\_\_\_ DATE \_\_\_\_\_  
 MARYLAND DEPARTMENT OF THE ENVIRONMENT

**NOTE TO CONTRACTOR:**

EROSION/SEDIMENT CONTROL WILL BE STRICTLY ENFORCED.

LIMIT OF DISTURBANCE: ±803,250 S.F. OR 18.44 AC.

**OWNER / DEVELOPER**

TRADEPOINT ATLANTIC, LLC  
 1600 SPARROWS POINT BLVD  
 BALTIMORE, MD 21219  
 CONTACT: JOHN M. MARTIN III, P.E.  
 PHONE: 301-651-3565

E&S 1 OF 5

MDE PROJECT #:  
 20-SF-0118

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

PROFESSIONAL CERTIFICATION  
 I, MICHAEL J. GESELL, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 44897, EXPIRATION DATE: 6/30/21

**BOHLER**  
 SITE CIVIL AND CONSULTING ENGINEERING  
 PROGRAM MANAGEMENT  
 LANDSCAPE ARCHITECTURE  
 SUSTAINABLE DESIGN  
 PERMITTING SERVICES  
 TRANSPORTATION SERVICES

**REVISIONS**

REV	DATE	COMMENT	DRAWN BY	CHECKED BY

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PROJECT No.: MD16206639 CPH  
 DRAWN BY: MUG  
 CHECKED BY: 3/5/2021  
 DATE: EROS-0  
 CAD ID:

**WASTEWATER TREATMENT PLANT REPLACEMENT PLAN FOR**



SHIPYARD ROAD AT TRADEPOINT AVENUE  
 BALTIMORE, MD 21219  
 TM 111, GRID 14 PARCEL 318  
 ELECTION DISTRICT 15  
 COUNCILMANIC DISTRICT 7  
 BALTIMORE COUNTY

**BOHLER**

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

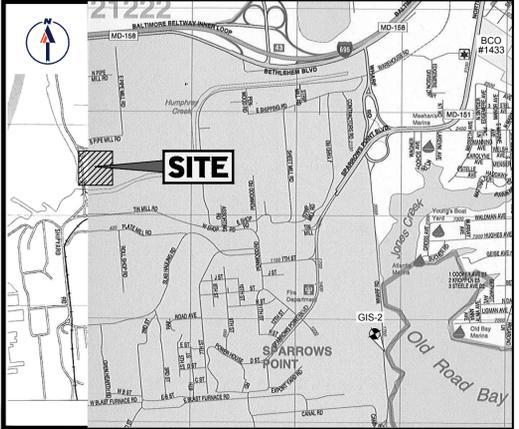
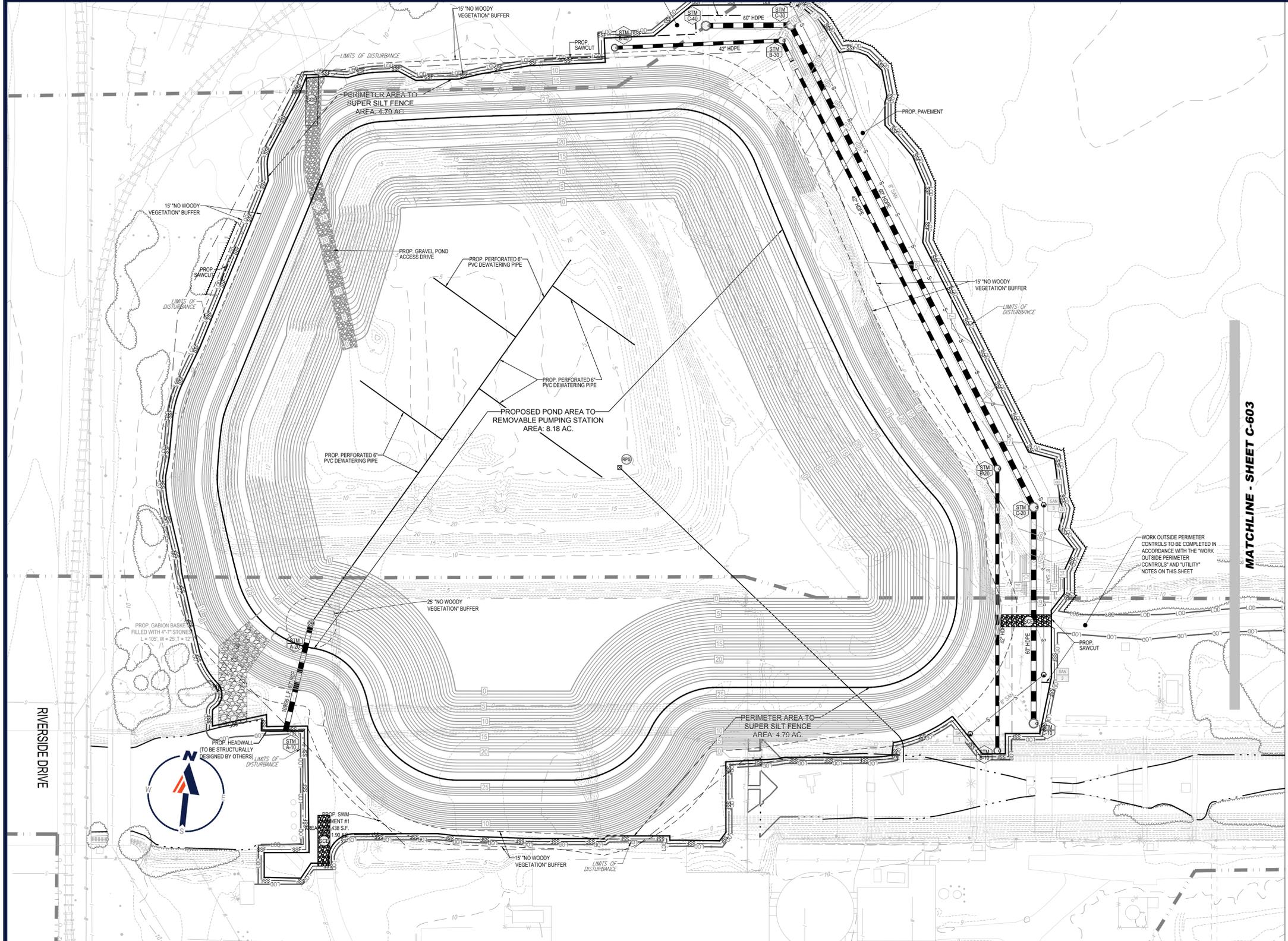
M.J. GESELL

PROFESSIONAL ENGINEER  
 MARYLAND LICENSE NO. 44897

**PHASE I EROSION AND SEDIMENT CONTROL PLAN**

SHEET NUMBER:  
**C-601**

ORG. DATE - 3/5/2021



**LOCATION MAP**  
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 PERMIT USE NO. 20602153-5  
 SCALE: 1"=2000'

**BENCHMARK INFORMATION**  
 ELEVATIONS ARE BASED ON NAVD 88. COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER THE FOLLOWING MONUMENTS:  
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 EAST SIDE OF WHARF ROAD 420' NORTH OF LIGHT TOWER

**BOHLER**  
 SITE CIVIL AND CONSULTING ENGINEERING  
 PROGRAM MANAGEMENT  
 LANDSCAPE ARCHITECTURE  
 SUSTAINABLE DESIGN  
 PERMITTING SERVICES  
 TRANSPORTATION SERVICES

**REVISIONS**

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PROJECT No.:	MD16206639
DRAWN BY:	CPH
CHECKED BY:	MUG
DATE:	3/5/2021
CAD ID:	EROS - 0

**WASTEWATER TREATMENT PLANT REPLACEMENT PLAN**  
 FOR  
**TRADEPOINT ATLANTIC**

SHIPYARD ROAD AT TRADEPOINT AVENUE  
 BALTIMORE, MD 21219  
 TM 111, GRID 14 PARCEL 318  
 ELECTION DISTRICT 15  
 COUNCILMANIC DISTRICT 7  
 BALTIMORE COUNTY

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

**M.J. GESELL**  
 PROFESSIONAL ENGINEER  
 MARYLAND LICENSE NO. 44907

**PHASE II EROSION AND SEDIMENT CONTROL PLAN**  
 SHEET NUMBER: **C-602**  
 ORG. DATE - 3/5/2021

**WORK OUTSIDE PERIMETER CONTROLS NOTES**

CONTRACTOR SHALL ONLY DISTURB THAT AREA WHICH CAN BE COMPLETED AND STABILIZED BY THE END OF EACH WORKING DAY. STABILIZATION SHALL BE AS FOLLOWS:  
 1. FOR AREA TO BE PAVED, THE APPLICATION OF STONE BASE  
 2. FOR AREAS TO BE VEGETATIVELY STABILIZED  
 a. PERMANENT SEED AND SOIL STABILIZATION MATTING OR SOD FOR ALL STEEP SLOPES, CHANNELS OR SWALES  
 b. PERMANENT SEED AND MULCH FOR ALL OTHER AREAS  
 ANY AREAS WHICH CAN NOT BE STABILIZED BY THE END OF EACH WORKING DAY MUST HAVE SILT FENCE INSTALLED ON THE DOWN SLOPE SIDE.

WORK TO BE COMPLETED OUTSIDE THE SEDIMENT CONTROL MEASURES SHALL BE DONE PER THE "WORK OUTSIDE PERIMETER CONTROLS NOTES" AND "UTILITY NOTES" ON THIS SHEET.

**SITE SPECIFIC DEMOLITION NOTES**

- ADDITIONAL EXISTING UTILITIES OR EXISTING FEATURES LOCATED WITHIN THE LIMIT OF DISTURBANCE NOT IDENTIFIED AS "TO BE REMOVED" OR "TO BE RELOCATED" MAY REQUIRE REMOVAL OR RELOCATION AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR TRADEPOINT DEVELOPMENT.
- EXISTING UTILITIES NOTED AS "TO REMAIN" WITHIN THE LIMIT OF DISTURBANCE MUST BE MAINTAINED TO PROVIDE SERVICE FOR THE PROPOSED DEVELOPMENT.
- THE LOCATION OF ALL UTILITIES SHOWN ARE APPROXIMATE BASED ON BETHLEHEM STEEL RECORD DRAWINGS (BSR), BALTIMORE COUNTY RECORD DRAWINGS (DWG #), AND THE AERIAL SURVEY CAD FILES NOTED ON THE COVER SHEET. THE CONTRACTOR IS ADVISED EXCAVATION MAY BE NECESSARY.
- CONTRACTOR IS TO COORDINATE WITH TRADEPOINT DEVELOPMENT AND BOE FOR ANY UTILITY POLE RELOCATIONS THAT ARE REQUIRED TO CONSTRUCT THE IMPROVEMENTS SHOWN IN THIS PLAN SET.
- SUBGRADE SITE FEATURES ARE SHOWN BASED UPON INFORMATION PROVIDED BY MCM MANAGEMENT CORPORATION, ENTITLED: SPARROWS POINT FACILITY, COLD SHEET MILL; SUBGRADE STRUCTURE LOCATION EXHIBIT, DATED 5/13/16, JOB NO. 151117.01 AND HAVE NOT BEEN VERIFIED BY BOHLER ENGINEERING.

**SAME DAY STABILIZATION NOTES**

- WHERE NO SCE IS PROVIDED, THE CONTRACTOR SHALL DESIGNATE PIECES OF CONSTRUCTION EQUIPMENT THAT SHALL BE ALLOWED WITHIN THE LOD. THIS EQUIPMENT SHALL BE KEPT WITHIN THE PROPOSED WORK IS COMPLETE AND SHALL HAVE TREADS/TIRES CLEANED PRIOR TO LEAVING THE LOD. ALL MATERIAL REMOVAL/LOAD OUT SHALL BE LIFTED FROM THE LOD.
- THE WORK SHOWN IN THIS AREA SHALL BE DONE USING THE METHOD OF "SAME DAY STABILIZATION": NO MORE LAND AREA (OR LENGTH OF TRENCH, SWALE, CHANNEL, ETC.) SHALL BE DISTURBED THAN CAN BE STABILIZED BY THE END OF THE WORKDAY. ALL DISTURBED AREAS THAT DO NOT DRAIN TO A SEDIMENT CONTROL DEVICE SHALL BE STABILIZED BY THE END OF THE WORKDAY. NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED OVERNIGHT UNLESS THE RUNOFF IS DIRECTED TO AN MDE APPROVED SEDIMENT CONTROL DEVICE. FOR WORK ACTIVITIES IN PAVED AREAS, THE STONE BASE COURSE LAYER MUST BE PLACED BY THE END OF THE SAME DAY TO QUALIFY AS SAME DAY STABILIZATION.

**SOIL STABILIZATION NOTE**

FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND SEVEN (7) DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.

**MAPPED SOIL TYPES**

UoB	URBAN LAND-UDORTHTS COMPLEX, 0 TO 8 PERCENT SLOPES	D	NO	NO

**UTILITY NOTE**

- CONTRACTOR SHOULD OPEN ONLY THAT SECTION OF TRENCH THAT CAN BE BACKFILLED AND STABILIZED EACH DAY. IF TRENCH MUST REMAIN OPEN LONGER THAN ONE DAY, SILT FENCE SHALL BE PLACED BELOW (DOWNSLOPE OF) THE TRENCH.
- PLACE ALL EXCAVATED MATERIAL ON UPHILL SIDE OF TRENCH.
- ANY SEDIMENT CONTROL DISTURBED BY UTILITY CONSTRUCTION ARE TO BE REPAIRED IMMEDIATELY.
- ALL UTILITIES AND STORM DRAIN SHOWN ON THIS PLAN WERE TO HAVE BEEN INSTALLED DURING MASS GRADING. CONTRACTOR IS TO VERIFY ALL UTILITIES AND STORM DRAIN ON THIS PLAN HAVE BEEN INSTALLED, AND IS TO NOTIFY BOHLER IN WRITING IF ANY DISCREPANCIES ARE FOUND.

**MAINTENANCE NOTE**

CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SEDIMENT CONTROL MEASURES AND DEVICES AFTER EVERY STORM EVENT. MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO, THE REMOVAL OF ALL ACCUMULATED SEDIMENT. GEOTEXTILE FABRIC SHALL BE REPLACED AS NEEDED TO ENSURE PROPER FUNCTION. SUPER SILT FENCE STORAGE AREAS SHALL BE DEWATERED AND SEDIMENT CLEANED OUT AFTER EVERY STORM EVENT.

**QUANTITY TAKEOFF OF SEDIMENT CONTROL MEASURES**

*ALL PHASES SUPER SILT FENCE:	5,200 L.F.
STABILIZED CONSTRUCTION ENTRANCE:	3 EA.
REMOVABLE PUMPING STATION:	1 EA.

EARTH WORK (TOTAL DEVELOPMENT)	10,590 C.Y.
CUT:	68,850 C.Y.
FILL:	58,260 C.Y. (FILL)
NET:	

SPOIL MATERIAL SHALL BE DISCARDED AT A SITE WITH AN ACTIVE GRADING PERMIT AND APPROVED SEDIMENT CONTROL PLAN. BORROW MATERIAL SHALL BE OBTAINED FROM AN APPROVED SITE WITH AN ACTIVE GRADING PERMIT AND AN APPROVED SEDIMENT CONTROL PLAN.

EARTH QUANTITIES LISTED ABOVE ARE FOR SEDIMENT CONTROL. USE ONLY CONTRACTOR SHALL NOT RELY ON THESE FIGURES FOR ESTIMATING AND BONDING PURPOSES. EARTH QUANTITIES ARE DETERMINED BY COMPARING TOP OF EXISTING GRADE TO TOP OF FINAL GRADE.

**TEMPORARY STOCKPILE NOTES**

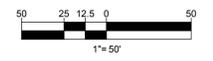
- TEMPORARY STOCKPILES SHALL BE:
- LOCATED WITHIN THE LIMIT OF DISTURBANCE (LOD).
  - DRAIN TO A FUNCTIONING SEDIMENT CONTROL DEVICE.
  - POSITIONED TO NOT IMPEDE UPON, OR IMPAIR THE FUNCTION OF SAID DEVICE.
  - POSITIONED TO NOT ALTER DRAINAGE DIVIDES.
- THESE ITEMS SHOULD BE INCORPORATED INTO ANY NOTE REFERENCING TEMPORARY STOCKPILES, AND WHEN ACTUALLY DELINEATING THEM ON PLAN VIEWS.

**INLET PROTECTION NOTE**

THE CONTRACTOR IS REQUIRED TO INSTALL INLET PROTECTION ON ALL STORM DRAIN INLETS WITH THE EXCEPTION OF THE FOLLOWING:

- ANY INLET OUTFALLING DIRECTLY INTO A SEDIMENT TRAPPING DEVICE.
- INLETS ON PRIVATE OR PUBLIC PAVED ROAD OPEN TO THE PUBLIC.

ALL INLET PROTECTION WILL BE INSTALLED AS DIRECTED BY THE INSPECTOR IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, PAGE E-23. THE REMOVAL OF ANY INLET PROTECTION DEVICES WILL REQUIRE APPROVAL FROM THE INSPECTOR.  
 \*STORM DRAIN TO BE FLUSHED PRIOR TO TRAPPING DEVICE REMOVAL.



