Weaver Consultants Group

April 23, 2015

Ms. Barbara Brown
Section Head
Maryland Department of the Environment
Voluntary Cleanup Program
1800 Washington Blvd – Suite 625
Baltimore, MD 21230-1719

Re: Phase II Environmental Site Assessment Report/Response Action Plan
Sparrows Point
Parcel A1
VCP Applicant: Sparrows Point Terminal, LLC

Dear Ms. Brown:

On behalf of our client, Scannell Properties, Weaver Consultants Group North Central, LLC herein submits the enclosed Phase II Environmental Site Assessment Report/Response Action Plan for the above referenced property. The enclosed document has been prepared in accordance with applicable Maryland Voluntary Cleanup Program (VCP) requirements. Two hard copies are being submitted to the Maryland Department of Environment (MDE) and the United States Environmental Protection Agency (USEPA). In addition, an electronic version of the document has been emailed to MDE and Mr. Andrew Fan of USEPA Region III.

Due to the volume of paper associated with the extended data deliverable laboratory analytical reports, which comprise over 6,000 pages alone, we are transmitting this information on a compact disk contained in the enclosed documents. If you would like us to transmit paper copies of this information, please advise and we are happy to do so.

Lastly, please note that the data validation reports from the independent third party data validation contractor are not included in the enclosed documentation, but are nearly finished. We anticipate transmitting these reports under separate cover by early next week.

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We look forward to your review of the enclosed document. Feel free to contact either of the undersigned with any questions.

Sincerely,

Weaver Consultants Group North Central, LLC

Michael B. Maxwell, LPG
Senior Project Manager

Douglas G. Dorgan, Jr., LPG
Principal

Cc: Andrew Fan, USEPA Region III (via Fedex and email)
Tim Elam, Scannell Properties (via email)
Chuck McMahon, SPT (via email)

Enclosure: Phase II Environmental Site Assessment Report/Response Action Plan (2 copies)

April 23, 2015

PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT/RESPONSE ACTION PLAN

PARCEL A1
FORMER SPARROWS POINT STEEL MILL
SPARROWS POINT, MARYLAND

PREPARED FOR:

SCANNELL PROPERTIES

PREPARED BY

Weaver Consultants Group

EXECUTIVE SUMMARY

On behalf of Scannell Properties (who represents the potential future lessee), Weaver Consultants Group North Central, LLC (WCG) has prepared this Phase II Environmental Site Assessment (ESA) Report/Response Action Plan (RAP) for the property identified as Parcel A1 located on the northern portion of the Sparrows Point Peninsula in Sparrows Point, Maryland (the Site). The Site is part of an approximately 3,100-acre former steel mill located on the Sparrows Point Peninsula (Property).

The entire Property was accepted into the Maryland Department of the Environment's (MDE's) Voluntary Cleanup Program (VCP) on September 11, 2014. Subsequently, a VCP application for an area of the Property designated as Area A, which includes the Site, was submitted to the MDE. Parcels located in Area A are designated for investigation and remediation on a priority basis through the Maryland VCP process.

The Site consists of approximately 48.5 acres of land and is currently vacant. Beginning in the 1940s, the Site historically operated as a pipe production facility (Pipe Mill) associated with the former steel mill. In 1998, the Pipe Mill was demolished. The proposed redevelopment use of the Property, including the Site, is Tier 3B, Restricted Industrial Use. Currently, it is anticipated that the Site will be redeveloped as a Federal Express facility.

As part of the environmental due diligence activities implemented for Bryan Cave LLC, WCG previously performed a Phase I ESA of the entire Property and prepared a report dated May 19, 2014 (May 2014 Phase I ESA). Six Findings were identified related to the Site and these six Findings were grouped into one recognized environmental condition (REC) identified as REC-6: Rod and Wire and Pipe Mill Area. In addition to the May 2014 Phase I ESA, WCG performed a Phase I ESA specifically for the Site and prepared a report dated February 18, 2015. Based on the above Phase I ESA, four RECs were identified in connection with the Site related to historical operations on the Site and adjoining properties.

To assess potential environmental site conditions associated with the identified RECs, a Phase II ESA was implemented at the Site in November 2014. During the Phase II ESA, twenty-six soil borings/soil probes were advanced and groundwater samples were collected from five of the soil borings. In general, results of the Phase II ESA indicated the presence of select metals, one polychlorinated biphenyl (PCB), and total petroleum hydrocarbons-diesel range organics (TPH-DRO) in soil at concentrations exceeding the applicable MDE Non-Residential Cleanup Standards (NRCS) and/or the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs). In addition, various dissolved metals were detected in groundwater at concentrations exceeding the MDE Groundwater Standards for Type I and Type II Aquifers and/or USEPA Maximum Contaminant Levels (MCLs) or Tap Water RSLs.

Additional investigation was conducted in February 2015 to further assess the impacts identified during the Phase II ESA. Twenty soil probes were advanced for soil sample collection and analysis. In general, the results indicated the presence of select metals, TPH-DRO, one PCB,

and select polynuclear aromatic hydrocarbons (PAHs) in soil at concentrations exceeding the applicable MDE NRCS and/or the USEPA RSLs.

The RAP included herein proposes a remedy for impacted soil and groundwater in conjunction with the planned Site redevelopment. The selected technologies to address the soil and groundwater impacts include engineering and institutional controls, as well as health and safety protocols for construction workers. The engineering and institutional controls will control the exposure pathways (incidental ingestion, dermal contact, and inhalation of soil particles) from the media of concern (soil and groundwater) to the potential receptors (future adult workers and visitors). Additionally, the health and safety protocols developed for future construction of capped areas and redevelopment construction activities shall be designed to protect construction workers from unacceptable risk.

The engineering controls will consist of capping technologies, including concrete covered areas (future building slab and concrete paving), asphalt-paved areas, and capped landscaped areas with a geotextile fabric. Following implementation of the containment remedies (capping), institutional controls, including a groundwater use deed restriction, industrial land use restriction, and cap maintenance requirements will be recorded for the Site in order to maintain the integrity of the containment remedies and mitigate potential exposure. This RAP was prepared for submittal to the MDE so that ultimately a No Further Action Letter and a Certificate of Completion may be obtained following completion of the proposed RAP activities.

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1 INTRODUCTION

On behalf of Scannell Properties (who represents the potential future lessee), Weaver Consultants Group North Central, LLC (WCG) has prepared this Phase II Environmental Site Assessment (ESA) Report/Response Action Plan (RAP) for the site identified as Parcel A1 located on the northern portion of the Sparrows Point Peninsula in Sparrows Point, Maryland (the Site). The location of the Site is shown on **Figure 1 – Site Location Map**.

The Site is part of an approximately 3,100-acre former steel mill located on the Sparrows Point Peninsula (Property). On June 26, 2014, the current owner of the Property, Sparrows Point Terminal, LLC (SPT), submitted an application to place the entire Property into the Maryland Department of the Environment's (MDE's) Voluntary Cleanup Program (VCP). On September 11, 2014, MDE determined that SPT was eligible for participation in the VCP. On September 12, 2014, SPT and MDE entered into an Administrative Consent Order (ACO) that allows for designation of certain areas of the Property for investigation and remediation on a priority basis through the VCP process. A VCP application for the priority areas (designated as Area A), including the Site, was submitted to the MDE on September 12, 2014.

The Site consists of approximately 48.5 acres of land and is currently vacant. Beginning in the 1940s, the Site historically operated as a pipe production facility (Pipe Mill) associated with the former steel mill. In May 1984, the Pipe Mill was closed under a Closure Plan approved by the MDE on December 12, 1983. Closure activities occurred on the Site and surrounding area through the 1980s and 1990s. In 1998, the Pipe Mill was demolished.

The proposed redevelopment use of the Property, including the Site, is Tier 3B, Restricted Industrial Use. The VCP application for Area A specifies that the intended future use is Tier 3 (Industrial) with land use controls anticipated as part of the future use (designated by B [Restricted]). Currently, it is anticipated that the Site will be redeveloped as a Federal Express facility, which is consistent with the intended future use designation on the Area A VCP application.