REVIEWED AND APPROVED FOR SEDIMENT CONTROL UNDER SECTION 4-105  
 BY \_\_\_\_\_ DATE \_\_\_\_\_  
 MARYLAND DEPARTMENT OF THE ENVIRONMENT

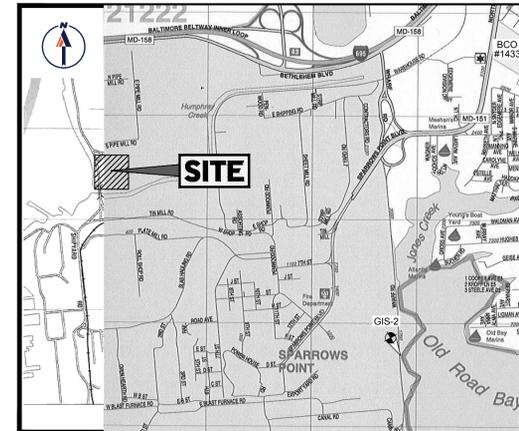
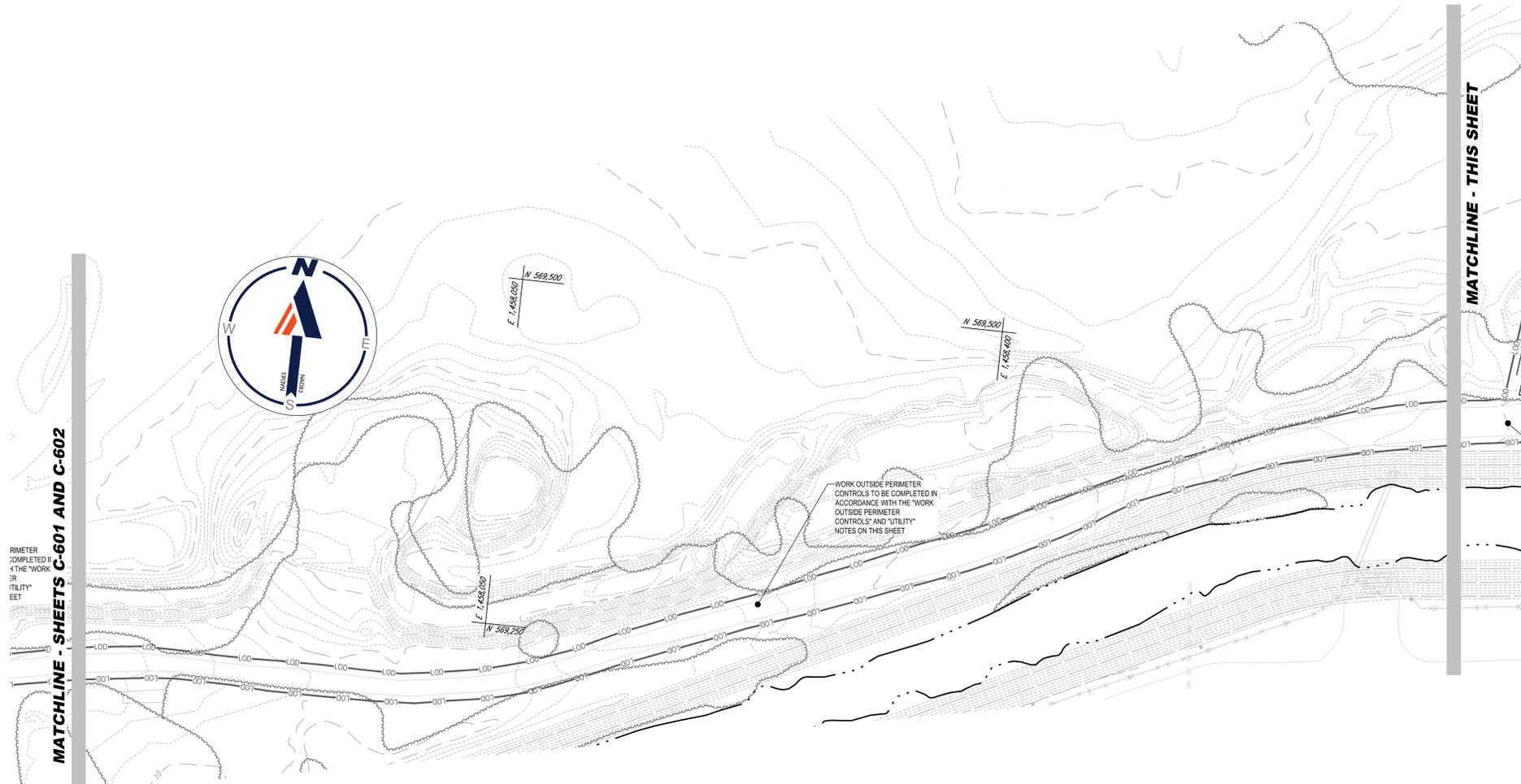
**OWNER / DEVELOPER**  
 TRADEPOINT ATLANTIC, LLC  
 1600 SPARROWS POINT BLVD  
 BALTIMORE, MD 21219  
 CONTACT: JOHN M. MARTIN III, P.E.  
 PHONE: 201-651-3565

**E&S 2 OF 5**  
**MDE PROJECT #:**  
**20-SF-0118**

**NOTE TO CONTRACTOR:**  
 EROSION/SEDIMENT CONTROL WILL BE STRICTLY ENFORCED.  
**LIMIT OF DISTURBANCE: ±803,250 S.F. OR 18.44 AC.**

ELEVATIONS BASED ON NAVD 88, COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER MONUMENTS BCO #1433 AND GIS 2  
 PROFESSIONAL CERTIFICATION  
 I, MICHAEL J. GESELL, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 44907, EXPIRATION DATE: 6/30/21

APR 09, 2021  
 H:\16101020639\DRAWINGS\PLAN SETS\MAD\202003 - EROS - 0 - LAYOUT - C-602 PHASE II.EROS



**LOCATION MAP**  
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 SCALE: 1"=2000'

**BENCHMARK INFORMATION**

ELEVATIONS ARE BASED ON NAVD 88. COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER THE FOLLOWING MONUMENTS:

- BCOH 1433 (CAPPED REBAR)  
 N 571,883.79; E 1,486,230.69; ELEV. 16.59  
 IN MEDIAN OF NORTH POINT BLVD SOUTH OF NORTH SNYDER AVE.
- GIS #2 (BRASS DISK)  
 N 565,182.39; E 1,484,480.72; ELEV. 9.95  
 EAST SIDE OF WHARF ROAD 420± NORTH OF LIGHT TOWER

**TEMPORARY STOCKPILE NOTES**

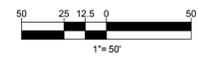
TEMPORARY STOCKPILES SHALL BE:

- LOCATED WITHIN THE LIMIT OF DISTURBANCE (LOD).
  - DRAIN TO A FUNCTIONING SEDIMENT CONTROL DEVICE.
  - POSITIONED TO NOT IMPEDE UPON, OR IMPAIR THE FUNCTION OF SAID DEVICE.
  - POSITIONED TO NOT ALTER DRAINAGE DIVIDES.
- THESE ITEMS SHOULD BE INCORPORATED INTO ANY NOTE REFERENCING TEMPORARY STOCKPILES, AND WHEN ACTUALLY DELINEATING THEM ON PLAN VIEWS.

**WORK OUTSIDE PERIMETER CONTROLS NOTES**

- CONTRACTOR SHALL ONLY DISTURB THAT AREA WHICH CAN BE COMPLETED AND STABILIZED BY THE END OF EACH WORKING DAY. STABILIZATION SHALL BE AS FOLLOWS:
- FOR AREA TO BE PAVED, THE APPLICATION OF STONE BASE
  - FOR AREAS TO BE VEGETATIVELY STABILIZED
    - PERMANENT SEED AND SOIL STABILIZATION MATTING OR SOD FOR ALL STEEP SLOPES, CHANNELS OR SWALES
    - PERMANENT SEED AND MULCH FOR ALL OTHER AREAS.
- ANY AREAS WHICH CAN NOT BE STABILIZED BY THE END OF EACH WORKING DAY MUST HAVE SILT FENCE INSTALLED ON THE DOWN SLOPE SIDE.

WORK TO BE COMPLETED OUTSIDE THE SEDIMENT CONTROL MEASURES SHALL BE DONE PER THE "WORK OUTSIDE PERIMETER CONTROLS NOTES" AND "UTILITY NOTES" ON THIS SHEET.



REVIEWED AND APPROVED FOR SEDIMENT CONTROL UNDER SECTION 4-105

BY \_\_\_\_\_ DATE \_\_\_\_\_

MARYLAND DEPARTMENT OF THE ENVIRONMENT

**NOTE TO CONTRACTOR:**

EROSION/SEDIMENT CONTROL WILL BE STRICTLY ENFORCED.

LIMIT OF DISTURBANCE: ±803,250 S.F. OR 18.44 AC.

**OWNER / DEVELOPER**  
 TRADEPOINT ATLANTIC, LLC  
 1600 SPARROWS POINT BLVD  
 BALTIMORE, MD 21219  
 CONTACT: JOHN M. MARTIN III, P.E.  
 PHONE: 301-851-9565

E&S 3 OF 5  
 MDE PROJECT #: 20-SF-0118

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

PROFESSIONAL CERTIFICATION  
 I, MICHAEL J. GESELL, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 44097, EXPIRATION DATE: 6/30/21

**BOHLER**  
 SITE CIVIL AND CONSULTING ENGINEERING  
 PROGRAM MANAGEMENT  
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PROJECT No.: MD16206639  
 DRAWN BY: CPH  
 CHECKED BY: MUG  
 DATE: 3/5/2021  
 CAD ID: EROS - 0

**WASTEWATER TREATMENT PLANT REPLACEMENT PLAN FOR**



SHIPYARD ROAD AT TRADEPOINT AVENUE  
 BALTIMORE, MD 21219  
 TM 111, GRID 14 PARCEL 318  
 ELECTION DISTRICT 15  
 COUNCILMANIC DISTRICT 7  
 BALTIMORE COUNTY

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

M.J. GESELL  
 PROFESSIONAL ENGINEER  
 MARYLAND LICENSE NO. 44097

SHEET TITLE: **EROSION AND SEDIMENT CONTROL STOCKPILE**

SHEET NUMBER: **C-603**

ORG. DATE - 3/5/2021

**B-4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION**

**DEFINITION**  
USING VEGETATION AS COVER TO PROTECT EXPOSED SOIL FROM EROSION.

**PURPOSE**  
TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL.

**CONDITIONS WHERE PRACTICE APPLIES**

ON ALL DISTURBED AREAS NOT STABILIZED BY OTHER METHODS, THIS SPECIFICATION IS DIVIDED INTO SECTIONS ON INCREMENTAL STABILIZATION, SOIL PREPARATION, SOIL AMENDMENTS AND TOPSOILING, SEEDING AND MULCHING, TEMPORARY STABILIZATION, AND PERMANENT STABILIZATION.

**EFFECTS ON WATER QUALITY AND QUANTITY**

STABILIZATION PRACTICES ARE USED TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL. WHEN SOIL IS STABILIZED WITH VEGETATION, THE SOIL IS LESS LIKELY TO ERODE AND MORE LIKELY TO ALLOW INFILTRATION OF RAINFALL, THEREBY REDUCING SEDIMENT LOADS AND RUNOFF TO DOWNSTREAM AREAS.

PLANTING VEGETATION IN DISTURBED AREAS WILL HAVE AN EFFECT ON THE WATER BUDGET, ESPECIALLY ON VOLUMES AND RATES OF RUNOFF, INFILTRATION, EVAPORATION, TRANSPIRATION, PERCOLATION, AND GROUNDWATER RECHARGE. OVER TIME, VEGETATION WILL INCREASE ORGANIC MATTER CONTENT AND IMPROVE THE WATER HOLDING CAPACITY OF THE SOIL AND SUBSEQUENT PLANT GROWTH.

VEGETATION WILL HELP REDUCE THE MOVEMENT OF SEDIMENT, NUTRIENTS, AND OTHER CHEMICALS CARRIED BY RUNOFF TO RECEIVING WATERS. PLANTS WILL ALSO HELP PROTECT GROUNDWATER SUPPLIES BY ASSIMILATING THOSE SUBSTANCES PRESENT WITHIN THE ROOT ZONE.

SEDIMENT CONTROL PRACTICES IN PLACE DURING GRADING, SEEDBED PREPARATION, SEEDING, MULCHING, AND VEGETATIVE ESTABLISHMENT.

**ADEQUATE VEGETATIVE ESTABLISHMENT**

- INSPECT SEEDING AREAS FOR VEGETATIVE ESTABLISHMENT AND MAKE NECESSARY REPAIRS, REPLACEMENTS, AND RESEEDINGS WITHIN THE PLANTING SEASON.
1. ADEQUATE VEGETATIVE STABILIZATION REQUIRES 95 PERCENT GROUND COVER.
2. IF AN AREA HAS LESS THAN 40 PERCENT GROUND COVER, REESTABLISH FOLLOWING THE ORIGINAL RECOMMENDATIONS FOR LIME, FERTILIZER, SEEDBED PREPARATION, AND SEEDING.
3. IF AN AREA HAS BETWEEN 40 AND 94 PERCENT GROUND COVER, OVER-SEED AND FERTILIZE USING HALF OF THE RATES ORIGINALLY SPECIFIED.
4. MAINTENANCE FERTILIZER RATES FOR PERMANENT SEEDING ARE SHOWN IN TABLE B.6.

**B-4.1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION**

**DEFINITION**  
ESTABLISHMENT OF VEGETATIVE COVER ON CUT AND FILL SLOPES.

**PURPOSE**  
TO PROVIDE TIMELY VEGETATIVE COVER ON CUT AND FILL SLOPES AS WORK PROGRESSES.

**CONDITIONS WHERE PRACTICE APPLIES**  
ANY CUT OR FILL SLOPE GREATER THAN 15 FEET IN HEIGHT. THIS PRACTICE ALSO APPLIES TO STOCKPILES.

**CRITERIA**

- INCREMENTAL STABILIZATION - CUT SLOPES
1. EXCAVATE AND STABILIZE CUT SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL CUT SLOPES AS THE WORK PROGRESSES.
2. STABILIZE SLOPES IMMEDIATELY WHEN THE VERTICAL HEIGHT OF A LIFT REACHES 15 FEET, OR WHEN THE GRADING OPERATION CEASES AS DESCRIBED IN THE PLANS.
3. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
4. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO CONVEY RUNOFF AROUND THE EXCAVATION.
b. PERFORMANCE PHASE 1 EXCAVATION, PREPARE SEEDBED, AND STABILIZE.
c. PERFORMANCE PHASE 2 EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PHASE 1 AREAS AS NECESSARY.
d. PERFORMANCE FINAL PHASE EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDBED AREAS AS NECESSARY.

NOTE: ONCE EXCAVATION HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETION OF THE OPERATION DURING THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

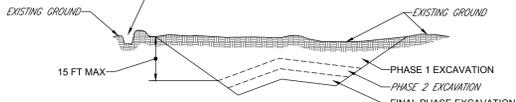


FIGURE B.1: INCREMENTAL STABILIZATION - CUT

- INCREMENTAL STABILIZATION - FILL SLOPES
1. CONSTRUCT AND STABILIZE FILL SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND MULCH ON ALL SLOPES AS THE WORK PROGRESSES.
2. STABILIZE SLOPES IMMEDIATELY WHEN THE VERTICAL HEIGHT OF A LIFT REACHES 15 FEET, OR WHEN THE GRADING OPERATION CEASES AS DESCRIBED IN THE PLANS.
3. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
4. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO DIVERT RUNOFF AROUND THE FILL. CONSTRUCT SILT FENCE ON LOW SIDE OF FILL UNLESS OTHER METHODS SHOWN ON THE PLANS ADDRESS THIS AREA.
b. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
c. PLACE PHASE 1 FILL, PREPARE SEEDBED, AND STABILIZE.
d. PLACE PHASE 2 FILL, PREPARE SEEDBED, AND STABILIZE.
e. PLACE FINAL PHASE FILL, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDBED AREAS AS NECESSARY.

NOTE: ONCE THE PLACEMENT OF FILL HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

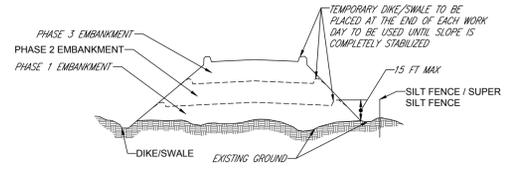


FIGURE B.2: INCREMENTAL STABILIZATION - FILL

**B-4.2 STANDARDS AND SPECIFICATIONS FOR SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS**

**DEFINITION**  
THE PROCESS OF PREPARING THE SOILS TO SUSTAIN ADEQUATE VEGETATIVE STABILIZATION.

**PURPOSE**  
TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH.

**CONDITIONS WHERE PRACTICE APPLIES**

WHERE VEGETATIVE STABILIZATION IS TO BE ESTABLISHED.