As part of the environmental due diligence activities implemented for Bryan Cave LLP (environmental counsel for SPT), WCG previously performed a Phase I ESA of the entire Property and prepared the *Phase I Environmental Site Assessment Report, Former RG Steel Facility, 1430 Sparrows Point Boulevard and 5111 North Point Boulevard, Sparrows Point, Maryland* dated May 19, 2014 (May 2014 Phase I ESA). The Phase I ESA Report was previously submitted to the MDE and therefore, is not included as an attachment to this report. Six Findings were identified related to the Site that is the subject of this report. These six Findings were grouped into one recognized environmental condition (REC) identified as REC-6: Rod and Wire and Pipe Mill Area (Findings 131 to 133, 153,

160, and 162). Findings 153 and 162 are specific to the former Pipe Mill and are associated with the Site; the other Findings are associated with the former Rod and Wire Mill located directly west of the Site. In addition to the May 2014 Phase I ESA, WCG performed a Phase I ESA specifically for the Site and prepared a report dated February 18, 2015. Based on the February 2015 Phase I ESA, WCG identified four RECs in connection with the Site related to historical operations on the Site and adjoining properties. Details of the RECs are discussed within this report.

To assess potential environmental site conditions associated with the RECs identified during the above referenced Phase I ESAs, WCG and our sub consultant KCI Technologies (KCI) implemented a Phase II ESA (Phase II ESA) at the Site on November 10 through 13, 2014 and November 24, 2014. The scope of work for the Phase II ESA generally included the advancement of soil borings/probes and the installation of temporary monitoring wells for soil and groundwater sample collection. A total of twenty-six soil borings/soil probes were advanced and groundwater samples were collected from five of the soil borings.

In general, results of the Phase II ESA indicated the presence of metals (arsenic, cadmium, zinc, iron, manganese, or vanadium), or total petroleum hydrocarbons-diesel range organics (TPH-DRO) in soil at concentrations exceeding the applicable MDE Non-Residential Cleanup Standards (NRCS) and/or the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs). Various dissolved metals (aluminum, cadmium, iron, manganese, vanadium, and zinc) were also detected in groundwater at concentrations exceeding the MDE Groundwater Standards for Type I and Type II Aquifers and/or USEPA Maximum Contaminant Levels (MCLs).

Additional investigation was conducted in February 2015 to further assess the soil impacts identified during the Phase II ESA. The scope of work for the additional investigation included the advancement of twenty soil probes for soil sample collection and analysis of select samples. In general, the results indicated the presence of select metals, TPH-DRO, PCBs, and polynuclear aromatic hydrocarbons (PAHs) in various soil samples at concentrations exceeding the applicable MDE NRCS and/or the USEPA RSLs.

1.1 Purpose and Scope

The purpose of this Phase II ESA Report/RAP is to:

- Provide a summary of the Phase II and supplemental site investigation activities and results;
- Evaluate the potential exposure pathways and potentially exposed populations for each media and contaminant of concern at the Site under the present and future land use scenarios;

- Based on the exposure evaluation, provide the details of the proposed response actions including engineering controls and institutional controls to mitigate potential risks to human health and the environment. The proposed response actions include containment remedies (engineering controls) and deed restrictions (institutional controls) prohibiting potable groundwater use, and restricting land use.

The responsible party implementing this RAP will comply with local, state, and federal laws and regulations by obtaining necessary approvals and permits to conduct the activities pursuant to an approved RAP. If during implementation of the RAP, any previously undiscovered contamination or citation from regulatory entities related to health and safety practices is identified, the MDE VCP will be verbally notified within one business day. Written notification will be submitted within ten business days.

A description of the Site and summary of the Site history are provided in **Section 2.0**. The Phase II ESA investigation activities and results are summarized in **Section 3.0** and the additional investigation activities are discussed in **Section 4.0**. The RAP exposure assessment is provided in **Section 5.0** and the clean-up criteria are provided in **Section 6.0**. Details of the RAP including the selected technologies including engineering and institutional controls are provided in **Section 7.0.** RAP implementation details are outlined in **Sections 8.0** through **10.0** and references are provided in **Section 11.0**.

2 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The Site is identified as Parcel A1, located on the northern portion of the Sparrows Point Peninsula in Sparrows Point, Maryland. The Site consists of approximately 48.5 acres of land with approximately 700 feet of frontage along Bethlehem Boulevard/Riverside Drive/Route 158 and 850 feet of frontage along Patapsco Back Rivers (PBR) Railroad Road. The Site is described as one lot on the Sparrows Point Peninsula in Baltimore County, Maryland (see **Figure 1 – Site Location Map**).

The Site is currently vacant, but contains building foundations and concrete slabs from former structures (see **Figure 2 – Site Layout Map**). The Site historically operated as a pipe production facility (Pipe Mill) from the 1940s to 1984 when operations ceased. The southern and eastern edges of the Site are improved with a chain-link fence. One access road is present through the center and along the western portion of the Site

2.2 Site Setting

The Site generally lies east and south of Riverside Drive/Bethlehem Boulevard/Route 158, north of PBR Railroad Road, and west of Wharf Road/Route 151. The following table is a listing of the current adjoining properties including the applicable property name, address, operation, and direction from the Site:

CURRENT ADJOINING PROPERTIES			
Property Name/Occupant	**Address**	**Operation/Use**	**Direction from the Site**
Greys Landfill	Along Interstate-695 Sparrows Point, Maryland	Landfill	North across I-695
Electrical Substation	Along US Route 138 Sparrows Point, Maryland	Electrical Substation	Northwest
New Cold Mill Complex	Along PBR Railroad Road Sparrows Point, Maryland	Vacant Building - Part of Former New Cold Mill	East
Former Billet Building	Along Cold Mill Road Sparrows Point, Maryland	Vacant/Former Industrial	South across railroad tracks
Humphrey's Impoundment	Along PBR Railroad Road Sparrows Point, Maryland	Impoundment	South across railroad tracks

CURRENT ADJOINING PROPERTIES			
Property Name/Occupant	**Address**	**Operation/Use**	**Direction from the Site**
Vacant Land	Along PBR Railroad Road Sparrows Point, Maryland	Vacant/Former Rod and Wire Mill	West

The Site is part of an approximately 3,100-acre former steel mill located on the Sparrows Point Peninsula. The surrounding area generally consists of properties formerly used for heavy industry associated with the former steel mill. The Sparrows Point Peninsula consists largely of the former steel mill plant, which was owned and operated primarily by the former Bethlehem Steel Company.

The following utility services are provided to the Sparrows Point Peninsula Property generally; specific availability is not verified herein:

- Electric service – provided by Baltimore Gas and Electric (BGE);
- Natural gas service – None (formerly BGE);
- Potable water – provided by Baltimore County; and
- Sanitary service – provided by City of Baltimore.

Storm water at the Site and in the surrounding area largely sheet flows; however, some storm water is also managed via an internal storm sewer system which discharges to various outfalls.

2.3 Site History

Based on historical information reviewed for the prior Phase I ESA performed for the Site, the central and western portions of the Site were improved by at least 1938 with six industrial buildings and access roads that were associated with the western adjoining property. The western adjoining property was improved with a large industrial building housing the former Rod and Wire Mill. The southern portion of the Site, which was previously part of Humphrey Creek, was filled in and developed with railroad tracks while the northern portion was farmland. A portion of the former East Pond associated with the former Rod and Wire Mill was located in the northwestern corner of the Site. The Site was identified as the Pipe Mill and began operating as a pipe production facility in the 1940s. In May 1984, the Pipe Mill was closed under a Closure Plan approved by the MDE on December 12, 1983. Closure activities occurred on the Site and surrounding area through the 1980s and 1990s. In 1998, the Pipe Mill was demolished. The Site is

currently vacant, but contains building foundations and concrete slabs from former structures.

As mentioned previously, the Site was part of a former steel mill that existed for over one hundred years. Pennsylvania Steel built the first furnace at the Sparrows Point facility in 1887 and the first iron was cast in 1889. In 1916, Bethlehem Steel Corporation (BSC) purchased the Sparrows Point facility and enlarged it with the addition of mills to produce hot rolled sheet, cold rolled sheet, galvanized sheet, tin mill products, and steel plate. Following the bankruptcy of BSC in 2001, the Property was owned by a succession of owners operating under different names. Steelmaking operations at the facility ceased in 2012. Throughout 2013 to the present day, a demolition contractor has been demolishing the majority of the above-grade structures on the Property.

On February 25, 1997, the United States Environmental Protection Agency (USEPA) filed a complaint under the Resource Conservation and Recovery Act (RCRA) against BSC claiming that BSC operated a hazardous waste treatment, storage, or disposal facility and that a release of hazardous constituents had occurred. On October 8, 1997, BSC, the USEPA, and the MDE entered into a Consent Decree to address releases from historical and on-going operations at the facility. As required by the Consent Decree, BSC submitted a Description of Current Conditions (DCC) Report on January 20, 1998 describing prior investigations and identifying potential sources of contaminants. Subsequently, numerous other major reports focusing primarily on designated Special Study Areas have been submitted to the USEPA and MDE.

Based on the May 2014 Phase I ESA, the Site is part of the Rod and Wire Mill Special Study Area. The former Rod and Wire Mill was located on the western adjoining property. According to the DCC Report, activities at the former Rod and Wire Mill associated with leaching of zinc ore and a subsequent treatment process to remove cadmium impurities resulted in impacted soil and groundwater. In 1986, BSC initiated a groundwater remediation program under MDE Complaint and Order C-0-85-179 dated February 25, 1985. The remediation activities included in-situ leaching of contaminated soil and treatment of groundwater pumped from a network of extraction wells. As part of the Interim Measures (IM) associated with the 1997 Consent Decree, BSC was required to continue to operate the remediation system (soil leaching system and groundwater pump and treat system). The groundwater pump and treat system is currently operational in the former Rod and Wire Mill Area for treatment of cadmium and zinc-impacted groundwater. The pumping system conveys groundwater to the existing Humphrey Creek Waste Water Treatment Plant. Based on the DCC Report, the former Pipe Mill Area associated with the Site was located in the eastern part of the Rod and Wire Mill & Pipe Mills Facility Area. Two solid waste management units (SWMUs) were identified in the Pipe Mill Area: the Zinc Ammonium Chloride Sludge Storage Tanks (SWMU 48) and the Pipe Mill Trenches/Sump (SWMU 49). At the time the DCC Report was prepared, the Zinc Ammonium Chloride Sludge Storage Tanks were inactive and

formerly used for the management of zinc ammonium chloride sludge. There was one reported release in the sludge storage area resulting in contaminated soil, which was subsequently excavated and stored in this area. The unit was located on the northern end of the Pipe Mill and consisted of an area where 55-gallon drums containing waste zinc ammonium chloride were temporarily stored on pallets. This unit was closed in 1984 under a Closure Plan approved by MDE on December 12, 1983. The Pipe Mill Trenches/Sumps were identified as a unit consisting of piping designed to transport process wastewater from the Pipe Mill to the Tin Mill Canal (TMC) Discharge Pipes and ultimately to the TMC. This unit began operations in the 1950s and was dismantled in 1983.

Three Areas of Concern (AOC) were also identified on the Site: the Hydraulic Oil Storage Area (AOC O), the Pipe Mill Selenium Testing Area (AOC Y), and the Pipe Mill Acid Tanks (AOC Z). The Hydraulic Oil Storage Area consisted of approximately 20 drums stored outside on soil and gravel on the east side of the Pipe Mill. Non-hazardous, water-based hydraulic oil was managed in this area until the Pipe Mill ceased operations in the 1980s. During a 1997 site inspection, the area contained no drums and was overgrown with vegetation. Additionally, no staining was observed in the area of AOC O. The Pipe Mill Selenium Testing Area consisted of a portion of the mill containing slag contaminated with selenium. The selenium-bearing slag was removed and replaced with new slag. The Pipe Mill Acid Tanks included four steel tanks that were observed to be rusted and contained visible holes during a 1991 site visit. The tanks were believed to be used to store sulfuric acid. There were no reported releases from the tanks and they were reportedly out of use before 1980. The tanks were not present at the time of the DCC Report.

On September 12, 2014, SPT and MDE entered into an Agreed Consent Order (ACO), which provides the framework for investigations and remedial measures to address contaminants of concern on the entire 3,100-acre Property under MDE's VCP. Additionally, SPT and USEPA entered into a Prospective Purchaser Agreement (PPA) which was effective as of November 25, 2014. The PPA is a Settlement Agreement and Covenant Not to Sue and outlines SPT's obligations and work to be performed associated with the existing contamination on the Sparrows Point Property. The PPA was subsequently amended during the first quarter of 2015 and is now considered a Settlement Agreement.

2.4 Environmental Setting

2.4.1 Topography

A review of the 1974 Sparrows Point, Maryland, 7.5-minute quadrangle topographic map published by the United States Geological Survey (USGS) indicates that the Site is at an elevation of approximately 10 feet above mean sea level (msl) and slopes in a general southwest direction.

2.4.2 Regional Geology/Hydrogeology

Based on information provided in historical reports reviewed for the May 2014 Phase I ESA, the Sparrows Point facility is located within the Coastal Plain Physiographic Province, which is the relatively low-lying portion of the Atlantic Slope. The unconsolidated sediments beneath Sparrows Point rest on a surface of Precambrian and Early Paleozoic crystalline bedrock that slopes downward to the southeast. The unconsolidated sediments include (from youngest to oldest) recent fill deposits consisting primarily of iron- and steel-making slag; the Pleistocene Talbot Formation (predominantly clays, organic clays, silts, and muds) approximately five to 100 ft. thick; the Upper Cretaceous Patapsco Formation (predominantly sand and gravel interbedded with lenses of sandy clay) approximately 145 to 255 ft. thick; the Upper Cretaceous Arundel Formation (predominantly dense, plastic clays with nodules of iron oxide and a few discontinuous lenses of sand) approximately 20 to 180 ft. thick with an average thickness of 100 ft.; and the Lower Cretaceous Patuxent Formation (interbedded and lenticular beds of gravel, sand, sandy clay, and clay) approximately 50 to 250 ft. thick. The Cretaceous formations comprise the Potomac Group.

Based on information provided in historical reports, unconfined groundwater exists within a shallow aquifer composed of the slag fill material, and intermediate and deep aquifers exist within the Talbot and Patapsco Formations, respectively. The aquifers are hydraulically interconnected, but are partially separated in areas by discontinuous lenses of silt and clay. Radial flow on the western side of the peninsula is toward Bear Creek and the Patapsco River to the west. Flow on the south side of the peninsula is south toward the southern shoreline and turning basin. Flow on the east side of the peninsula is toward Old Road Bay to the east. Groundwater flow direction within the intermediate aquifer along the western portion of the peninsula is northwest, apparently influenced by historical pumping activities in the area near the shipyard to the west of the peninsula. Groundwater flow direction within the intermediate aquifer along the eastern portion of the peninsula is south-southwest in the apparent direction of the natural gradient. Groundwater flow direction within the deep aquifer is unidirectional to the east-northeast.

2.4.3 Site Geology/Hydrogeology

The following interpretation of the subsurface conditions is based upon the soil borings/soil probes advanced at the Site in November 2014 and February 2015 (additional details provided in **Sections 3.0 and 4.0,** respectively). Eleven (11) of the soil borings were advanced as part of a geotechnical investigation conducted by KCI on November 10 to 13, 2014. These borings were advanced to depths ranging from approximately 16 feet to 75 feet below ground surface (bgs). In addition, fifteen (15) soil probes were advanced on November 24, 2014 to depths ranging from seven to 16 feet bgs. Twenty (20) additional soil probes were advanced on February 5, 2015 to

depths ranging from four to 12 feet bgs. Logs describing the soils and conditions encountered are provided in **Appendix A – Soil Boring/Soil Probe Logs**.