**CRITERIA**

- SOIL PREPARATION
1. TEMPORARY STABILIZATION
a. SEEDBED PREPARATION CONSISTS OF LOOSENING SOIL TO A DEPTH OF 3 TO 5 INCHES BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS OR CHISEL PLOWS OR RIPPERIS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED, IT MUST NOT BE ROLLED OR DRAGGED SMOOTH BUT LEFT IN THE ROUGHENED CONDITION. SLOPES 3:1 OR FLATTER ARE TO BE TRACKED WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.
b. APPLY FERTILIZER AND LIME AS PRESCRIBED ON THE PLANS.
c. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.

**2. PERMANENT STABILIZATION**

- a. A SOIL TEST IS REQUIRED FOR ANY EARTH DISTURBANCE OF 5 ACRES OR MORE. THE MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT ARE:
i. SOIL PH BETWEEN 6.0 AND 7.0.
ii. SOLUBLE SALTS LESS THAN 500 PARTS PER MILLION (PPM).
iii. SOIL CONTAINS LESS THAN 40 PERCENT CLAY BUT ENOUGH FINE GRAINED MATERIAL (GREATER THAN 10 PERCENT SILT TO 2 INCHES) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION IF 10 PERCENT WILL BE PLANTED, THEN A SANDY SOIL (LESS THAN 30 PERCENT SILT PLUS CLAY) WOULD BE ACCEPTABLE.
iv. SOIL CONTAINS 1.5 PERCENT MINIMUM ORGANIC MATTER BY WEIGHT.
v. SOIL CONTAINS SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.
b. SOIL AMENDMENTS OR TOPSOIL IS REQUIRED IF ON-SITE SOILS DO NOT MEET THE ABOVE CONDITIONS.
c. GRADED AREAS MUST BE MAINTAINED IN A TRUE AND EVEN GRADE AS SPECIFIED ON THE APPROVED PLANS. THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES.
d. APPLY SOIL AMENDMENTS AS SPECIFIED ON THE APPROVED PLANS OR AS INDICATED BY THE RESULTS OF A SOIL TEST.
e. MIX SOIL INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS. RAKE LAWN AREAS TO SMOOTH THE SURFACE. REMOVE LARGE OBJECTS LIKE STONES PERMANENTLY AND REFRACTORY MATERIALS TO A DEPTH OF 2 INCHES.
f. DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION. TRACK SLOPES 3:1 OR FLATTER WITH TRACKED PNEUMATIC EQUIPMENT. SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. LEAVE THE TOP 1 TO 3 INCHES OF SOIL LOOSE AND FRAGILE. SEEDBED LOOSENING MAY BE UNNECESSARY ON NEWLY DISTURBED AREAS.

**B. TOPSOILING**

- 1. TOPSOIL IS PLACED OVER PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION. THE PURPOSE IS TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.
2. TOPSOIL SALVAGED FROM AN EXISTING SITE MAY BE USED PROVIDED IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-NRCS.
3. TOPSOILING IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPES WHERE:
a. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.
b. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.
c. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.
d. THE SOIL MATERIAL IS TOO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.
e. AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN.
f. TOPSOIL SPECIFICATIONS: SOIL TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING CRITERIA:
i. UNIFORMLY DISTRIBUTED TOPSOIL AT A 5 TO 8 INCH LAYER AND LIGHTLY COMPACT TO A MINIMUM THICKNESS OF 4 INCHES. SPREADING IS TO BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED IMMEDIATELY.
ii. MINIMUM MOISTURE CONTENT AT THE TIME OF SPREADING.
iii. FREQUILACIOUS IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS MUST BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.
iv. TOPSOIL MUST NOT BE RE-AGED IF THE TOPSOIL SUBSTRATE IS NOT IN A NON-EROSIVE CONDITION. WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.
5. TOPSOIL APPLICATION
a. EROSION AND SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED WHEN APPLYING TOPSOIL.
b. UNIFORMLY DISTRIBUTE TOPSOIL AT A 5 TO 8 INCH LAYER AND LIGHTLY COMPACT TO A MINIMUM THICKNESS OF 4 INCHES. SPREADING IS TO BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED IMMEDIATELY.
c. FREQUILACIOUS IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS MUST BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.
d. TOPSOIL MUST NOT BE RE-AGED IF THE TOPSOIL SUBSTRATE IS NOT IN A NON-EROSIVE CONDITION. WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.

**C. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)**

- 1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OF 5 ACRES OR MORE. SOIL ANALYSIS MAY BE PERFORMED BY A RECOGNIZED PRIVATE OR COMMERCIAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSES.
2. FERTILIZERS MUST BE UNIFORM IN COMPOSITION, FREE FLOWING AND SUITABLE FOR ACCURATE APPLICATION BY APPROPRIATE EQUIPMENT. MANUFACTURER'S LABELS MUST BE USED FOR PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS MUST ALL BE APPLIED TO THE SAME ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AND MUST BEAR THE NAME, TRADE NAME OR TRADEMARK AND WARRANTY OF THE PRODUCER.
3. LIME MATERIALS MUST BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED EXCEPT WHEN HYDROSEEDING) WHICH CONTAINS AT LEAST 90 PERCENT CALCIUM OXIDE PLUS MAGNESIUM OXIDE. LIMESTONE MUST BE GROUND TO SUCH FINENESS THAT AT LEAST 90 PERCENT WILL PASS THROUGH A NO. 100 (150 MICRON) SIEVE AND AT LEAST 80 PERCENT THROUGH A #20 MESH SIEVE.
4. LIME AND FERTILIZER ARE TO BE EVENLY DISTRIBUTED AND INCORPORATED INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
5. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, SPREAD GROUND LIMESTONE AT THE RATE OF 8 TO 10 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL.

**B-4.3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING**

**DEFINITION**  
THE APPLICATION OF SEED AND MULCH TO ESTABLISH VEGETATIVE COVER.

**PURPOSE**  
TO PROTECT DISTURBED SOILS FROM EROSION DURING AND AT THE END OF CONSTRUCTION.

**CONDITIONS WHERE PRACTICE APPLIES**

TO THE SURFACE OF ALL PERIMETER CONTROLS, SLOPES, AND ANY DISTURBED AREA NOT UNDER ACTIVE GRADING.

**CRITERIA**

- A. SEEDING
1. SPECIFICATIONS
a. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED MUST BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED MUST HAVE BEEN TESTED WITHIN THE 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SEEDING. MATERIAL ON ANY PROJECT REFER TO TABLE B.4 REGARDING THE QUALITY OF SEED. SEED TAGS MUST BE AVAILABLE UPON REQUEST TO THE INSPECTOR TO VERIFY TYPE OF SEED AND SEEDING RATE.
b. MULCH ALONE MAY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES ONLY IF THE GROUND IS FROZEN. THE APPROPRIATE SEEDING MIXTURE MUST BE APPLIED TO THE GRASS AND THAWS.
c. INOCULANTS: THE INOCULANT FOR TREATING LEGUME SEED IN THE SEED MIXTURES MUST BE A PURE CULTURE OF NITROGEN FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS MUST NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANTS AS DIRECTED ON THE PACKAGE. USE FOUR TIMES THE RECOMMENDED RATE WHEN HYDROSEEDING. NOTE: IT IS VERY IMPORTANT TO KEEP INOCULANTS AS COOL AS POSSIBLE UNTIL USED. TEMPERATURES ABOVE 70 TO 80 DEGREES FAHRENHEIT CAN WEAKEN BACTERIA AND MAKE THE INOCULANT LESS EFFECTIVE.
d. SOD OR SEED MUST NOT BE PLACED ON SOIL WHICH HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL, UNTIL SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF PHYTO-TOXIC MATERIALS.
2. APPLICATION
a. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.
i. INCORPORATE SEED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON TEMPORARY SEEDING TABLE B.1, PERMANENT SEEDING TABLE B.3, OR SITE-SPECIFIC SEEDING SUMMARIES.
ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER, APPLY HALF THE SEEDING RATE IN EACH DIRECTION. ROLL THE SEEDBED AREA WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.
iii. DRILL OR CULTIPLACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.
i. CULTIPLACKER SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST 1/4 INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.
ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER, APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
iii. HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER).
iv. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES SHOULD NOT EXCEED THE FOLLOWING: NITROGEN: 100 POUNDS PER ACRE TOTAL OF SOLUBLE NITROGEN; P205 (PHOSPHOROUS): 200 POUNDS PER ACRE; K2O (POTASSIUM): 200 POUNDS PER ACRE.
v. LIME: USE ONLY GROUND AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE MAY BE APPLIED BY MEANS OF A SPREADER). LIME IS NOT REQUIRED FOR HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN HYDROSEEDING.
vi. MIX SEED AND FERTILIZER ON SITE AND SEED IMMEDIATELY AND WITHOUT INTERRUPTION.
b. WHEN HYDROSEEDING DO NOT INCORPORATE SEED INTO THE SOIL.

**B. MULCHING**

- 1. MULCH MATERIALS (IN ORDER OF PREFERENCE)
a. STRAW CONSISTING OF THOROUGHLY THRESHED WHEAT, RYE, OAT, OR BARLEY AND REASONABLY BRIGHT IN COLOR. STRAW IS TO BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW AND NOT MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY. NOTE: USE ONLY STERILE STRAW MULCH IN AREAS WHERE ONE SPECIES OF GRASS IS DESIRED.
b. WOOD CELLULOSE FIBER MULCH (WCFM) CONSISTING OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
i. WCFM IS TO BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.
ii. WCFM, INCLUDING DYE, MUST CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.
iii. WCFM MATERIALS ARE TO BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN A UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER AND OTHER ADDITIVES TO FORM A UNIFORM SLURRY.
iv. WCFM MATERIALS MUST BE FREE OF NOXIOUS WEED SEEDS AND OTHER TOXIC MATERIALS.
v. WCFM MATERIALS MUST NOT CONTACT ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO-TOXIC.
vi. WCFM MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH OF APPROXIMATELY 10 MILLIMETERS, DIAMETER APPROXIMATELY 1 MILLIMETER, PH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6 PERCENT MAXIMUM AND WATER HOLDING CAPACITY OF 90 PERCENT MINIMUM.

**2. APPLICATION**

- i. APPLY MULCH TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.
j. WHEN STRAW MULCH IS USED, SPREAD IT OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS PER ACRE TO A UNIFORM COVER DEPTH OF 1 TO 2 INCHES. APPLY MULCH TO ACHIEVE A UNIFORM DISTRIBUTION AND DEPTH SO THAT THE SOIL SURFACE IS NOT EXPOSED. WHEN USING A MULCH ANCHORING TOOL, INCREASE THE APPLICATION RATE TO 2.5 TONS PER ACRE.
k. WOOD CELLULOSE FIBER USED AS MULCH MUST BE APPLIED AT A NET DRY WEIGHT OF 1500 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER TO ATTAIN A MIXTURE WITH A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
3. ANCHORING
i. PERFORM MULCH ANCHORING IMMEDIATELY FOLLOWING APPLICATION OF MULCH TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON THE SIZE OF THE AREA AND EROSION HAZARD:
i. A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE TO A MINIMUM OF 2 INCHES. THIS PRACTICE IS MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD FOLLOW THE CONTOUR.
ii. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. APPLY THE FIBER BINDER AT A NET DRY WEIGHT OF 750 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER AT A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
iii. SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRO-TACK), DCA-70, PETEROSE, TERRA TACK II, TERRA TACK AR OR OTHER APPROVED EQUAL MAY BE USED. FOLLOW APPLICATION RATES AS SPECIFIED BY THE MANUFACTURER. APPLICATION OF LIQUID BINDERS NEEDS TO BE HEAVIER AT THE EDGES WHERE WIND CATCHES MULCH, SUCH AS IN VALLEYS AND ON CRESTS OF BANKS. USE OF ASPHALT BINDERS IS STRICTLY PROHIBITED.
iv. LIGHTWEIGHT PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4 TO 15 FEET WIDE AND 500 TO 3,000 FEET LONG.

**B-4.4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABILIZATION**

**DEFINITION**  
TO STABILIZE DISTURBED SOILS WITH VEGETATION FOR UP TO 6 MONTHS.

**PURPOSE**  
TO USE FAST GROWING VEGETATION THAT PROVIDES COVER ON DISTURBED SOILS.

**CONDITIONS WHERE PRACTICE APPLIES**

EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR A PERIOD OF 6 MONTHS OR LESS. FOR LONGER DURATION OF TIME, PERMANENT STABILIZATION PRACTICES ARE REQUIRED.

**CRITERIA**

- 1. SELECT ONE OR MORE OF THE SPECIES OR SEED MIXTURES LISTED IN TABLE B.1 FOR THE APPROPRIATE PLANT HARDNESS ZONE (FROM FIGURE B.3), AND ENTER THEM IN THE TEMPORARY SEEDING SUMMARY BELOW ALONG WITH APPLICATION RATES, SEEDING DATES AND SEEDING DEPTHS. IF THIS SUMMARY IS NOT PUT ON THE PLAN AND COMPLETED, THEN TABLE B.1 PLUS FERTILIZER AND LIME RATES MUST BE PUT ON THE PLAN.
2. FOR SITES HAVING SOIL TESTS PERFORMED, USE AND SHOW THE RECOMMENDED RATES BY THE TESTING AGENCY. SOIL TESTS ARE NOT REQUIRED FOR TEMPORARY SEEDING.
3. WHEN STABILIZATION IS REQUIRED OUTSIDE OF A SEEDING SEASON, APPLY SEED AND MULCH OR STRAW MULCH ALONE AS PRESCRIBED IN SECTION B-4.3.A.1B AND MAINTAIN UNTIL THE NEXT SEEDING SEASON.

TEMPORARY SEEDING SUMMARY table with columns for No., Species, Application Rate (lb/ac), Seeding Dates, Seeding Depths, Fertilizer Rate (10-20-20), and Lime Rate.

TEMPORARY SEEDING SUMMARY table with columns for No., Species, Application Rate (lb/ac), Seeding Dates, Seeding Depths, Fertilizer Rate (10-20-20), and Lime Rate.

1. SEEDING RATES FOR THE WARM-SEASON GRASSES ARE IN POUNDS OF PURE LIME SEED (PLS). ACTUAL PLANTING RATES SHALL BE ADJUSTED TO REFLECT LOCAL CONDITIONS.
2. FOR BARLEY, OATS AND WHEAT GRASSES ANNUAL RYEGRASS, PEARL MILLET, FOXTAIL MILLET, DO NOT EXCEED MORE THAN 5% BY WEIGHT OF THE OVERALL PERMANENT SEEDING MIXTURE. CEREAL RYE GENERALLY SHOULD NOT BE USED AS A NURSE CROP, UNLESS PLANTING WILL OCCUR IN VERY LATE FALL.
3. CEREAL RYE HAS ALLOPATHIC PROPERTIES THAT INHIBIT THE GERMINATION AND GROWTH OF OTHER PLANTS. IF IT MUST BE USED AS A NURSE CROP, SEED AT 1/3 OF THE RATE LISTED IN WARM-SEASON GRASSES.
4. OATS ARE THE RECOMMENDED NURSE CROP FOR WARM-SEASON GRASSES.
5. FOR SANDY SOILS, PLANT SEEDS AT TWICE THE DEPTH LISTED ABOVE.
6. FOR PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE AND MAY REQUIRE ADJUSTMENT TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONE.

**B-4.5 STANDARDS AND SPECIFICATIONS FOR PERMANENT STABILIZATION**

**DEFINITION**  
TO STABILIZE DISTURBED SOILS WITH PERMANENT VEGETATION.

**PURPOSE**  
TO USE LONG-LIVED PERENNIAL GRASSES AND LEGUMES TO ESTABLISH PERMANENT GROUND COVER ON DISTURBED SOILS.

**CONDITIONS WHERE PRACTICE APPLIES**

EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR 6 MONTHS OR MORE.