The following units were generally observed within the subsurface:

- A surficial layer of primarily granular fill material was encountered at most locations, with a thickness generally varying from approximately 0.5 to 8 feet. The granular fill material consisted of silty/clayey sand or gravel, a mixture of sand and gravel, gravelly asphalt-like material, slag-like material, slag with ash, and poorly or well-graded sand. A greater thickness of fill was encountered at SP-9, SP-19, SP-24, SP-26, SP-29, and SP-35 to the termination depth of 12 to 16 feet bgs. The fill material in these borings varied from a loose slag-like material or material identified as slag, well-graded sand to silty sand, and silty/clayey gravel.;

- In general, a moist layer of sandy or silty clay was found beneath the above fill layer. The majority of the borings/probes were advanced to a depth of approximately 12 to 16 feet bgs and the clay layer generally extended to the bottom of these borings. Within the above silty or sandy clay layer, a wet silty sand layer was encountered at various depths at several locations. The thickness of this layer varied from approximately 1 to 5 feet;

- In borings completed to depths greater than 16 feet bgs for geotechnical purposes, a sandy, silty clay with sand or silt layers was generally encountered below 16 feet to the maximum depth explored at 75 feet bgs. In general, the thickness of the sand or silt layers within the clay varied from 3.5 feet to 10.5 feet. In several borings completed to greater depths, silty sand layers up to 30 feet thick were encountered.

Groundwater was generally encountered during drilling/probing at depths of 2 to 6 feet bgs. The groundwater is believed to be perched on top of the underlying silty clayey layer. A separate groundwater unit was occasionally encountered in the deeper silty sand units.

Temporary wells were installed in soil borings SWM-2, SWM-4, SWM-5, B-5, and B-11 for groundwater sample collection and analysis. Additional detail regarding the installation and sampling of the temporary monitoring wells can be found in **Section 3.1.2.2**. The depth to groundwater in the temporary wells was found to vary from less than 1 foot to approximately 3.5 feet bgs. Deeper groundwater depths were observed at the western and southern portions of the site, which suggests that groundwater flow includes a western and southern component. This is generally consistent with the groundwater flow direction on the adjoining Rod and Wire Mill property.

2.5 Areas of Concern

As part of the environmental due diligence activities implemented for Bryan Cave LLP, WCG previously performed a Phase I ESA of the entire Property and prepared a report dated May 2014. In addition, WCG performed a Phase I ESA specifically for the subject Site and prepared a report dated February 18, 2015 for Scannell Properties. To assess potential subsurface environmental site conditions associated with the RECs identified during the Phase I ESAs, a Phase II ESA was conducted on the Site in November 2014. Further investigation was conducted in February 2015 to assess further impacts identified during the Phase II ESA.

The RECs identified during each Phase I ESA are summarized in the sections below. The Phase II ESA activities are discussed in **Sections 2.5.3** and **Section 3.0**. Additional investigation activities are discussed in **Sections 2.5.4** and **Section 4.0**.

2.5.1 May 2014 Phase I ESA

During the May 2014 Phase I ESA, six Findings were identified related to the Site that is the subject of this report. These six Findings were grouped into one recognized REC identified as REC-6: Rod and Wire and Pipe Mill Area (Findings 131 to 133, 153, 160, and 162). The Findings were as follows:

- Finding 153: The Pipe Mill Trenches/Sumps, a piping system designed to transport process wastewater which may have resulted in a release to the environment.
- Finding 162: The Pipe Mill Acid Tanks, which potentially contained hazardous substances that may have resulted in a release to the environment.
- Finding 131: The Rod Mill Remediation Area, where continuing interim measures (IM) are in place for cadmium and zinc-impacted groundwater.
- Finding 132: The filled Northwest Pond area.
- Finding 133: The filled East Pond area.
- Finding 160: The unknown aboveground tank, which potentially contained hazardous substances and/or petroleum products which may have resulted in a release to the environment.

Findings 153 and 162 are specific to the former Pipe Mill and are associated with the Site. The other findings are associated with the former Rod and Wire Mill located directly west of the Site.

2.5.2 November 2014 Phase I ESA

In November 2014, WCG initiated a Phase I ESA of the Site for Scannell Properties to meet the environmental due diligence requirements of FedEx Ground Packaging Systems. Based on the conclusions of the February 2015 Phase I ESA Report, WCG identified the following RECs in connection with the Site:

- The potential presence of surface and subsurface impacts associated with the historical presence of a Pipe Mill on the Property.
- The potential presence of surface and subsurface impacts associated with potentially PCB-containing transformers located on the Site and adjoining properties.
- The potential presence of surface and subsurface impacts associated with slag fill material on the Site and adjoining properties.
- The potential presence of surface and subsurface impacts associated with the historical operations of the adjoining properties as part of a former steel mill, including a landfill, a decanter cell, rod mill, cold mill, part of a wastewater treatment plant, and impoundment area.

To assess potential subsurface environmental site conditions associated with the RECs identified above, a Phase II ESA was implemented at the Site as discussed below.

2.5.3 Phase II ESA

A Phase II ESA was conducted at the Site in November 2014. The scope of work for the Phase II ESA generally included the advancement of soil borings/probes and the installation of temporary monitoring wells for soil and groundwater sample collection at the Site. A total of 26 soil borings/probes were advanced and groundwater samples were collected from five of the soil borings. Prior to implementing the Phase II ESA activities, a work plan outlining the Scope of Work was submitted via email to MDE on November 7, 2014. The MDE acknowledged receipt of the work plan and offered various comments regarding the scope in an email dated November 9, 2014. Details of the Phase II ESA investigation activities and results are provided in **Section 3.0** of this report.

2.5.4 Additional Investigation

Additional investigation was conducted at the Site in February 2015 to assess further impacts identified during the Phase II ESA. During the additional investigation, twenty (20) soil probes were advanced for soil sample collection and analysis. The work was performed in accordance with a work plan transmitted to MDE via email on January 27,

2015 and approved by MDE on February 2, 2015. Details of the additional investigation activities and results are provided in **Section 4.0**.

2.6 Proposed Development and Future Use

Present plans call for the Site to be redeveloped as a Federal Express facility consisting of an approximate 338,000 square foot, single-story distribution center/warehouse and associated parking lots. The latest available Schematic Design Documents for the Federal Express facility are included as **Appendix B**.

The proposed redevelopment use of the Site is Tier 3B, Restricted Industrial Use. The VCP application for Area A specifies that the intended future use is Tier 3 (Industrial) with land use controls anticipated as part of the future use (designated by B [Restricted]). Redevelopment of the Site as a Federal Express facility is consistent with the intended future use designation on the Area A VCP application. The term restricted industrial refers to the planned use of the property that allows exposure and access by workers over the age of 18, including adult workers and construction workers, and other potential expected users. Tier 3 properties typically include manufacturing facilities, maritime facilities, metal working shops, oil refineries, chemical plants, and other material plants.

Restricted industrial also indicates that one or more land use controls are imposed on the property as a condition for the future use of the Site. It is anticipated that a potable groundwater use restriction, an industrial land use restriction, and a requirement for maintenance of the designated capped areas will be placed on the property deed prior to issuance of the No Further Action determination.

Although final site plans are still being refined, the future building foundation will be either conventional concrete spread footings and slab-on-grade construction or structural concrete on deep foundations. Open areas surrounding the future building are anticipated to consist of surface-level paved parking areas, concrete walkways, and landscaped areas. Site redevelopment will also include a series of storm water management structures.

The Site will be serviced by municipal water and sanitary sewer (Baltimore County) and below grade storm water drains and storm water management structures, natural gas, and electric. Groundwater will not be used as a potable water supply. To ensure groundwater is not used, a groundwater use restriction will be placed on the Site prior to occupancy.

2.7 Proposed Response Actions

The future building will serve as an engineered barrier to address potential exposure to impacted media in the building area. In addition, designated portions of the future

landscaped areas and paved areas (asphalt or concrete) are subject to the remedy proposed within this RAP. The RAP will be implemented by constructing a containment remedy (cap) in select future landscaped or concrete/asphalt-paved areas. The containment remedy will consist of clean fill/soil overlying a geotextile fabric or asphalt/concrete cover materials placed in appropriately designated areas. Following implementation of the containment remedy, institutional controls (potable groundwater use deed restriction, industrial land use restriction, and cap maintenance) will be recorded for the Site in order to maintain the integrity of the containment remedy and mitigate potential exposure.

3 PHASE II ENVIRONMENTAL SITE ASSESSMENT

To assess potential environmental site conditions associated with the identified RECs, a Phase II ESA has been implemented at the Site as discussed in the sections below. Prior to implementing the Phase II ESA activities, a work plan outlining the Scope of Work was submitted via email to MDE on November 7, 2014. The MDE acknowledged receipt of the work plan and offered various comments regarding the scope in an email dated November 9, 2014.

3.1 Field Activities

Field activities conducted at the Site included the advancement of soil borings/probes and the installation of temporary monitoring wells for soil and groundwater sample collection to assess surface and subsurface conditions. The following includes a summary of these activities.

3.1.1 Areas of Exploration

The soil boring/probe locations were based upon the RECs identified during the prior Phase I ESAs performed for the Site. Additionally, to minimize duplication of efforts, select borings installed as part of a geotechnical investigation were also advanced for environmental sampling purposes. Eleven (11) soil borings (B-2 to B-7, B-11, SWM-1, SWM-2, SWM-4, and SWM-5) were advanced by Free State Drilling (FSD) of Frederick, Maryland for both geotechnical and environmental testing. Subsequently, an additional fifteen (15) soil probes (SP-1 to SP-15) were advanced by Tidewater, Inc. (Tidewater) of Elkridge, Maryland. Prior to beginning subsurface work, KCI contacted Miss Utility to clear public utilities. In addition, KCI's Utility Service group provided onsite utility location services to clear the proposed boring/probe locations prior to drilling. To assess the potential presence of surface and subsurface impacts, the soil borings/probes were advanced within the following general areas (see **Figure 3** – **Approximate Boring Location Plan**):

- Soil borings/probes B-3, B-4, B-5, B-6, B-7, B-11, SP-4, SP-5, SP-8, and SP-9 were advanced to assess potential impacts associated with the historical operation of a Pipe Mill on the Site within the area of the proposed Federal Express distribution center/warehouse building;

- Soil probe SP-3 was advanced in the vicinity of the former Pipe Mill Trenches/Sump (SWMU 49), the Hydraulic Oil Storage Area (AOC O), and a pole-mounted electrical transformer;

- Soil probe SP-6 was advanced in the vicinity of the former Pipe Mill Selenium Testing Area (AOC Y);

- Soil probe SP-11 was advanced in the vicinity of the former Zinc Ammonium Chloride Sludge Storage Tanks (SWMU 48);

- Soil probe SP-13 was advanced in the vicinity of the former Pipe Mill Acid Tanks (AOC Z);

- Soil borings/probes SWM-1 and SP-1 were advanced to assess the potential impacts associated with historical operations on the northern adjoining property;

- Soil borings/probes SWM-2, SP-12, SP-14, and SP-15 were advanced to assess the potential impacts associated with historical operations on the western adjoining property, including the former Rod and Wire Mill and the former East Pond (northwest of the Site);

- Soil borings/probes SWM-4, SP-7, SP-10, and SP-15 were advanced to assess the potential impacts associated with historical operations on the southern adjoining property, including part of a wastewater treatment plant and an impoundment area; and

- Soil boring/probes SWM-4, SWM-5, B-2, SP-1, and SP-2 were advanced to assess the potential impacts associated with historical operations on the eastern adjoining property, including the former Cold Mill.

3.1.2 Methodology of Field Activities

3.1.2.1 Soil Sampling Activities

On November 10 to 13, 2014, FSD advanced eleven (11) soil borings using 3.25-inch inner diameter hollow stem augers. The borings were advanced for field screening, documentation of the soil profile, and soil sample collection for laboratory analysis. Four of the soil borings were advanced to a depth of approximately 16 feet bgs while the remaining soil borings were advanced to depths ranging from 45 to 75 feet bgs. Select soil borings were advanced to depths greater than 16 feet bgs for purposes of the geotechnical investigation. Drilling tools and down-hole equipment were steam cleaned between borings.

Soil samples were collected continuously using a two-inch diameter, two-foot long split-spoon sampler to at least 16 feet bgs in soil borings SWM-1, SWM-2, SWM-4, SWM-5, B-5, and B-11. Soil samples were collected at 2.5-foot intervals to 10 feet and then at 5-foot intervals to at least 16 feet bgs using a two-inch diameter, 1.5-foot long split-spoon sampler in soil borings B-2, B-3, B-4, B-6, and B-7. Split-spoon samplers were decontaminated between collection of each sample using a Liquinox and distilled water solution followed by a potable water rinse.

On November 24, 2014, Tidewater advanced fifteen (15) soil probes under the direction of KCI using a track-mounted Geoprobe® rig. The soil probes were advanced to depths of approximately 7 to 16 feet bgs for soil sample collection and analysis. Each soil probe was intended to be advanced to 16 feet bgs; however, refusal was encountered at 8 feet bgs and 7 feet bgs at soil probes SP-14 and SP-15, respectively. Soil samples were obtained by driving four-foot long, two-inch diameter probe rods into the undisturbed subsurface. Soil samples were collected continuously via individual four-foot long, two-inch diameter acrylic liners. Tidewater decontaminated the sampling equipment before each sample was collected. The cleaning process consisted of an initial wash with a Liquinox and potable water solution, followed by a potable water rinse.

Upon retrieval, soil samples were described and logged. The field representative noted color, soil type, moisture content, and other applicable characteristics. This information was subsequently used to construct boring logs of the subsurface conditions encountered. The soil boring/probe logs are provided in **Appendix A**. Upon completion of each boring/probe, bentonite pellets were placed into each borehole. The samples collected were discrete samples and not composited over the designated sampling intervals (two-foot, 2.5-foot, or four-foot intervals).

Additionally, the soils were evaluated for the presence of volatile organic compounds (VOCs) in the field using a photoionization detector (PID) equipped with a 10.6 eV lamp. The PID provides a qualitative field measurement of VOCs contained in the sample. The field screening process involved placing a portion of the soil sample in a zip-lock plastic bag. The headspace was then sampled and soil gas VOC concentrations were measured and recorded. In addition to PID screening, visual and olfactory observations were used to assess soil conditions during the field activities. Field screening results were used to assess the presence of impacted soil and select the appropriate sample interval for laboratory analysis.

Generally, the sample from a particular interval exhibiting the greatest likelihood of possible impacts was submitted for laboratory analysis. Significant PID measurements were not observed in the field. The PID measurements are included on the soil boring/probe logs in **Appendix A**. In addition, a number of soil samples were also collected from deeper intervals underlying select shallow soil samples in an effort to characterize the vertical extent of impacts, if necessary.

Soil cuttings generated during the soil boring/probe activities were placed in a roll-off container and stored for later off-site disposal.

3.1.2.2 Groundwater Sampling Activities

Five temporary wells were installed in select soil borings (SWM-2, SWM-4, SWM-5, B-5, and B-11) to assess the subsurface groundwater conditions. Each temporary monitoring well was constructed of a one-inch diameter, schedule 40 polyvinyl chloride (PVC) riser

and 10-foot long, 0.010-inch slot PVC well screen. The screen and PVC riser were lowered into a soil boring hole following completion of soil boring activities. The screen was installed with a sand pack and positioned from approximately six feet bgs to sixteen (16) feet bgs.

The wells were allowed to equilibrate for approximately twenty-four hours before groundwater levels were measured with a water-level meter. Groundwater samples were then collected using the methodology described in **Section 3.1.2.4**. Following groundwater sample collection, the temporary monitoring wells were removed. Boreholes were subsequently backfilled to ground surface with bentonite pellets.

3.1.2.3 Soil Sample Collection and Analysis

Select soil samples from each boring/probe were placed into pre-cleaned, laboratory-supplied sample containers preserved as necessary for subsequent laboratory analysis. The sample containers were tightly capped, labeled, placed in a cooler, and surrounded with ice in order to maintain their temperature near 4° Celsius (^{o}C). Each sample was logged onto a chain-of-custody form, which is used to track the samples from the point of collection to receipt by the laboratory. The chain-of-custody forms are included with the laboratory reports in **Appendix C**.