**CRITERIA**

- A. SEED MIXTURES
1. GENERAL USE
a. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE B.3 FOR THE APPROPRIATE PLANT HARDNESS ZONE (FROM FIGURE B.3) AND BASED ON THE SITE CONDITION OR PURPOSE FOUND ON TABLE B.2. ENTER SELECTED MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.
b. ADDITIONAL PLANTING SPECIFICATIONS FOR EXCEPTIONAL SITES SUCH AS SHORELINES, STREAM BANKS, OR DUNES OR FOR SPECIAL PURPOSES SUCH AS WILDLIFE OR ESTHETIC TREATMENT MAY BE FOUND IN USDA-NRCS TECHNICAL FIELD OFFICE GUIDE, SECTION 342 - CRITICAL AREA PLANTING.
c. FOR SITES HAVING DISTURBED AREA OVER 5 ACRES, USE AND SHOW THE RATES RECOMMENDED BY THE SOIL TESTING AGENCY.
d. FOR AREAS RECEIVING LOW MAINTENANCE, APPLY UREA FORM FERTILIZER (46-0-0) AT 3 1/2 POUNDS PER 1000 SQUARE FEET (180 POUNDS PER ACRE) AT THE TIME OF SEEDING IN ADDITION TO THE SOIL AMENDMENTS SHOWN IN THE PERMANENT SEEDING SUMMARY.
2. TURFGRASS MIXTURES
a. AREAS WHERE TURFGRASS MAY BE DESIRED INCLUDE LAWNS, PARKS, PLAYGROUNDS, AND COMMERCIAL SITES WHICH WILL RECEIVE A MEDIUM TO HIGH LEVEL OF MAINTENANCE.
b. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED BELOW BASED ON THE SITE CONDITIONS OR PURPOSE. ENTER SEEDING MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.
i. KENTUCKY BLUEGRASS - FULL SUN MIXTURE: FOR USE IN AREAS THAT RECEIVE INTENSIVE MANAGEMENT. IRRIGATION REQUIRED IN THE AREAS OF CENTRAL MARYLAND AND EASTERN SHORE. RECOMMENDED CERTIFIED KENTUCKY BLUEGRASS CULTIVARS SEEDING RATE: 1.5 TO 2.0 POUNDS PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.
ii. KENTUCKY BLUEGRASS/PERENNIAL RYE: FULL SUN MIXTURE: FOR USE IN FULL SUN AREAS WHERE RAPID ESTABLISHMENT IS NECESSARY AND WHEN TURF WILL RECEIVE MEDIUM TO INTENSIVE MANAGEMENT. CERTIFIED PERENNIAL RYEGRASS CULTIVARS/CERTIFIED KENTUCKY BLUEGRASS SEEDING RATE: 2 POUNDS MIXTURE PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.
iii. TALL FESCUE/KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN DROUGHT PRONE AREAS AND/OR FOR AREAS RECEIVING LOW TO MEDIUM MANAGEMENT IN FULL SUN TO MEDIUM SHADE. RECOMMENDED MIXTURE INCLUDES: CERTIFIED TALL FESCUE CULTIVARS 95 TO 100 PERCENT, CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 0 TO 5 PERCENT. SEEDING RATE: 5 TO 10 POUNDS PER 1000 SQUARE FEET. ONE OR MORE CULTIVARS MAY BE BLENDED.
iv. KENTUCKY BLUEGRASS/FINE FESCUE: SHADE MIXTURE: FOR USE IN AREAS WITH SHADE IN BLUEGRASS LAWNS. FOR ESTABLISHMENT IN HIGH QUALITY, INTENSIVELY MAINTAINED TURFGRASS AREAS. RECOMMENDED MIXTURE INCLUDES: CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 30 TO 40 PERCENT AND CERTIFIED FINE FESCUE AND 60 TO 70 PERCENT. SEEDING RATE: 1 1/2 TO 3 POUNDS PER 1000 SQUARE FEET.
NOTES
SELECT TURFGRASS VARIETIES FROM THOSE LISTED IN THE MOST CURRENT UNIVERSITY OF MARYLAND PUBLICATION, AGRONOMY MEMO #77, "TURFGRASS CULTIVAR RECOMMENDATIONS FOR MARYLAND" CHOOSE CERTIFIED MATERIAL. CERTIFIED MATERIAL IS THE BEST GUARANTEE OF CULTIVAR PURITY. THE CERTIFICATION PROGRAM OF THE MARYLAND DEPARTMENT OF AGRICULTURE, TURF AND SEED SECTION, PROVIDES A RELIABLE MEANS OF CONSUMER PROTECTION AND ASSURES A PURE GENETIC LINE.

- c. IDEAL TIMES OF SEEDING FOR TURF GRASS MIXTURES
WESTERN MD: MARCH 15 TO JUNE 1, AUGUST 1 TO OCTOBER 1 (HARDINESS ZONES: 5B, 6A)
CENTRAL MD: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONES: 6B)
SOUTHERN MD, EASTERN SHORE: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONES: 7A, 7B)
d. TILL AREAS TO RECEIVE SEED BY DISKING OR OTHER APPROVED METHODS TO A DEPTH OF 2 TO 4 INCHES. LEVEL AND RAKE THE AREAS TO PREPARE A PROPER SEEDBED. REMOVE STONES AND DEBRIS OVER 1/2 INCHES IN DIAMETER. THE RESULTING SEEDBED MUST BE IN SUCH CONDITION THAT FUTURE MOWING OF GRASSES WILL NOT BE DIFFICULTY.
e. IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER FOR PLANT GROWTH (1/2 TO 1 INCH EVERY 3 TO 4 DAYS DEPENDING ON SOIL TYPE). PERMANENT SEEDINGS SHOULD BE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY OR HOT WEATHERS, OR ON ADVERSE SITES.

**PERMANENT SEEDING SUMMARY**

PERMANENT SEEDING SUMMARY table with columns for No., Species, Application Rate (lb/ac), Seeding Dates, Seeding Depths, Fertilizer Rate (10-20-20), and Lime Rate.

1) THE PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE. THESE DATES MAY REQUIRE ADJUSTMENTS TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONES. WHEN SEEDING TOWARD THE END OF THE LISTED PLANTING DATES, OR WHEN CONDITIONS ARE EXPECTED TO BE LESS THAN OPTIMAL, SELECT AN APPROPRIATE NURSE CROP FROM TEMPORARY SEEDING SUMMARY FOR ESTABLISHMENT AND PLANT TOGETHER WITH THE PERMANENT SEEDING MIX.

2) WHEN PLANTED DURING THE GROWING SEASON, MOST OF THESE MATERIALS MUST BE PURCHASED AND KEPT IN A DORMANT CONDITION UNTIL PLANTING. BARE-ROOT GRASSES ARE THE EXCEPTION. THEY MAY BE SUPPLIED AS GROWING NON-DORMANT PLANTS.
ADDITIONAL PLANTING DATES DURING WHICH SUPPLEMENTAL WATERING MAY BE NEEDED TO ENSURE PLANT ESTABLISHMENT:
\*\*WARM-SEASON GRASSES NEED A SOIL TEMPERATURE OF AT LEAST 50 DEGREES F IN ORDER TO GERMINATE. IF SOIL TEMPERATURES ARE COLDER THAN 50 DEGREES, OR MOISTURE IS NOT ADEQUATE, THE SEEDS WILL REMAIN DORMANT UNTIL CONDITIONS ARE FAVORABLE FOR GERMINATION. IN GENERAL, PLANTING DURING THE LATTER PORTION OF THIS PERIOD ALLOWS MORE TIME FOR WEED EMERGENCE AND WEED CONTROL PRIOR TO PLANTING. WHEN SELECTING A PLANTING DATE, CONSIDER THE NEED FOR WEED CONTROL VS. THE UNLIKELIHOOD OF HAVING SUFFICIENT MOISTURE FOR LATER PLANTINGS, ESPECIALLY ON DROUGHTY SITES.
ADDITIONAL PLANTING DATES FOR THE COLDER COASTAL PLAN, DEPENDENT ON ANNUAL CLIMATE AND TEMPERATURE TRENDS, RECOMMEND ADDING A NURSE CROP AS NOTED ABOVE. IF PLANTING DURING THIS PERIOD:
+HIGHTER FREEZING AND THAWING OF WET SOILS MAY RESULT IN FROST HEAVING OF MATERIALS PLANTED IN LATE FALL. IF PLANTS HAVE NOT SUFFICIENTLY ROOTED IN PLACE, SOIL USUALLY NEEDS 4 TO 6 WEEKS TO BECOME SUFFICIENTLY ROOTED. LARGE CONTAINERIZED AND BALLED-AND-BURLAPPED STOCK MAY BE PLANTED INTO THE WINTER MONTHS AS LONG AS THE GROUND IS NOT FROZEN AND SOIL MOISTURE IS ADEQUATE.

B. SOD: TO PROVIDE QUICK COVER ON DISTURBED AREAS (2:1 GRADE OR FLATTER).
1. GENERAL SPECIFICATIONS
a. GLASS OF TURFGRASS SOD MUST BE MARYLAND STATE CERTIFIED. SOD LABELS MUST BE MADE AVAILABLE TO THE JOB FOREMAN AND INSPECTOR.
b. SOD MUST BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 1/4 INCH, 3/8 INCH OR 1/2 INCH. AT THE TIME OF CUTTING, MEASUREMENT FOR THICKNESS MUST EXCLUDE TOP GROUND AND THATCH. BROKEN PADS AND TORN OR UNEVEN ENDS WILL NOT BE ACCEPTABLE.
c. STANDARD SIZE SECTIONS OF SOD MUST BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED VERTICALLY WITH A FIRM GRASP ON THE UPPER 10 PERCENT OF THE SECTION.
d. SOD MUST NOT BE HARVESTED OR TRANSPORTED WHEN MOISTURE CONTENT IS EXCESSIVELY DRY OR WET. IT MAY ADVERSELY AFFECT ITS SURVIVAL.
e. SOD MUST BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS. SOD NOT TRANSPLANTED WITHIN THIS PERIOD MUST BE APPROVED BY AN AGRONOMIST OR SOIL SCIENTIST PRIOR TO ITS INSTALLATION.

2. SOD INSTALLATION
a. DURING PERIODS OF EXCESSIVELY HIGH TEMPERATURE OR IN AREAS HAVING DRY SUBSOIL, LIGHTLY IRRIGATE THE SUBSOIL IMMEDIATELY PRIOR TO LAYING THE SOD.
b. LAY THE FIRST ROW OF SOD IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO IT AND TIGHTLY WEDGED AGAINST EACH OTHER. STAGGER LATERAL JOINTS TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT Voids WHICH WOULD CAUSE AIR DRYING OF THE JOINTS.
c. WHEREVER POSSIBLE, LAY SOD WITH THE LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERING JOINTS. ROLL AND TAMP. PEG OR OTHERWISE SECURE THE SOD TO PREVENT SLIPPAGE ON SLOPES. ENSURE SOIL CONTACT EXISTS BETWEEN SOD ROOTS AND THE UNDERLYING SOIL SURFACE.
d. WATER THE SOD IMMEDIATELY FOLLOWING ROLLING AND TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOIL SURFACE BELOW THE SOD ARE THOROUGHLY WET. COMPLETE THE OPERATIONS OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD WITHIN EIGHT HOURS.

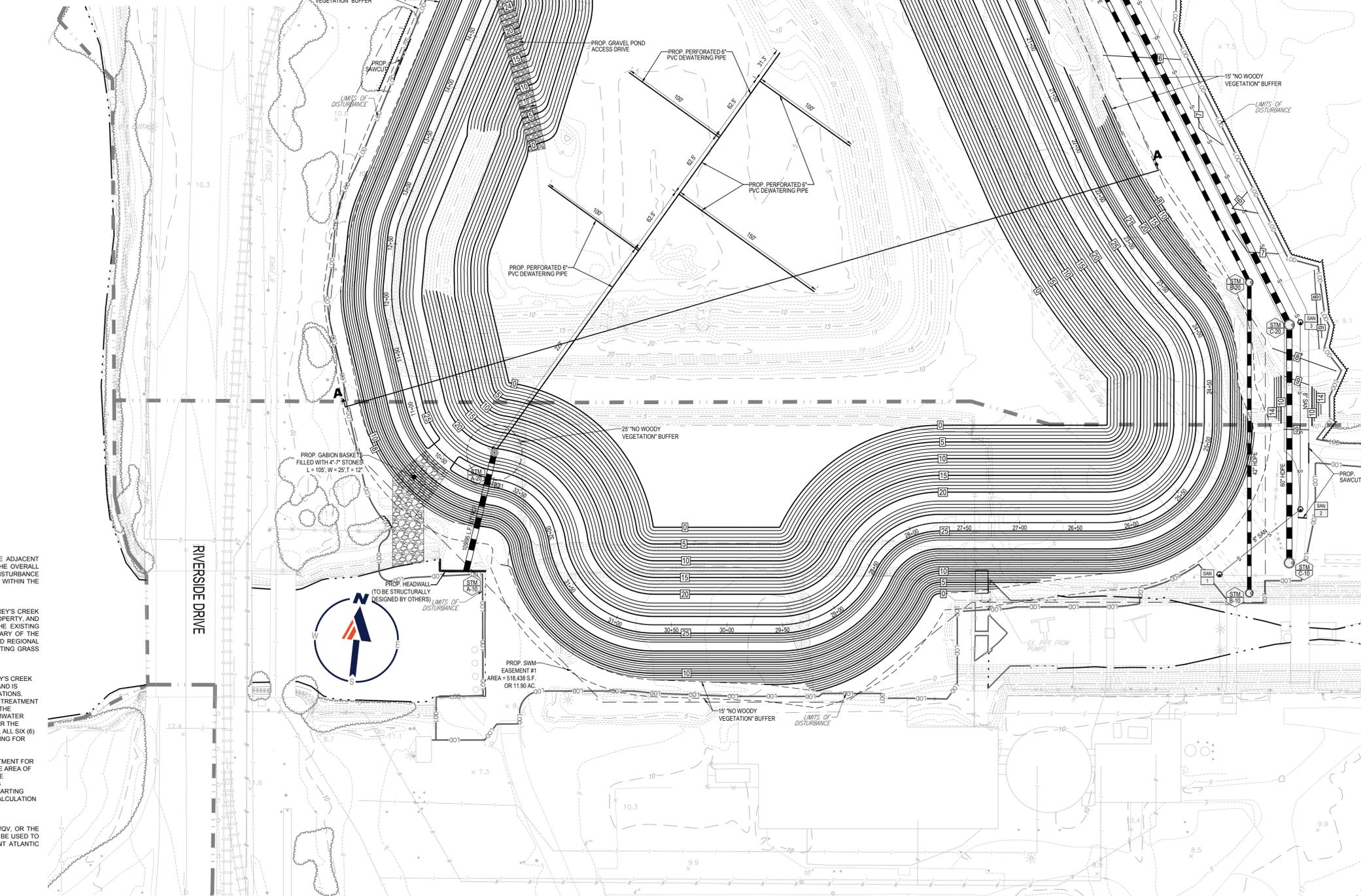
3. SOD MAINTENANCE



**STORMWATER MANAGEMENT SUMMARY**

LIMIT OF DISTURBANCE = 11.92 AC.  
 REQUIRED WQV VOLUME (Pe = 1.007) = 4,947,874 CF  
 PROVIDED WQV VOLUME = 4,947,874 CF  
 WATERSHED: BALTIMORE HARBOR

SOILS INFORMATION					
SYMBOL	NAME	SLOPE	STRUCTURAL LIMITATIONS	HYDROLOGIC GROUP	K VALUE > 0.35
UuB	URBAN LAND-UDORTHERTS	0% TO 8%	NOT RATED	D	N/A



SITE DATA	
KEYSHEET	ANW
ELECTION DISTRICT	15
COUNCILMANIC DISTRICT	7
SWM MAINTENANCE	PRIVATE

**DEDICATION TABLE**

THIS TABLE DEPICTS VARIOUS RIGHTS-OF-WAY THAT MAY NEED TO BE CONVEYED TO BALTIMORE COUNTY BY THE DEVELOPER/OWNER. CHOOSE THE RIGHT(S)-OF-WAY THAT APPLY TO YOUR PROJECT, AND THEN CREATE THE TABLE ACCORDINGLY.

TYPE OF CONVEYANCE	NO.	TOTAL AREA**
STORMWATER EASEMENT	1	518,438 S.F.

\*\*NOTE: DURING THE PROCESSING OF DEVELOPMENT PLANS AND PRIOR TO FINAL DEVELOPMENT PLAN (FDP) SUBMITTAL, TOTAL AREAS SHOWN IN THIS TABLE MAY BE APPROXIMATE.

APPROVED: \_\_\_\_\_ CHIEF  
 STORMWATER MANAGEMENT DIVISION  
 BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

50 25 12.5 0 50  
 1"=50'  
 LIMIT OF DISTURBANCE: ±803,250 S.F. OR 18.44 AC.