A total of 30 soil samples were submitted for laboratory analysis, including four soil samples collected from deeper intervals in select soil borings. Samples were submitted to Microbac Laboratories, Inc. (Microbac) in Baltimore, Maryland and Merrillville, Indiana, which is certified under the National Environmental Laboratory Accreditation Program (NELAP). Sampling and laboratory analysis were performed in general accordance with approved techniques and methods as outlined in USEPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, and other published sources.

Select soil samples were analyzed for the following:

- VOCs using USEPA Methods 5035/8260B (nine soil samples from soil borings SWM-1, SWM-2, SWM-4, SWM-5, B-4, B-5, B-6, and B-11);
- Semi-volatile Organic Compounds (SVOCs) using Method 8270C (seven soil samples from soil borings/probes SWM-2, B-11, SP-3, SP-4, SP-6, SP-11, and SP-13);
- Pesticides using USEPA Method 8081A (seven soil samples from soil borings/probes SWM-2, B-11, SP-3, SP-4, SP-6, SP-11, and SP-13) ;
- Herbicides using USEPA Method 8151A (seven soil samples from soil borings/probes SWM-2, B-11, SP-3, SP-4, SP-6, SP-11, and SP-13);

- Polychlorinated Biphenyls (PCBs) using USEPA Method 8082 (seven soil samples from soil borings/probes SWM-2, B-11, SP-3, SP-4, SP-6, SP-11, and SP-13);

- Metals listed in the MDE Table 1, Generic Numeric Cleanup Standards for Groundwater and Soil by USEPA Methods 6020/6010B/7196A/7471A (twenty-nine soil samples from all soil borings/probes);

- Cyanide using USEPA Method 9014 (twenty-six soil samples from soil borings/probes SWM-1, SWM-2, SWM-4, SWM-5, B-4, B-5, B-7, B-11, and SP-1 to SP-15);

- Total Petroleum Hydrocarbons (TPH) as Gasoline Range Organics (GRO) using USEPA Methods 5035/8260 Modified and Diesel Range Organics (DRO) using USEPA Method 8015B (seven soil samples from soil borings/probes SWM-2, B-11, SP-3, SP-4, SP-6, SP-11, and SP-13); and

- pH using USEPA Method 9045C (twenty-nine soil samples from all soil borings/probes).

The laboratory analytical reports, including an extended QA/QC data package and the chain-of-custody forms, are provided in **Appendix C**. **Table 1** provides a summary of the soil analytical results, with comparisons to the MDE Non-Residential Cleanup Standards (NRCS) listed in *MDE Cleanup Standards for Soil and Groundwater, Interim Final Guidance (*Update No. 2.1) dated June 2008. The soil results were also compared to USEPA RSLs for Industrial Soil obtained from the *Regional Screening Levels for Chemical Contaminants at Superfund Sites* screening level/preliminary remediation goal website (RSL Summary Table, November 2014). Additionally, the soil analytical results for metals were compared to Anticipated Typical Concentrations (ATCs) for the Eastern Maryland Province included in Appendix 2, Attachment 2 of the above referenced MDE document. The ATCs were used for screening instead of the NRCS if the ATCs were greater than the MDE NRCS. Data validation is currently being performed by a third party and results of the data validation will be forwarded to the MDE and USEPA upon completion. The data validation will be performed following the USEPA CLP National Functional Guidelines.

3.1.2.4 Groundwater Sample Collection and Analysis

Groundwater samples were collected into laboratory-provided sample containers from temporary monitoring wells installed in soil borings SWM-2, SWM-4, SWM-5, B-5, and B-11 for laboratory analysis. The groundwater samples were collected using a low-flow peristaltic pump and disposable polyethylene tubing installed at the middle of the water column. The pump was adjusted to a low-flow pumping rate (i.e., less than 100 mL/minute) to minimize sediment disturbance. The sample containers for metals analysis were filled first followed by VOCs and other organics. Samples collected for dissolved metals analysis were field-filtered using a 0.45-micron disposable filter. A

table documenting groundwater sample collection and field parameters measured during groundwater sampling is included in **Appendix D – Groundwater Sampling Field Data**. Samples were then placed on ice to maintain their temperature near 4° C. Each sample was logged onto a chain-of-custody form, which is used to track the samples from the point of collection to receipt by the laboratory. An extended QA/QC package and chain-of-custody form is included with the laboratory analysis report in **Appendix C**.

A total of five groundwater samples were submitted for laboratory analysis. Samples were submitted to Microbac in Baltimore, Maryland and Merrillville, Indiana.

Select samples were analyzed for the following:

- VOCs using USEPA Method 8260B (four groundwater samples from SWM-2, SWM-4, B-5, and B-11);
- SVOCs using USEPA Method 8270C (four groundwater samples from SWM-2, SWM-4, B-5, and B-11);
- Pesticides using USEPA Method 8081A (two groundwater samples from SWM-2 and SWM-4);
- Herbicides using USEPA Method 8151A (two groundwater samples from SWM-2 and SWM-4);
- PCBs using USEPA Method 8082 (two groundwater samples from SWM-2 and SWM-4);
- Total and dissolved metals listed in MDE Table 1 (Generic Numeric Cleanup Standards for Groundwater and Soil) by USEPA Methods 245.1/ 200.7/200.8/6020 (five groundwater samples from SWM-2, SWM-4, SWM-5, B-5, and B-11);
- Cyanide using USEPA Method 335.4 (five groundwater samples from SWM-2, SWM-4, SWM-5, B-5, and B-11); and
- TPH as GRO using USEPA Methods 8260 Modified and DRO using USEPA Method 8015B (two groundwater samples from SWM-2 and SWM-4).

Table 2 provides a summary of the groundwater analytical results with comparisons to MDE Groundwater Cleanup Standards (GWS) as listed in *MDE Cleanup Standards for Soil and Groundwater, Interim Final Guidance (*Update No. 2.1) dated June 2008. Groundwater results were also compared to USEPA Maximum Contaminant Levels (MCLs) from the *Regional Screening Levels for Chemical Contaminants at Superfund Sites* screening level/preliminary remediation goal website (RSL Summary Table November

2014). Data validation is currently being performed by a third party and results of the data validation will be forwarded to the MDE and USEPA upon completion.

3.2 Soil Analytical Results

As summarized in **Table 1**, the following soil analytical results were compared to MDE NRCS, USEPA RSLs for Industrial Soil, and ATCs for metals (when greater than MDE NRCS). **Figure 4** shows soil analytical results exceeding the applicable soil standards. A preliminary summary of the soil and groundwater analytical results was provided to the MDE and USEPA via email on December 29, 2014. In comments on the data provided by MDE and USEPA within an email dated January 14, 2015, the MDE indicated that Protection of Groundwater Soil Standards are not relevant since groundwater data was collected at the Site. Also, as mentioned above, groundwater is also being addressed with an ongoing interim measure consisting of a groundwater extraction and treatment system at the adjacent Rod and Wire Mill Area.

3.2.1 VOCs

Nine soil samples were submitted for VOC analysis. Results were below laboratory reporting limits or MDE soil standards and USEPA RSLs.

3.2.2 SVOCs

Seven soil samples were submitted for SVOC analysis. Results were below laboratory reporting limits or applicable MDE soil standards and USEPA RSLs.

3.2.3 Pesticides

Seven soil samples were submitted for pesticide analysis. Results were below laboratory reporting limits or applicable MDE soil standards and USEPA RSLs.

3.2.4 Herbicides

Seven soil samples were submitted for herbicide analysis. Results for each of the submitted samples were below laboratory reporting limits.

3.2.5 PCBs

Seven soil samples were submitted for PCB analysis. Aroclor 1260 was detected in soil sample SP-6 / 1-1.5’ (2.1 mg/kg) in excess of the MDE NRCS (1.4 mg/kg) and the USEPA RSL (1.0 mg/kg). The remaining results were below laboratory reporting limits or MDE soil standards and USEPA RSLs.