**OWNER/DEVELOPER**  
 TRADEPOINT DEVELOPMENT, LLC  
 1600 SPARROWS POINT BLVD  
 BALTIMORE, MD 21219  
 CONTACT: JOHN M. MARTIN III, P.E.  
 PHONE: 301-651-3565

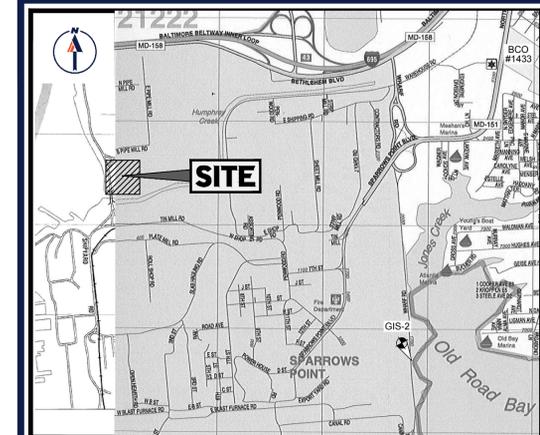
**SWM 1 OF 5**  
**MARYLAND COORDINATE SYSTEM (MCS)**

BALTIMORE COUNTY SOIL CONSERVATION DISTRICT  
**APPROVED FOR STORMWATER MANAGEMENT**

DISTRICT OFFICIAL \_\_\_\_\_ DATE \_\_\_\_\_ PLAN NO. \_\_\_\_\_  
 TECHNICAL REVIEW FOR DISTRICT \_\_\_\_\_  
 BY: BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY DATE \_\_\_\_\_

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

PROFESSIONAL CERTIFICATION  
 I, MICHAEL J. GESELL, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 44087, EXPIRATION DATE 6/30/21



**LOCATION MAP**  
 COPYRIGHT ADC THE MAP PEOPLE  
 PERMIT USE NO. 20602153-5  
 SCALE: 1"=2000'

**BENCHMARK INFORMATION**

ELEVATIONS ARE BASED ON NAVD 88. COORDINATES AND MERIDIAN ARE BASED ON THE MARYLAND COORDINATE SYSTEM (MCS) PER THE FOLLOWING MONUMENTS:  
 BCO# 1433 (CAPPED REBAR)  
 N 571,883.79, E 1,466,230.69, ELEV. 16.59  
 IN MEDIAN OF NORTH POINT BLVD SOUTH OF NORTH SNYDER AVE.  
 GIS #2 (BRASS DISK)  
 N 565,182.39, E. 1,464,480.72, ELEV. 9.95  
 EAST SIDE OF WHARF ROAD 420' NORTH OF LIGHT TOWER

**LEGEND**

EXISTING NOTE	TYPICAL NOTE TEXT	PROPOSED NOTE
---	ONSITE PROPERTY LINE / R.O.W. LINE	---
---	CONTOUR LINE	---
---	SPOT ELEVATIONS	---
---	SANITARY SEWER LINE	---
---	UNDERGROUND WATER LINE	---
---	UNDERGROUND ELECTRIC LINE	---
---	UNDERGROUND GAS LINE	---
---	OVERHEAD WIRE	---
---	UNDERGROUND TELEPHONE LINE	---
---	STORM SEWER	---
---	LIMIT OF DISTURBANCE	---
---	CONCRETE CURB & GUTTER	---
---	BORING LOCATIONS	---

**NARRATIVE**

**INTRODUCTION:**  
 TRADEPOINT DEVELOPMENT IS PROPOSING A REGIONAL STORMWATER MANAGEMENT FACILITY ADJACENT TO THE ADJACENT HUMPHREYS CREEK WASTEWATER TREATMENT PLANT IN ORDER TO PROVIDE STORMWATER MANAGEMENT FOR THE OVERALL TRADEPOINT ATLANTIC PROPERTY. THE TOTAL PARCEL AREA IS 3,035.49 ACRES, WITH THIS PROJECT'S LIMIT OF DISTURBANCE BEING 18.44 ACRES ENTIRELY ZONED MH-M (MANUFACTURING - HEAVY - INDUSTRIAL - MAJOR). THE SITE IS LOCATED WITHIN THE BALTIMORE HARBOR WATERSHED AND DISCHARGES DIRECTLY INTO THE BEAR CREEK TIDAL WATERS.

**EXISTING CONDITIONS:**  
 CURRENTLY, 1,258.96 ACRES OF RUNOFF DRAIN TO THE EXISTING TIN MALL CANAL, TO BE TREATED AT THE HUMPHREYS CREEK WASTEWATER TREATMENT PLANT. 980.10 ACRES OF THE TOTAL AREA CONSIST OF ON-SITE TRADEPOINT ATLANTIC PROPERTY, AND THE REMAINING 298.86 ACRES ARE OFF-SITE DRAINAGE AREA FROM OFF-SITE AREAS EAST OF WHARF ROAD. THE EXISTING HUMPHREYS CREEK WASTEWATER TREATMENT PLANT DISCHARGES DIRECTLY INTO BEAR CREEK, A TIDAL TRIBUTARY OF THE PATAPSCO RIVER, VIA SIX (6) PUMPS THAT PUMP AT A RATE OF 25,000 GPM EACH. THE AREA WHERE THE PROPOSED REGIONAL STORMWATER MANAGEMENT FACILITY WILL GO CURRENTLY CONSISTS OF A SMALLER EXCAVATED POND, AND EXISTING GRASS AND PAVED AREAS LEFTOVER FROM THE FORMER BETHLEHEM STEEL MILL.

**PROPOSED CONDITIONS:**  
 A REGIONAL STORMWATER MANAGEMENT FACILITY IS PROPOSED IMMEDIATELY ADJACENT TO THE EXISTING HUMPHREYS CREEK WASTEWATER TREATMENT PLANT. THIS FACILITY WILL BE A WET POND (APPROVED MDE STORMWATER PRACTICE P-2) AND IS DESIGNED TO MEET CURRENT BALTIMORE COUNTY AND MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) REGULATIONS. SINCE THE DRAINAGE AREA DISCHARGES INTO TIDAL WATERS, THE ENTIRE DEVELOPMENT IS SUBJECT TO PROVIDING TREATMENT OF THE REQUIRED IMPERVIOUS AREA FOR AN ESTABLISHED PE OF 1.0 INCHES, IN ORDER TO ACHIEVE THIS, TWO (2) OF THE EXISTING SIX (6) PUMPS WILL DIVERT THE RUNOFF FROM A 24-HOUR 1.0" OF STORM INTO THE PROPOSED REGIONAL STORMWATER MANAGEMENT FACILITY, WHICH WILL THEN DISCHARGE VIA A 60" PRINCIPAL SPILLWAY DIRECTLY INTO BEAR CREEK NEAR THE EXISTING APPROVED MDE OUTFALL LOCATION FOR THE EXISTING TREATMENT PLANT. DURING LARGER STORM EVENTS, ALL SIX (6) PUMPS WILL BE RUNNING TO CONTINUE SAFELY DISCHARGING THE RUNOFF INTO BEAR CREEK AS THEY HAVE BEEN DOING FOR YEARS.

THE WATER QUALITY VOLUME FOR THE PROPOSED WET POND WILL BE 4,947,874 CF. THIS VOLUME WILL PROVIDE TREATMENT FOR APPROXIMATELY 1,262 ACRES OF IMPERVIOUS AREA. THE TREATMENT OF THE IMPERVIOUS AREA WITHIN THE DRAINAGE AREA OF THE FACILITY WILL BE USED TO ESTABLISH A CREDIT BANK TO PROVIDE FOR THE TREATMENT OF CURRENT AND FUTURE DEVELOPMENTS THAT MAY OR MAY NOT ULTIMATELY DRAIN DIRECTLY TO THE FACILITY. IN ADDITION, ANY OUTSTANDING TREATMENT REQUIREMENTS FOR PREVIOUSLY APPROVED DEVELOPMENT PROJECTS WILL BE DEDUCTED FROM THE STARTING VALUE OF THE BANK. PLEASE REFER TO THE APPROVED SWM VARIANCE FOR MORE DETAILED INFORMATION ON THE CALCULATION OF THE CREDIT BANK.

**CONCLUSION:**  
 IN CONCLUSION, THE PROPOSED REGIONAL STORMWATER MANAGEMENT FACILITY WILL PROVIDE 4,947,874 CF OF WQV, OR THE EQUIVALENT OF 1,362 ACRES OF IMPERVIOUS AREA BASED ON A REQUIREMENT OF PE = 1.0'. THIS WQV VOLUME WILL BE USED TO CREATE A CREDIT BANK TO BE USED FOR TREATMENT OF CURRENT AND FUTURE PROJECTS ON THE TRADEPOINT ATLANTIC PROPERTY.

**BLANKET ACCESS NOTE FOR SWM**

OWNERS OF LOTS CONTAINING STORMWATER EASEMENTS OR DRAINAGE AND UTILITY EASEMENTS SHALL GRANT TO AUTHORIZED BALTIMORE COUNTY PERSONNEL A RIGHT OF ENTRY FOR THE PURPOSE OF INSPECTION AND/OR MONITORING SITE VISITS. SAID INSPECTION AND/OR MONITORING VISITS SHALL ONLY BE CONDUCTED DURING NORMAL BALTIMORE COUNTY WORKING HOURS (8 AM TO 4 PM MONDAY THROUGH FRIDAY).

**BOHLER**  
 SITE CIVIL AND CONSULTING ENGINEERING  
 PROGRAM MANAGEMENT  
 LANDSCAPE ARCHITECTURE  
 SUSTAINABLE DESIGN  
 PERMITTING SERVICES  
 TRANSPORTATION SERVICES

**REVISIONS**

REV	DATE	COMMENT	DRAWN BY

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**NOT APPROVED FOR CONSTRUCTION**

PROJECT No.: MD16206639  
 DRAWN BY: CPH  
 CHECKED BY: MUG  
 DATE: 3/5/2021  
 CAD ID: BMPS-0

**WASTEWATER TREATMENT PLANT REPLACEMENT PLAN FOR**

**TRADEPOINT ATLANTIC**

SHIPYARD ROAD AT TRADEPOINT AVENUE  
 BALTIMORE, MD 21219  
 TM 111, GRID 14 PARCEL 318  
 ELECTION DISTRICT 15  
 COUNCILMANIC DISTRICT 7  
 BALTIMORE COUNTY

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

**M.J. GESELL**  
 PROFESSIONAL ENGINEER  
 MARYLAND LICENSE NO. 44087

SHEET TITLE:  
**STORMWATER MANAGEMENT PLAN**

SHEET NUMBER:  
**C-701**

ORG. DATE - 3/5/2021

WET POND FACILITY			
PHASE	DATE	INITIALS	REMARKS - DESCRIPTION OF ACTION TAKEN
1. EXCAVATION			
A. SIZE AND LOCATION			
B. SIDE SLOPE STABILITY			
C. SOIL PERMEABILITY			
D. GROUNDWATER/BEDROCK			
E. SETBACKS PER DESIGN MANUAL			
2. AGGREGATE MATERIAL			
A. TYPE (SLAG, IF CRUSHED, GRAVEL)			
B. SIZE			
C. PLACEMENT			
3. SURFACE LAYER			
A. AGGREGATE SURFACE			
B. VEGETATIVE SURFACE			
C. PAVED SURFACE			
4. RISER STRUCTURE			
A. INVERTS AND ELEVATIONS			
B. RECEIVES DESIGNED DRAINAGE AREA			
5. FINAL GRADING & PERMANENT STABILIZATION			
A. FINAL GRADES, PLANTINGS, AND MULCH			

I HEREBY CERTIFY THAT I PERSONALLY REVIEWED OR A PERSON UNDER MY DIRECT SUPERVISION PROVIDED THE INFORMATION REPORTED ON THIS CHECKLIST AND TO THE BEST OF MY KNOWLEDGE DO HEREBY INSURE THAT THE SUBMITTAL IS COMPLETE AND ACCURATE.

PROFESSIONAL ENGINEER SIGNATURE AND DATE

- OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER PONDS**
- ROUTINE MAINTENANCE
- OWNER SHALL INSPECT THE FACILITY ANNUALLY AND AFTER EVERY HEAVY STORM. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE POND IS FUNCTIONING PROPERLY.
  - THE OWNER SHALL MOW THE TOP AND SIDE SLOPES OF THE EMBANKMENT A MINIMUM OF TWO (2) TIMES PER YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER. OTHER SIDE SLOPES AND MAINTENANCE ACCESS SHALL BE MOWED AS NEEDED. PLANTED AREAS SHALL BE ALLOWED TO GROW TO THEIR DESIGNED SIZE, AND SHALL BE WEDED AS NEEDED. CONSULT LANDSCAPE ARCHITECT FOR DETAILS.
  - THE OWNER SHALL REMOVE ANY DEBRIS AND LITTER FROM THE FACILITY.
  - THE OWNER SHALL REPAIR ANY EROSION IN THE POND AS WELL AS THE RIP-RAP OR GABION OUTLET AREA AS SOON AS IT IS NOTICED.
  - STRUCTURAL COMPONENTS OF THE POND SUCH AS THE EMBANKMENT, THE RISER, AND THE PIPES SHALL BE REPAIRED UPON THE DETECTION OF ANY DAMAGE. THE COMPONENTS SHALL BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
  - THE OWNER SHALL REMOVE SEDIMENT FROM THE POND, AND FOREBAY, NO LATER THAN WHEN THE CAPACITY OF THE POND, OR FOREBAY, IS HALF FULL OF SEDIMENT, OR WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, UPON APPROVAL FROM THE DEPARTMENT OF PUBLIC WORKS.

- BALTIMORE COUNTY STORMWATER MANAGEMENT NOTES**
- VOLUME SEPARATED FOR QUALITY STORAGE: 4,947,874 C.F.
  - TYPE OF WATER QUALITY FEATURED USED: WET POND
  - MD-378 POND: YES
  - WATERSHED NAME: BALTIMORE HARBOR
  - STRUCTURE TYPE: TYPE 'C' MANHOLE (BALT. CO. STD. D-3.02A) WITH TRASH RACK
  - STORAGE HEIGHT: 20.75 FEET
  - DRAINAGE AREA TO FACILITY: 54,840,298 S.F. OR 1,258.86 AC. (TOTAL)
  - LEVEL OF MANAGEMENT PROPOSED: WATER QUALITY
  - STORMWATER MANAGEMENT APPROVED UNDER BILL NO. 25-10
  - MAINTENANCE RESPONSIBILITY: PRIVATE
  - STRUCTURE CLASSIFICATION: A
  - RON TO FACILITY: 92
  - HEIGHT TO EMERGENCY SPILLWAY CREST: N/A
  - MAXIMUM HEIGHT OF FILL: N/A
  - PERMANENT POOL WATER SURFACE AREA: 307,938 S.F. OR 7.07 AC.
  - PRINCIPAL SPILLWAY CAPACITY AT DESIGN STORM: 74.81 CFS
  - EMERGENCY SPILLWAY CAPACITY AT DESIGN STORM: N/A
  - FREEBOARD REQUIRED: 2.0
  - FREEBOARD PROVIDED: 2.06 FEET
  - DESIGN STORM: 10 YR.
  - ALLOWABLE RELEASE RATE: N/A
  - FACILITY INFLOW: 10 YR.: 107.43 CFS
  - FACILITY DISCHARGE: 10 YR.: 107.43 CFS
  - WATER SURFACE ELEVATION: 10 YR.: 21.69
  - STORAGE VOLUME: N/A
  - UNLESS OTHERWISE NOTED, ALL CONSTRUCTION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH:
    - BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION MATERIALS, DECEMBER 2007, ERRATA AND ADDENDA
    - NATURAL RESOURCES CONSERVATION SERVICE OF MARYLAND STANDARDS AND SPECIFICATIONS, POND CODE 378, JANUARY 2000.
    - MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION, JULY 2008, STANDARD SPECIFICATIONS FOR CONSTRUCTION MATERIAL.

**BOHLER**

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LANDSCAPE ARCHITECTURE  
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**REVISIONS**

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PROJECT No.: MD16206639  
DRAWN BY: CPH  
CHECKED BY: MUG  
DATE: 3/5/2021  
CAD ID: BMPS - 0

PROJECT:

**WASTEWATER TREATMENT PLANT REPLACEMENT PLAN**

FOR

**TRADEPOINT ATLANTIC**

SHIPYARD ROAD AT TRADEPOINT AVENUE  
BALTIMORE, MD 21219  
TM 111, GRID 14 PARCEL 318  
ELECTION DISTRICT 15  
COUNCILMANIC DISTRICT 7  
BALTIMORE COUNTY

**BOHLER**

901 DULANEY VALLEY ROAD, SUITE 801  
TOWSON, MARYLAND 21204  
Phone: (410) 821-7900  
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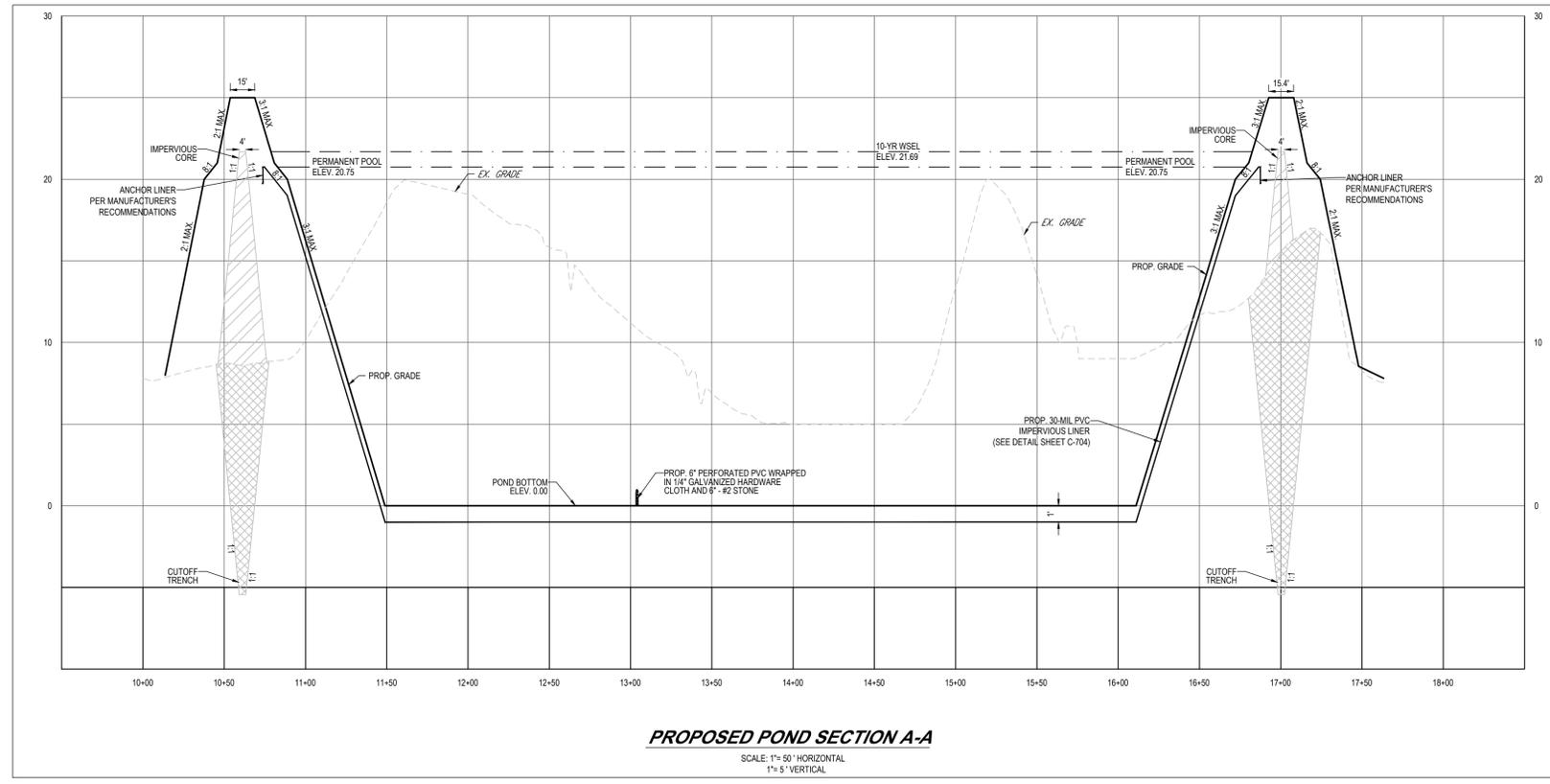
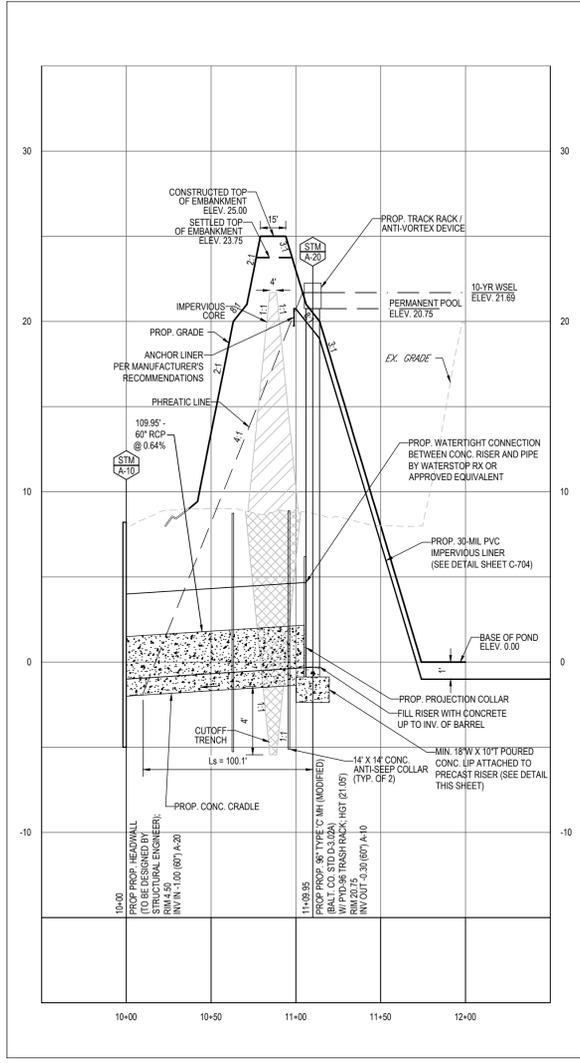
**M.J. GESELL**

PROFESSIONAL ENGINEER  
MARYLAND LICENSE NO. 44907

SHEET TITLE:  
**STORMWATER MANAGEMENT NOTES AND DETAILS**

SHEET NUMBER:  
**C-702**

ORG. DATE - 3/5/2021



**PROPOSED POND SECTION A-A**  
SCALE: 1"=50' HORIZONTAL  
1"=5' VERTICAL

**OWNER/DEVELOPER**

TRADEPOINT DEVELOPMENT, LLC  
1600 SPARROWS POINT BLVD  
BALTIMORE, MD 21219  
CONTACT: JOHN M. MARTIN III, P.E.  
PHONE: 301-651-3563

**SWM 2 OF 5**

**MARYLAND COORDINATE SYSTEM (MCS)**

**SITE DATA**

KEYSHEET	ANW
ELECTION DISTRICT	15
COUNCILMANIC DISTRICT	7
SWM MAINTENANCE	PRIVATE

**APPROVED:** \_\_\_\_\_ **CHIEF**

STORMWATER MANAGEMENT DIVISION  
BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

**BALTIMORE COUNTY SOIL CONSERVATION DISTRICT**

**APPROVED FOR STORMWATER MANAGEMENT**

DISTRICT OFFICIAL \_\_\_\_\_ DATE \_\_\_\_\_ PLAN NO. \_\_\_\_\_

TECHNICAL REVIEW FOR DISTRICT

BY: \_\_\_\_\_ DATE \_\_\_\_\_

BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

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

PROFESSIONAL CERTIFICATION  
I, MICHAEL J. GESELL, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 44907, EXPIRATION DATE: 6/30/21

**REVISIONS**

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PROJECT No.: MD16206639  
 DRAWN BY: CPH  
 CHECKED BY: MUG  
 DATE: 3/5/2021  
 CAD ID: BMPS - 0

PROJECT:  
**WASTEWATER TREATMENT PLANT REPLACEMENT PLAN FOR**



SHIPYARD ROAD AT  
 TRADEPOINT AVENUE  
 BALTIMORE, MD 21219  
 TM 111, GRID 14 PARCEL 318  
 ELECTION DISTRICT 15  
 COUNCILMANIC DISTRICT 7  
 BALTIMORE COUNTY

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

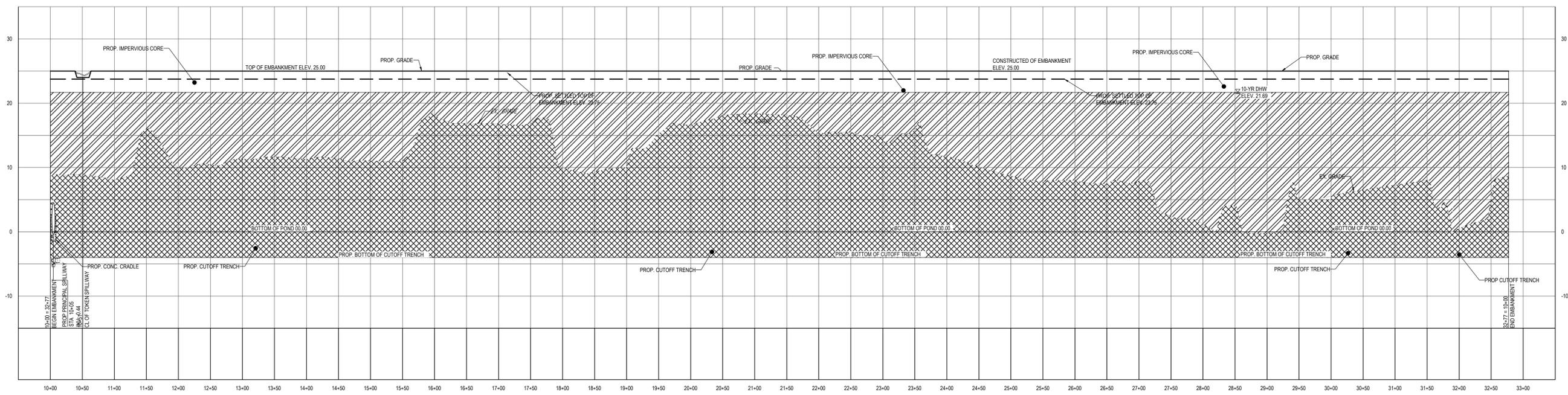
M.J. GESELL

PROFESSIONAL ENGINEER  
 MARYLAND LICENSE NO. 44607

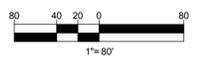
SHEET TITLE:  
**STORMWATER MANAGEMENT NOTES AND DETAILS**

SHEET NUMBER:  
**C-703**

ORG. DATE / 3/5/2021



**EMBAKMENT PROFILE - WWTP POND**  
 SCALE: 1"=50' HORIZONTAL  
 1"=5' VERTICAL



**OWNER/DEVELOPER**  
 TRADEPOINT DEVELOPMENT, LLC  
 1600 SPARROWS POINT BLVD  
 BALTIMORE, MD 21219  
 CONTACT: JOHN MARTIN, III  
 PHONE: 301-651-3565

SWM 3 OF 5  
 MARYLAND COORDINATE SYSTEM (MCS)

**LIMIT OF DISTURBANCE: ±519,200 S.F. OR 11.92 AC.**

**SITE DATA**

KEYSHEET	ANW
ELECTION DISTRICT	15
COUNCILMANIC DISTRICT	7
SWM MAINTENANCE	PRIVATE

**APPROVED:** \_\_\_\_\_ CHIEF  
 STORMWATER MANAGEMENT DIVISION  
 BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

BALTIMORE COUNTY SOIL CONSERVATION DISTRICT  
**APPROVED FOR STORMWATER MANAGEMENT**  
 DISTRICT OFFICIAL \_\_\_\_\_ DATE \_\_\_\_\_ PLAN NO. \_\_\_\_\_  
 TECHNICAL REVIEW FOR DISTRICT  
 BY: \_\_\_\_\_ DATE \_\_\_\_\_  
 BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

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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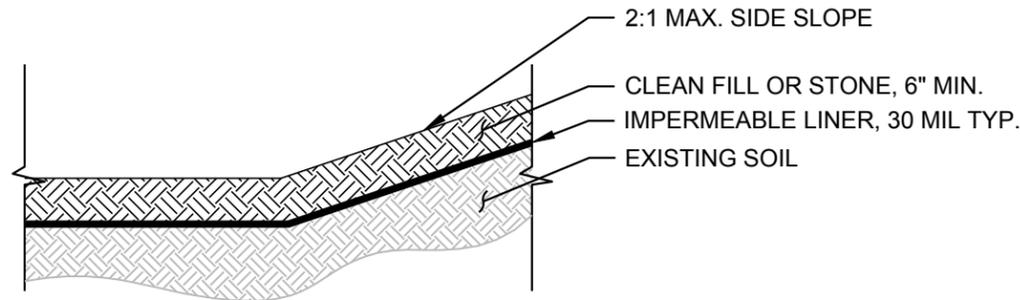
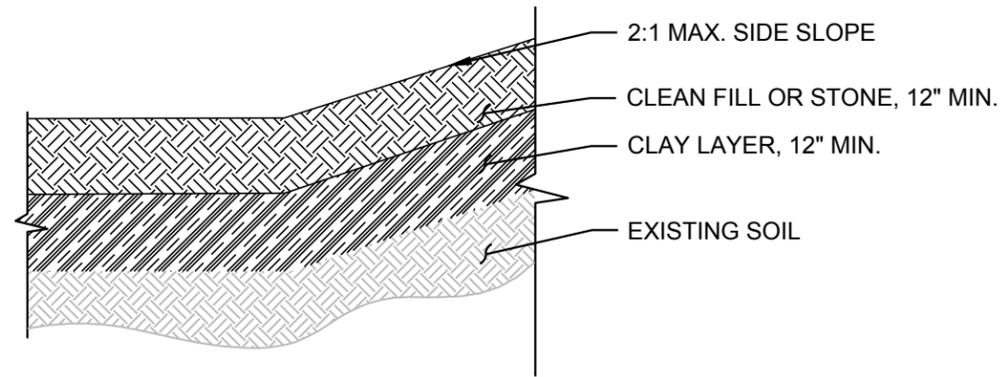
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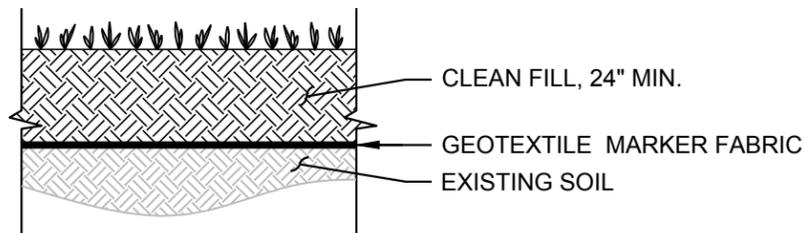
## **APPENDIX E**

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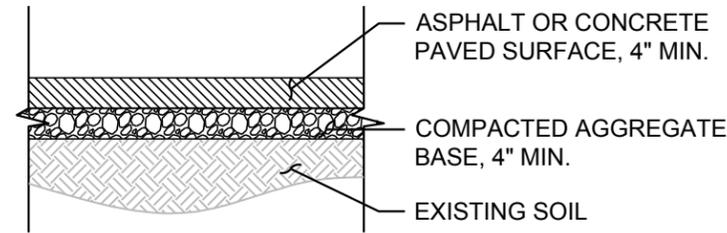
**TYPICAL POND SECTIONS**  
NOT TO SCALE



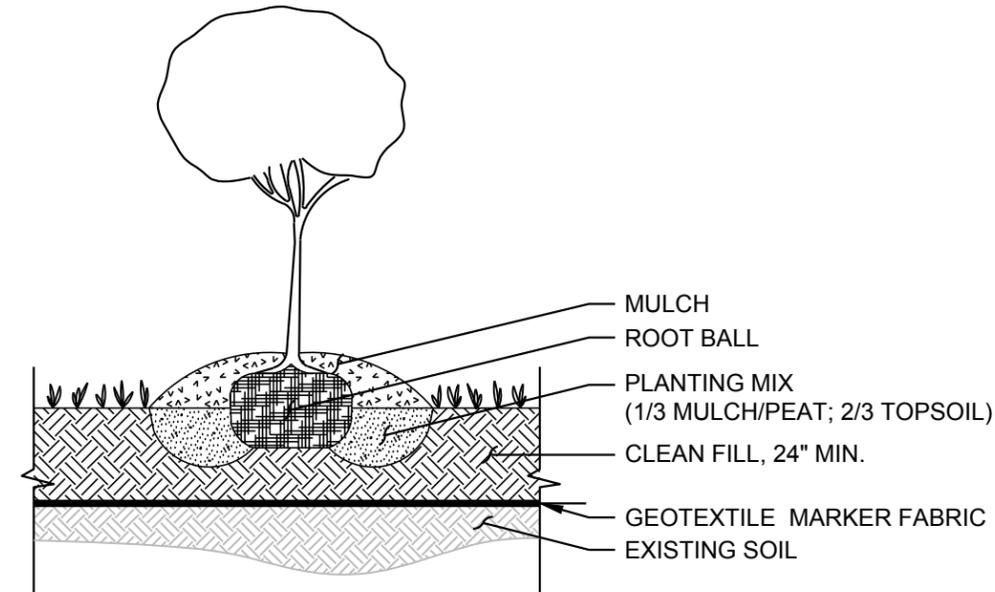
**TYPICAL LANDSCAPE SECTION**  
NOT TO SCALE

**GEOTEXTILE MARKER FABRIC SPECIFICATIONS**

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



**TYPICAL PAVING SECTION**  
NOT TO SCALE



**TYPICAL PLANTING SECTION**  
NOT TO SCALE

TCDNG'3"