3.2.6 Metals

Twenty-nine soil samples were submitted for MDE Table 1 metals analysis. Results were below laboratory reporting limits or MDE soil standards (utilized ATCs if greater than MDE standards) and USEPA RSLs with the exception of the following:

- Arsenic was detected in soil samples SWM-1 / 0-2' (5.7 mg/kg), SWM-2 / 0-1.5' (12 mg/kg), SWM-4 / 2-4' (12 mg/kg), SWM-5 / 0-1.5' (7.3 mg/kg), B-3 / 1-2.5' (4.1 mg/kg), B-7 / 1-2.5' (8.9 mg/kg), SP-10 / 1-1.5' (9.5 mg/kg), and SP-12 / 1-1.5' (15 mg/kg) in excess of the ATC (3.6 mg/kg) and the USEPA RSL for Industrial Soil (3.0 mg/kg). In addition, the arsenic concentration in SP-2 / 1-1.5' (3.4 mg/kg) exceeded the USEPA RSL for Industrial Soil (3.0 mg/kg);

- Cadmium was detected in soil sample SWM-2 / 0-1.5' (3,200 mg/kg) in excess of the MDE NRCS (51 mg/kg) as well as the USEPA RSL for Industrial Soil (980 mg/kg);

- Total chromium was detected in several soil samples in excess of the MDE NRCS (310 mg/kg). However, based on chromium speciation analysis, hexavalent chromium was not detected above the laboratory detection limits. Therefore, total chromium concentrations are comprised of trivalent chromium. Concentrations of trivalent chromium were below laboratory reporting limits and/or applicable MDE soil standards.

- Iron was detected in soil samples SWM-4 / 2-4' (160,000 mg/kg), SP-6 / 1-1.5' (120,000 mg/kg), SP-9 / 1-1.5' (91,000 mg/kg), and SP-12 / 1-1.5' (160,000 mg/kg) in excess of the MDE NRCS (72,000 mg/kg).

- Manganese was detected in soil samples SWM-4 / 2-4' (13,000 mg/kg), B-2 / 1-2.5' (5,000 mg/kg), B-4 / 1-2.5' (2,600 mg/kg), , SP-4 / 1-1.5' (9,300 mg/kg), SP-6 / 1-1.5' (2,300 mg/kg), SP-8 / 1-1.5' (2,400 mg/kg), SP-9 / 1-1.5' (10,000 mg/kg), SP-12 / 1-1.5' (3,900 mg/kg), SP-13 / 1-1.5' (3,600 mg/kg), and SP-14 / 1-1.5' (6,100 mg/kg) in excess of the MDE NRCS (2,000 mg/kg).

- Vanadium was detected in soil samples SWM-4 / 2-4' (3,500 mg/kg), B-2 / 1-2.5' (120 mg/kg), SP-4 / 1-1.5' (2,200 mg/kg), SP-9 / 1-1.5' (430 mg/kg), SP-12 / 1-1.5' (400 mg/kg), SP-14 / 1-1.5' (120 mg/kg), and SP-15 / 1-1.5' (110 mg/kg) in excess of the MDE NRCS (100 mg/kg).

- Zinc was detected in soil sample SWM-2 / 0-1.5 (290,000 mg/kg) in excess of the MDE NRCS (31,000 mg/kg).

3.2.7 Cyanide

Twenty-six soil samples were submitted for cyanide analysis. Results for each of the submitted samples were below laboratory reporting limits or MDE soil standards and USEPA RSLs.

3.2.8 TPH (GRO and DRO)

Seven soil samples were submitted for TPH (GRO and DRO) analysis. DRO was detected in soil samples B-11 / 0-1.5' (6,800 mg/kg), SP-4 / 1-1.5' (26,000 mg/kg), and SP-6 / 1-1.5' (630 mg/kg) in excess of the MDE NRCS (620 mg/kg) and the USEPA RSL (440 mg/kg). The remaining results were below laboratory reporting limits or MDE soil standards and USEPA RSLs.

3.2.9 pH

Twenty-nine soil samples were submitted for pH analysis. The soils exhibited a range of pH from 4.66 to 11.8 standard units.

3.3 Groundwater Analytical Results

As summarized in **Table 2**, the following analytical results were compared to MDE GWS for Type I and II Aquifers and USEPA MCLs. Laboratory analytical reports are included in **Appendix C**.

3.3.1 VOCs

Four groundwater samples were submitted to the laboratory for VOC analysis. Results were below laboratory reporting limits or MDE GWS and USEPA MCLs.

3.3.2 SVOCs

Four groundwater samples were submitted to the laboratory for SVOC analysis. Results were below laboratory reporting limits or MDE GWS.

3.3.3 Pesticides

Two groundwater samples were submitted to the laboratory for pesticide analysis. Alpha-BHC was detected between the reporting limit and method detection limit in groundwater sample SWM-2 (at an estimated concentration of 0.00003 milligrams/per liter [mg/L]) slightly above the MDE Groundwater Standard (0.000011 mg/L). The remaining results were below laboratory reporting limits or MDE GWS and USEPA MCLs.

3.3.4 Herbicides

Two groundwater samples were submitted to the laboratory for herbicide analysis. Results were below laboratory reporting limits.

3.3.5 PCBs

Two groundwater samples were submitted to the laboratory for PCB analysis. Results were below laboratory reporting limits.

3.3.6 Dissolved Metals

Five groundwater samples were submitted for laboratory analysis of dissolved metals (MDE Table 1). Analytical results for dissolved metals were below laboratory reporting limits or MDE GWS and USEPA MCLs with the exception of the following:

- Dissolved aluminum was detected in groundwater samples SWM-2 (0.074 mg/L) and SWM-4 (0.11 mg/L) in excess of the MDE GWS (0.05 mg/L).
- Dissolved cadmium was detected in groundwater sample SWM-2 (2.0 mg/L) in excess of the MDE GWS (0.005 mg/L) and USEPA MCL (0.005 mg/L).
- Dissolved iron was detected in the three of the five groundwater samples at concentrations in excess of the MDE GWS (0.3 mg/L). Concentrations in groundwater ranged from 0.73 mg/L to 46 mg/L.
- Dissolved manganese was detected in the five groundwater samples at concentrations in excess of the MDE GWS (0.05 mg/L). Concentrations in groundwater ranged from 0.13 to 6.1 mg/L.
- Dissolved vanadium was detected in groundwater sample SWM-5 (0.013 mg/L) in excess of the MDE GWS (0.0037 mg/L).
- Dissolved zinc was detected in groundwater sample SWM-2 (280 mg/L) at a concentration in excess of the MDE GWS (5.0 mg/L).

3.3.7 Cyanide

Five groundwater samples were submitted to the laboratory for total cyanide analysis. Results were below laboratory reporting limits or MDE GWS and USEPA MCLs.

3.3.8 TPH (DRO and GRO)

Two groundwater samples were submitted to the laboratory for TPH (GRO and DRO) analysis. Although GRO was detected in excess of the MDE GWS (0.047 mg/L) in both SWM-2 (0.066 mg/L) and SWM-4 (0.075 mg/L), the concentrations are estimated values

detected between the laboratory reporting limit and the method detection limit. Additionally, the available MDE standard for GRO is for residential properties.

DRO was also detected in excess of the MDE GWS (0.047 mg/L) in groundwater samples SWM-2 (0.83 mg/L) and SWM-4 (0.41 mg/L). However, the available MDE standard for DRO is for residential properties.

4 ADDITIONAL INVESTIGATION INFORMATION

Additional investigation was conducted at the Site in February 2015 to further assess impacts observed during the November 2014 Phase II ESA. The supplemental field work was performed in accordance with a work plan transmitted to MDE via email on January 27, 2015 and approved by MDE on February 2, 2015.

4.1 Field Activities

During the additional investigation, twenty (20) soil probes were advanced for soil sample collection and analysis. Note that a number of soil probes were advanced near boring location SWM-2, which is located near the Former East Pond (see **Figure 3**). As shown on **Figure 3**, most of these soil samples were ultimately considered off-site because the Site boundaries were adjusted to exclude these areas. Details of the additional investigation activities and results are provided in the sections below.