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

P:\EnviroAnalytics Group\60443M EAG\_TPA Redevelopment\Drawg\B6\Production\Figure 6b - Environmental Capping Detail.dwg Plotted: April 9, 2019



scale	N/A
date	9/8/2020
project no.	160443M

designed	RJC
checked	TNP
drawn	RJC

**O R I O W O "CAPPING SECTION DETAILS**

SPARROWS POINT  
TRADEPOINT ATLANTIC

SPARROWS POINT  
BALT. COUNTY, MARYLAND

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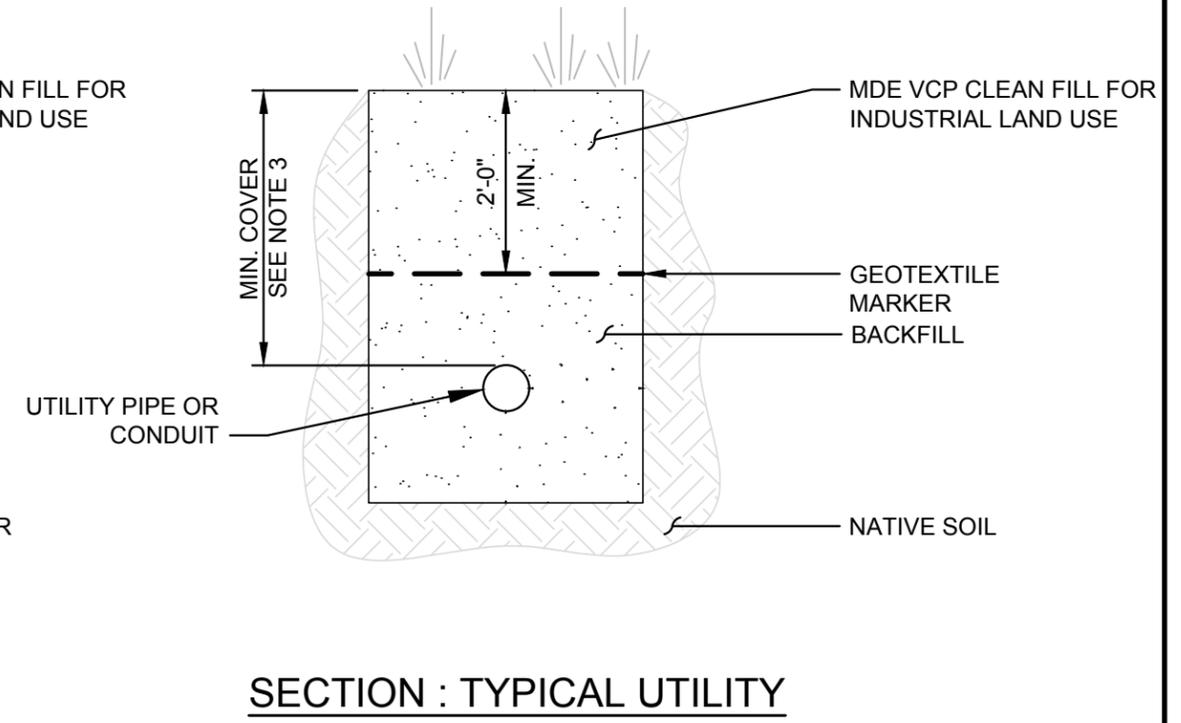
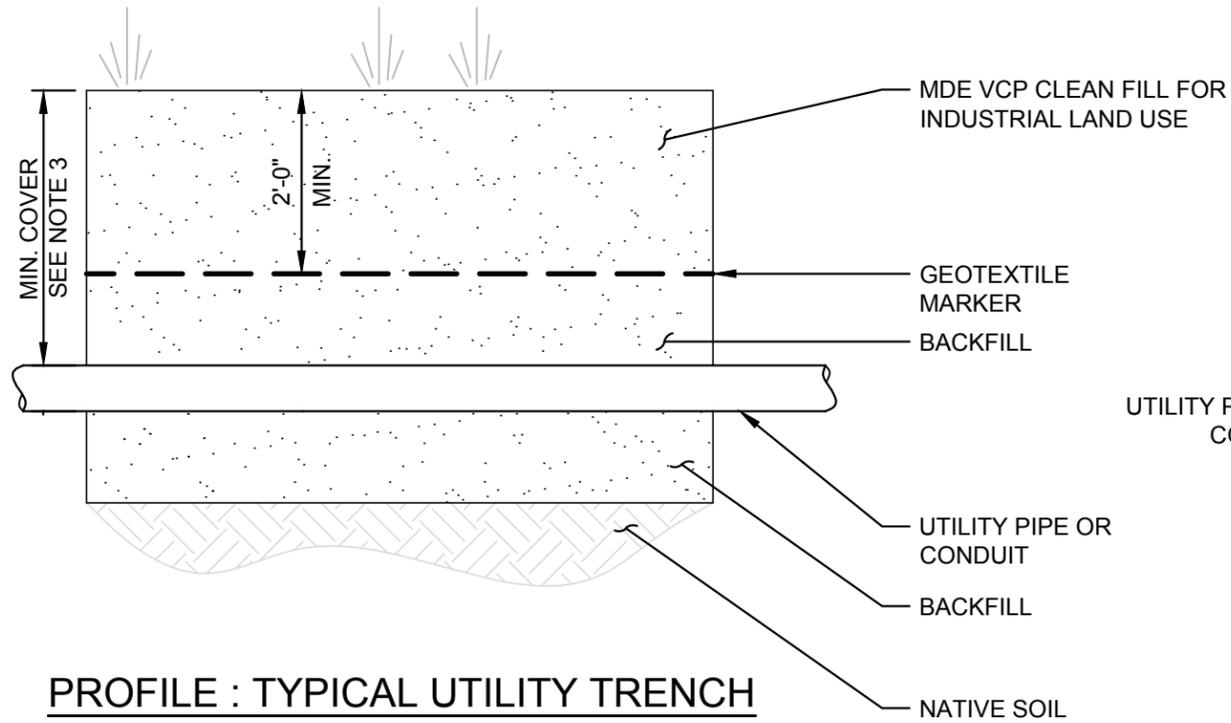
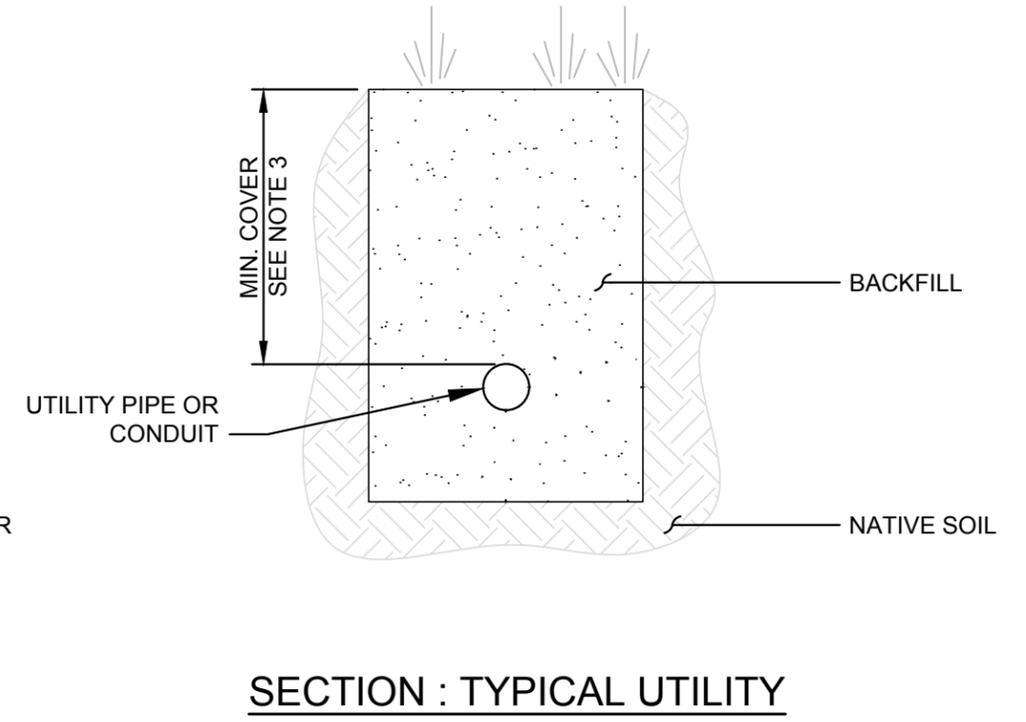
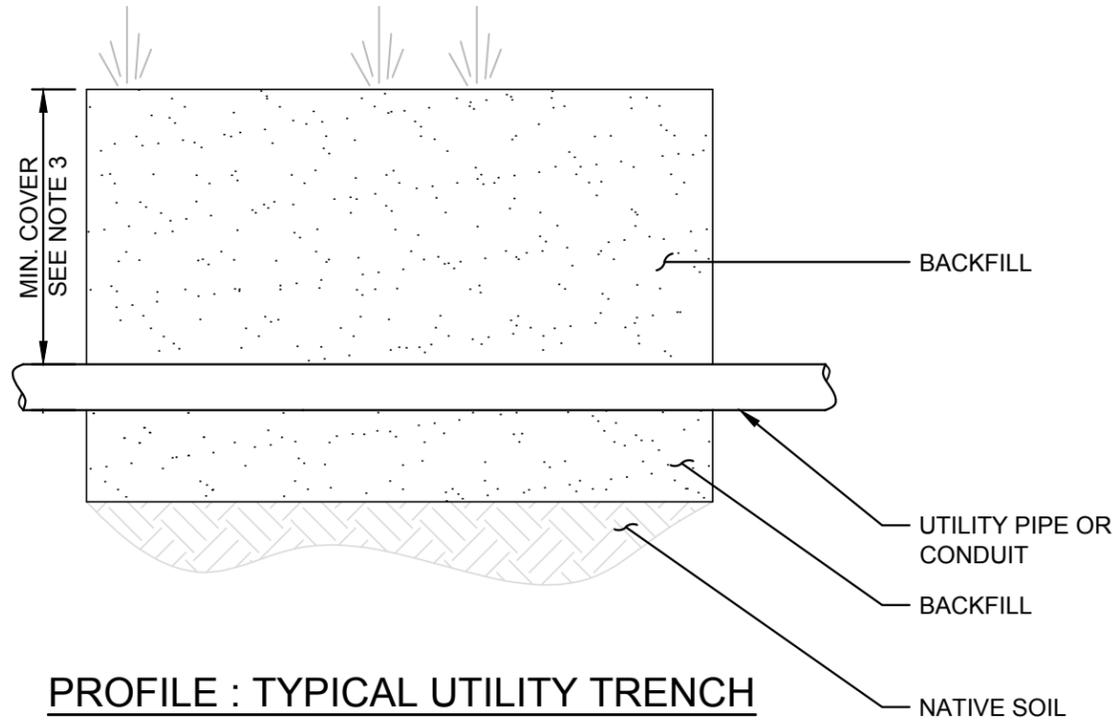
## **APPENDIX F**

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**GENERAL NOTES:**

1. ALL PIPES OR CONDUIT SHALL BE LEAK-PROOF AND WATERTIGHT. ALL JOINTS SHALL BE SEALED OR GASKETED.
2. ALL PIPES SHALL BE PROPERLY PLACED AND BEDDED TO PREVENT MISALIGNMENT OR LEAKAGE. PIPE BEDDING SHALL BE INSTALLED IN SUCH A MANNER AS TO MINIMIZE THE POTENTIAL FOR ACCUMULATION OF WATER AND CONCENTRATED INFILTRATION.
3. MINIMUM COVER ABOVE UTILITY SHALL BE BASED ON SPECIFIC UTILITY REQUIREMENTS.
4. TRENCHES SHALL BE BACKFILLED WITH BEDDING AND MATERIALS APPROVED BY MDE.
5. FOR ANY UTILITY SEGMENT WHICH GOES THROUGH AN AREA WHICH IS DESIGNATED TO RECEIVE A LANDSCAPED CAP, THE UPPER 2 FEET OF BACKFILL MUST MEET THE REQUIREMENTS OF MDE VCP CLEAN FILL FOR INDUSTRIAL LAND USE. IN THIS CASE THE MDE VCP CLEAN FILL WILL BE UNDERLAIN BY A GEOTEXTILE MARKER FABRIC. UTILITY SEGMENTS WHICH GO THROUGH AREAS WHICH DO NOT REQUIRE CAPPING OR ARE DESIGNATED TO RECEIVED A PAVED CAP WILL BE BACKFILLED WITH MATERIALS APPROVED BY MDE FOR THIS USE.



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**CRRGF KZ'I "**

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## **Utility Excavation NAPL Contingency Plan**

Revision 4 – June 19, 2017

### **Introduction:**

Proposed underground utilities and excavations necessary for the redevelopment of the Tradepoint Atlantic property may encounter areas of petroleum and/or Oil & Grease contamination in soil. The assessment of total petroleum hydrocarbons (TPH) diesel range organics (DRO), gasoline range organics (GRO), Oil & Grease, and/or non-aqueous phase liquid (NAPL) completed as part of each Phase II Investigation includes the following:

- Each soil boring with evidence of NAPL (i.e., containing a sheen or free oil in the soil core), whether located near utilities or not, is investigated via the installation of a piezometer to assess mobility to groundwater. If measureable NAPL is present in the initial piezometer, additional soil borings and shallow temporary piezometers are installed surrounding the initial detection to delineate the impacts. Each piezometer installed to delineate the presence or absence of NAPL is checked with an oil-water interface probe immediately after installation, 48 hours after installation, and at least 30 days after installation.
- TPH-DRO/GRO and Oil & Grease data, once received, are assessed in their magnitude and location respective to subsurface utilities, stormwater conveyances, and surface waters.
- Locations that exhibit elevated detections of TPH/Oil & Grease or evidence of NAPL, that are within reasonable proximity (i.e. 25 feet) to subsurface utilities or stormwater conveyances and/or within reasonable proximity (i.e. 100 feet) to surface waters, are identified for further delineation and selective removal (if warranted).

Any NAPL identified in soil borings or piezometers during the Phase II Investigation would be noted on relevant logs and identified in Response and Development Work Plans for construction planning purposes. Despite these planning efforts, unidentified pockets of contamination (including NAPL) may still be encountered during construction. This contingency plan provides the procedures to be utilized during construction work to properly address response and construction techniques if any materials impacted with NAPL are encountered.

### **Objectives:**

The purpose of this plan is to describe procedures to be followed in the event that NAPL is encountered in utility trenches or other excavations during development of the Tradepoint Atlantic property. The specific objectives of this plan and the procedures outlined herein are:

1. To ensure identification and proper management of Oil & Grease and petroleum-contaminated soils.
2. To ensure proper worker protection for working in areas of Oil & Grease and petroleum contamination.
3. To ensure that the installation of new utilities does not create new preferential flow paths for the migration of free-phase hydrocarbons (Oil & Grease, TPH-DRO/GRO, etc.) or soil vapors.

**Identification of Oil & Grease and Petroleum Contaminated Soil:**

An Environmental Professional (EP) will be on-site to determine if soils show evidence of the presence of Oil & Grease or TPH present as NAPL during installation of utility trenches or other excavation activities completed during development. Oil & Grease or petroleum-contaminated soils can be identified by the presence of free oil, oil staining, a petroleum odor, or any combination of these conditions. Free oil (NAPL) is liquid oil which could potentially be drained or otherwise extracted from the soil, and is the focus of this contingency plan, although severe staining accompanied by odors should be addressed via the same contingency measures provided herein (based on the judgement of the EP). The appearance of oil staining is not always consistent, but varies depending on the nature of the oil, the soil type, and the age of the release. Staining associated with old petroleum contamination often has a greenish hue, but may also be brown or black. The olfactory sense is the most sensitive instrument for identifying petroleum contamination in the field. Therefore, a petroleum odor may be noted although there is no visible sign of oil or staining. In some instances, decaying organic matter can produce an odor similar to petroleum, but this is rare.

If NAPL is encountered during construction, the extent of impacts shall be delineated by excavating trenches or installing four soil borings (two in each direction) perpendicular to the utility alignment or excavation to examine the soil for physical evidence of NAPL. Perpendicular transects will be investigated every 50 feet along the section of the utility trench or excavation where there is physical evidence of NAPL. Each transect will extend to a distance of 10 feet from the edge of the utility trench or excavation. This represents the maximum distance which would require mandatory excavation to mitigate potential migration risks (see below).

NAPL delineation will be guided primarily by screening observations from the perpendicular borings or trenches, and samples will be collected to test for extractable Oil & Grease or petroleum-contaminated soil using the Oil Sticks™ test kit. This test kit provides a determination of whether hydrocarbons are present in soil and extractable (i.e. could mobilize as a NAPL). Oil Sticks™ change from a pale blue to a deep blue color when they come in contact with free product. This instantaneous change in color occurs even when miniscule amounts of product come in contact with the strip. The sensitivity of Oil Sticks™ to determine the presence/absence of oil is reported by the manufacturer to be about 1,000 to 2,000 mg/kg. The

field test is performed by placing approximately 3 tablespoons of soil in a clean sample cup and adding enough water to cover the sample. After stirring the sample and waiting ~1 minute, the Oil Sticks™ test strip should be swished through the water, making sure to touch the strip to the sides of the cup where product may collect at the interface (meniscus) between the cup, water, and air. If the strip turns deep blue, or deep blue spots appear, oil or hydrocarbon is present. However, the MDE has observed that the Oil Sticks™ method may produce inconsistent results. Therefore, documentation of all screening methods is necessary during boring/trenching work. This documentation shall include an accurate record of visual and olfactory screening, along with a narrative with photographs. Field screening will be aided by photoionization detector (PID) results, and Oil Sticks™ samples should be biased to target elevated PID readings, if any. The agencies have requested that all soil samples prepared for the Oil Sticks™ field test be photographed for evidence of sheen/residue on the cup sides. Detailed records are required to be submitted with the project-specific Completion Report.

If petroleum or Oil & Grease impacts are identified in Site soils based on use of the Oil Sticks™ test kit or other field screening methods, disposal requirements will be determined using the quantitative PetroFLAG™ hydrocarbon analysis system or fixed laboratory analysis (see following section). The PetroFLAG™ hydrocarbon analysis system is a broad spectrum field test kit suitable for TPH contamination regardless of the source or state of degradation (Dexsil Corporation). PetroFLAG™ field test kits do not distinguish between aromatic and aliphatic hydrocarbons, but quantify all fuels, oils, and greases as TPH. Dilutions can be used to determine concentrations of TPH/Oil & Grease above the normal calibration range. Dexsil notes that positive results for TPH may occur if naturally occurring waxes and oils, such as vegetable oils, are present in the sample. Additional detail regarding the procedure for the PetroFLAG™ kit is given in **Attachment 1**.

### **Soil Excavation, Staging, Sampling and Disposal:**

The EP will monitor all utility trenching and excavation activities for signs of potential contamination. In particular, soils will be monitored with a hand-held PID for potential VOCs, and will also be visually inspected for the presence of staining, petroleum waste materials, or other indications of NAPL contamination that may be different than what was already characterized. Excavated material that is visibly stained or that exhibits a sustained PID reading of greater than 10 ppm will be segregated and containerized or placed in a stockpile on polyethylene or impervious surface until the material can be analyzed using the PetroFLAG™ test kit to characterize the material for appropriate disposal. If a PetroFLAG™ test kit is not available to the contractor, or if the contractor prefers to use fixed laboratory analysis, samples may be characterized via submittal to a laboratory for TPH/Oil & Grease analysis. However, any excavated material containing NAPL (i.e., containing free oil) cannot be characterized for waste disposal using the PetroFLAG™ test kit and must instead be characterized via fixed laboratory analysis, as described in the final paragraph of this section. In addition, any hydrocarbon contaminated soil discovered during construction activities that was not previously

characterized must also be analyzed for PCBs prior to removal and transport to an appropriate disposal facility. If excavated and stockpiled, such materials will be covered with a plastic tarp so that the entire stockpile is encapsulated, and anchored to prevent the elements from affecting the integrity of the containment. The MDE will be notified if such materials are encountered during utility work.

Soil exhibiting physical evidence of NAPL contamination or elevated TPH/Oil & Grease with detections in the low percentage range, which is located within 10 feet of a proposed new utility or subsurface structure (i.e., foundation, sump, electrical vault, underground tank, etc.), will be excavated and segregated for disposal at the on-site nonhazardous landfill (Greys Landfill) or an off-site facility pending the completion of any required PCB analytical testing. Impacted soil which is located greater than 10 feet away from the proposed utility or subsurface structure may be left in place and undisturbed. The extent of the excavation will be determined in the field following visual/olfactory screening supplemented by the PID and Oil Sticks™ test kit, but soil disposal requirements will be determined with the PetroFLAG™ test kit (since the Oil Sticks™ method is not quantitative) or via fixed laboratory analysis for TPH/Oil & Grease (if preferred by the contractor or if the PetroFLAG™ test kit is unavailable to the contractor).

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

### **Initial Reporting:**

If evidence of NAPL in soil or groundwater is encountered during excavation, it will be reported to the MDE within two hours. Information regarding the location and characteristics of any NAPL contaminated soil will be documented as follows:

- Location (exact stationing);
- Extent of contamination (horizontally and vertically – prepare a sketch including dimensions);
- Relative degree of contamination (i.e. free oil with strong odor vs. staining); and
- Visual documentation (take photographs and complete a photograph log)

**Utility Installations in Impacted Areas:**

Underground piping or conduits installed through areas of Oil & Grease or petroleum contamination shall be leak proof and water tight. All joints will be adequately sealed or gasketed, and pipes or conduits will be properly bedded and placed to prevent leakage. All trench backfill will meet the MDE definition of clean fill, or otherwise be approved by the MDE. Pipe bedding will be installed to minimize the potential for accumulation of water and concentrated infiltration. This can be achieved by using a relatively small amount of low-permeability pipe bedding; open-graded stone will be avoided or only used in thicknesses of 6 inches or less. Bedding must be properly placed and compacted below the haunches of the pipe. Clay, flowable fill, or concrete plugs will be placed every 100 feet across any permeable bedding to minimize the preferential flow and concentration of water along the bedding of such utilities.

If required, each trench plug will be constructed with a 2-foot-thick clay plug or 1-foot-thick flowable fill or concrete plug, perpendicular to the pipe, which extends at least 1 foot in all directions beyond the permeable pipe bedding. The plug acts as an anti-seep collar, and will extend above the top of the pipe. Installation of each trench plug will follow the completion of the trench excavation, installation of granular pipe bedding (because dense-graded aggregate or soil or other pipe bedding is difficult to properly compact below the haunches of the pipe), and seating of the pipe. The trench plug will then be installed by digging out a 1-foot trench below and around the pipe corridor, and placing clay, flowable fill, or concrete to construct the plug. A specification drawing for installation of the trench plug has been provided as **Figure 1**.

### **Attachment 1 - PetroFLAG™ Procedure**

PetroFLAG™ field test kits use a proprietary turbidimetric reaction to determine the TPH concentration of solvent extracted samples (USEPA). Calibration standards provided with the unit are used to perform a two-point calibration for the PetroFLAG™. A blank and a 1,000 ppm standard are run by the analyzer unit to create an internal calibration curve.

Analysis of a soil sample is performed using three simple steps: extraction, filtration, and analysis. The PetroFLAG™ analysis is performed as follows:

- Place a 10 gram soil sample in a test tube.
- Add extraction solvent to the tube.
- Shake the tube intermittently for four minutes.
- Filter the extract into a vial that contains development solution
- Allow the solution to react for 10 minutes.

The filtration step is important because the PetroFLAG™ analyzer measures the turbidity or "optical density" of the final solution. Approximately 25 samples can be analyzed per hour. The vial of developed solution is placed in the meter, and the instrument produces a quantitative reading that reveals the concentration of hydrocarbons in the soil sample. The PetroFLAG™ method quantifies all fuels, oils, and greases as TPH between 15 and 2000 ppm (Dexsil Corporation). A 10x dilution of the filtered extraction solvent will be completed to allow for quantification of soil concentrations in excess of 10,000 ppm. The specially designed PetroFLAG™ analyzer allows the user to select, in the field, the response factor that is appropriate for the suspected contaminant at each site. Vegetable-based oils have been shown to exhibit a response factor of 18% (EPA Method 9074). Using the selected response factor, the analyzer compensates for the relative response of each analyte and displays the correct concentration in parts per million (ppm).

#### References:

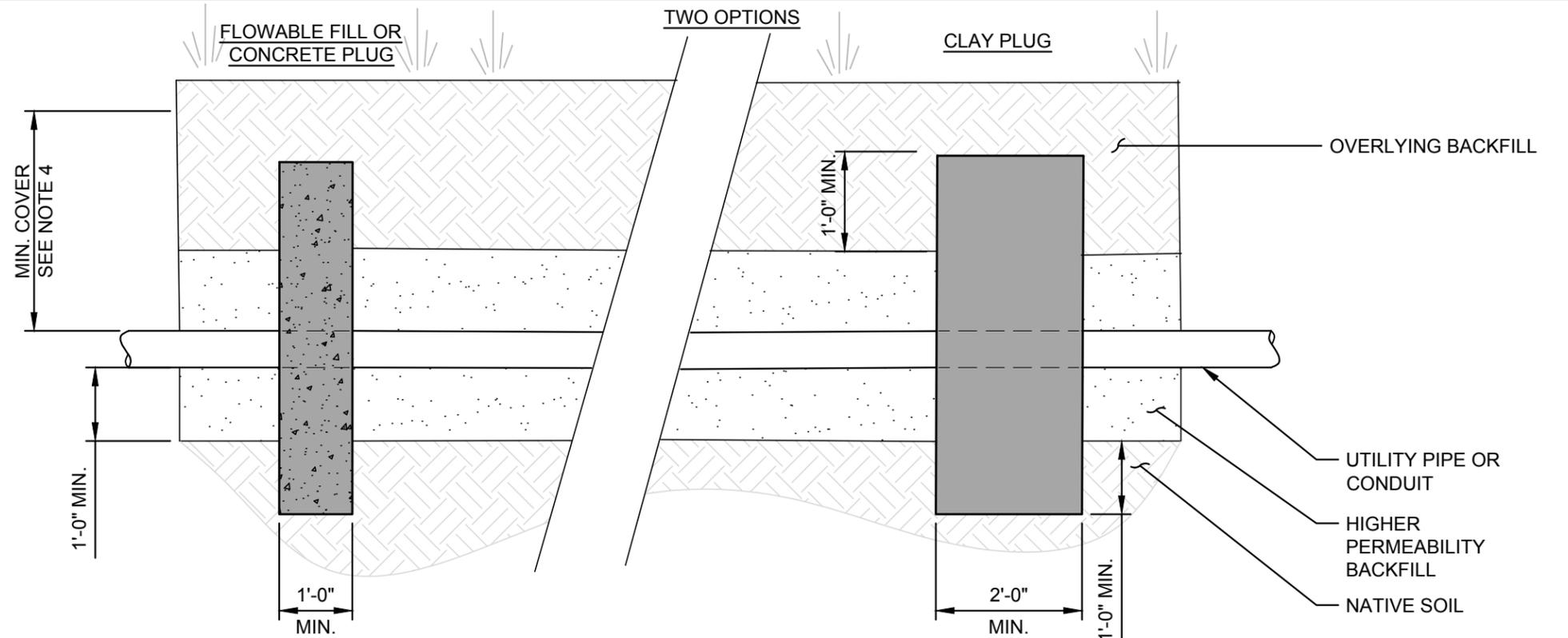
U.S. Environmental Protection Agency (EPA). Contaminated Site Clean-up Information (Clu-IN): Test Kits. Office of Superfund Remediation and Technology Innovation. <http://www.clu-in.net/characterization/technologies/color.cfm>

Dexsil Corporation. 2016. PetroFLAG Analyzer System (PF-MTR-01). [http://www.dexsil.com/products/detail.php?product\\_id=23](http://www.dexsil.com/products/detail.php?product_id=23)

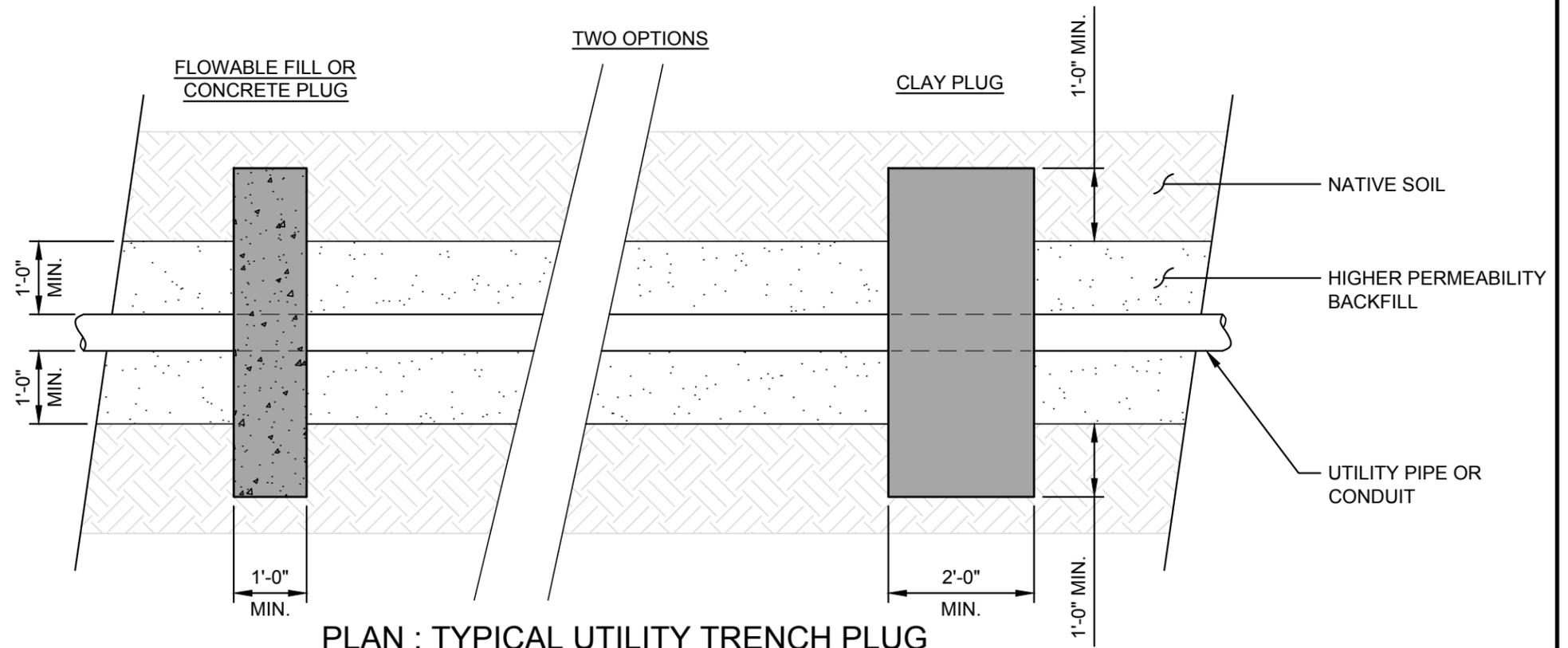
EPA SW-846 Method Number 9074 - Turbidimetric Screening Procedure for Total Recoverable Hydrocarbons in Soil

**GENERAL NOTES:**

1. ALL PIPES OR CONDUIT PASSING THROUGH AREAS OF PETROLEUM CONTAMINATION SHALL BE LEAK-PROOF AND WATERTIGHT. ALL JOINTS SHALL BE SEALED OR GASKETED.
2. ALL PIPES SHALL BE PROPERLY PLACED AND BEDDED TO PREVENT MISALIGNMENT OR LEAKAGE. PIPE BEDDING SHALL BE INSTALLED IN SUCH A MANNER AS TO MINIMIZE THE POTENTIAL FOR ACCUMULATION OF WATER AND CONCENTRATED INFILTRATION.
3. ANTI-SEEP COLLARS FROM THE PIPE MANUFACTURER, THAT ARE PRODUCED SPECIFICALLY FOR THE PURPOSE OF PREVENTING SEEPAGE AROUND THE PIPE, ARE ACCEPTABLE IF INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AND ONLY WITH PRIOR APPROVAL BY TPA.
4. MINIMUM COVER ABOVE UTILITY SHALL BE BASED ON SPECIFIC UTILITY REQUIREMENTS.
5. TRENCHES SHALL BE BACKFILLED WITH BEDDING AND MATERIALS APPROVED BY MDE.
6. FOR ADDITIONAL REQUIREMENTS, INCLUDING THE USE OF MDE VCP CLEAN FILL FOR INDUSTRIAL LAND USE AND INSTALLATION OF GEOTEXTILE MARKER FABRIC, REFER TO NOTE 5 ON THE TYPICAL UTILITY CROSS SECTIONS.
7. ALL UTILITIES INSTALLED THROUGH AREAS CONTAINING NAPL OR ELEVATED CHEMICAL IMPACTS WITH THE POTENTIAL TO TRANSMIT VAPORS ALONG PREFERENTIAL FLOW PATHWAYS SHALL BE EITHER 1) BACKFILLED WITH LOW PERMEABILITY BACKFILL MATERIAL (LESS THAN OR EQUAL TO THE PERMEABILITY OF THE EXISTING SUBGRADE), OR 2) INSTALLED WITH TRENCH PLUGS ALONG THE ALIGNMENT IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS PLAN AND THE FOLLOWING NOTES:
  - A.) UTILITY TRENCH PLUGS SHALL BE INSTALLED AT 100-FOOT (MAX.) INTERVALS THROUGH ALL AREAS OF NAPL CONTAMINATION.
  - B.) UTILITY TRENCH PLUGS SHALL EXTEND A MINIMUM OF 1-FOOT IN ALL DIRECTIONS BEYOND ANY HIGHER PERMEABILITY BACKFILL MATERIALS (I.E., MATERIALS EXCEEDING THE PERMEABILITY OF THE EXISTING SUBGRADE).



**SECTION : TYPICAL UTILITY TRENCH PLUG**



**PLAN : TYPICAL UTILITY TRENCH PLUG**

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**UTILITY TRENCH PLUG**  
Sparrows Point Site  
Tradepoint Atlantic

September 2020  
Not to Scale  
160443M

Figure  
**1**

P:\EnviroAnalytics Group\160443M EAG\_TPA Redevelopment\Drawings\NAPL Contingency\SK01\_UTILITY Trench Plug\_rev2.dwg Plotted: September 24, 2018