4.1.1 Areas of Exploration

The locations of the soil probes were based upon soil impacts identified during the Phase II ESA. Additional soil probes were completed in the vicinity of SWM-2, SP-4, SP-6, and B-11 to further assess soil impacts in these areas. The locations of the additional soil probes (SP-16 to SP-35) are shown on **Figure 3 - Approximate Boring Location Plan**.

4.1.2 Methodology of Field Activities

4.1.2.1 Soil Sampling Activities

On February 5, 2015, Tidewater advanced twenty (20) soil probes using a track-mounted Geoprobe® rig. The soil probes were advanced to depths of approximately 4 to 12 feet bgs for soil sample collection and analysis. The soil probe sampling methodologies described above in *Section 3.1.2.1* were used for the additional investigation activities.

The subsurface conditions encountered are described on the soil probe logs provided in **Appendix A**. Results of the PID field screening are provided on the boring logs. Based on the field screening, VOCs were not detected by the PID..

Surface soil samples were collected from each probe for laboratory analysis. In addition, subsurface soil samples were collected from select soil probes (SP-16, SP-17, SP-22 to SP-27, and SP-29) for laboratory analysis. Based on visual observations such as texture and/or staining, the subsurface interval most likely to be impacted was selected for laboratory analysis.

Soil cuttings generated during the soil probe activities were placed in a roll-off container for later off-site disposal.

4.1.2.2 Soil Sample Collection and Analysis

The soil sample collection methodology described above in *Section 3.1.2.3* was used for soil sample collection during the additional investigation. A total of 23 soil samples were submitted for laboratory analysis, including nine soil samples collected from deeper intervals in select soil borings. Samples were submitted to Microbac in Merrillville, Indiana. Sampling and laboratory analysis were performed in general accordance with approved techniques and methods as outlined in USEPA SW-846, Test Methods For Evaluating Solid Waste, Third Edition, and other published sources.

Select soil samples were analyzed for the following:

- SVOCs or polynuclear aromatic hydrocarbons (PAHs) using Method 8270C (seven soil samples from soil probes SP-16, SP-17, SP-18, SP-26, and SP-29);
- Pesticides using USEPA Method 8081A (three soil samples from soil probes SP-17, SP-26, and SP-29);
- PCBs using USEPA Method 8082 (three soil samples from soil probes SP-30, SP-31, and SP-32);
- Metals listed in the MDE Table 1, Generic Numeric Cleanup Standards for Groundwater and Soil by USEPA Methods 6020/6010B/7196A/7471A (four soil samples from soil probes SP-25 and SP-26);
- Select metals including cadmium, cobalt, and zinc by USEPA Method 6020A (six soil samples from soil probes SP-22 to SP-24);
- TPH as GRO using USEPA Methods 5035/8260 Modified (three soil samples from soil probes SP-17, SP-26, and SP-29); and
- TPH as DRO using USEPA Method 8015B (eleven soil samples from soil probes SP-16 to SP-18 and SP-26 to SP-28).

The laboratory analytical reports, including the extended QA/QC data package and chain-of-custody forms, are provided in **Appendix C**. **Table 3** summarizes the soil analytical results with comparisons to the MDE NRCS and USEPA RSLs for Industrial Soil. Additionally, the soil analytical results for metals were compared to ATCs for the Eastern Maryland Province. The ATCs were used for screening if they were greater than the MDE soil standards. **Figure 4** shows the soil analytical results exceeding the applicable soil standards. Data validation is currently being performed by a third party and results of the data validation will be forwarded to the MDE and USEPA upon completion. The data validation will be performed following the USEPA CLP National Functional Guidelines.

4.2 Soil Analytical Results

The soil analytical results are presented in the following sections.

4.2.1 SVOCs/PAHs

Seven soil samples were submitted for SVOC or PAH analysis. Benzo(a)pyrene was detected in the surface soil sample from SP-17 (1.9 mg/kg) in excess of the MDE NRCS (0.39 mg/kg) and the USEPA RSL (0.29 mg/kg). In addition, dibenzo(a,h)anthracene was detected in SP-17 at the surface (0.36 mg/kg) in excess of the USEPA RSL (0.29 mg/kg). ; The remaining results were below laboratory reporting limits or applicable MDE soil standards and USEPA RSLs.

4.2.2 Pesticides

Three soil samples were submitted for pesticide analysis. Results were below laboratory reporting limits or applicable MDE soil standards and USEPA RSLs.

4.2.3 PCBs

Three soil samples were submitted for PCB analysis. Aroclor 1260 was detected in soil sample SP-32 at the surface at a concentration of 4.1 mg/kg, which is greater than the MDE NRCS (1.4 mg/kg) and the EPA RSL (1.0 mg/kg).

4.2.4 Metals

Four soil samples were submitted for MDE Table 1 metals analysis and six soil samples were submitted for analysis of select metals (cadmium, cobalt, and zinc). Results were below laboratory reporting limits or applicable MDE soil standards (utilized ATCs if greater than MDE standards) and USEPA RSLs with the exception of the following:

- Arsenic was detected in soil sample SP-26 / 6-8’ (21 mg/kg) in excess of the ATC (3.6 mg/kg) and the USEPA RSL for Industrial Soil (3.0 mg/kg).
- Cadmium was detected in soil sample SP-23 at the surface (240 mg/kg) in excess of the MDE NRCS (51 mg/kg);
- Manganese was detected in soil samples SP-25 at the surface (5,600 mg/kg), SP-25 / 10-12’ (3,700 mg/kg), and SP-26 at the surface (4,600 mg/kg) in excess of the MDE NRCS (2,000 mg/kg).
- Vanadium was detected in soil sample SP-26 at the surface (140 mg/kg) in excess of the MDE NRCS (100 mg/kg).

- Zinc was detected in soil sample SP-23 at the surface (33,000 mg/kg) in excess of the MDE NRCS (31,000 mg/kg).

4.2.5 TPH (GRO and DRO)

Three soil samples were submitted for TPH-GRO analysis and eleven soil samples were submitted for TPH-DRO analysis. TPH-GRO results were below laboratory reporting limits or applicable MDE soil standards and USEPA RSLs. TPH-DRO was detected in soil samples SP-17 at the surface (2,500 mg/kg), SP-27 / 6-8' (1,000 mg/kg), SP-28 at the surface (14,000 mg/kg) in excess of the MDE NRCS (620 mg/kg) and the USEPA RSL (440 mg/kg). The remaining results were below laboratory reporting limits or MDE soil standards and USEPA RSLs.

5 EXPOSURE ASSESSMENT

Based on the intended restricted industrial land use (Tier 3B) presented in the September 2014 VCP Application, the media of concern, the potentially exposed populations, and the potential and complete exposure pathways, the following sections present an Exposure Assessment. In addition, the chemicals of potential concern are identified in **Section 5.3** below.

This exposure assessment does not include ecological exposures since the Site will be a developed area that would not represent potential terrestrial habitat. Based on communication with the MDE during a meeting held on November 19, 2014, ecological exposures will need to be addressed only in non-developable areas of the Property.

5.1 Media of Concern

5.1.1 Soil

Concentrations of certain metals, Aroclor 1260, select PAHs, and TPH (DRO) exceeding the MDE NRCS, USEPA RSLS, and/or ATCs were detected primarily in the fill material located near the surface. Therefore, soil is considered a potential media of concern. Future adult workers and visitors could potentially contact surface soil in proposed open landscaped areas of the Site. Future construction workers may contact impacted surface soil during earth movement activities associated with future construction activities.

The proposed containment remedy and institutional controls as discussed in **Section 7.0** will mitigate future adult workers and visitors from contacting impacted soil at the Site. The proposed health and safety controls outlined in **Section 9.1** and the site-specific Health and Safety Plan (HASP) will also mitigate the potential risk to construction workers from contacting impacted soil at the Site.

5.1.2 Groundwater and Soil to Groundwater

Concentrations of metals and one pesticide (alpha-BHC) exceeding the applicable MDE GWS were detected in groundwater at the Site. However, groundwater is not considered a media of concern since groundwater is being managed on a site-wide basis for the entire 3,100-acre Property. Additionally, a potable groundwater use restriction will be included as an institutional control in the No Further Action (NFA) Letter and Certificate of Completion (COC) issued by the MDE and a deed restriction prohibiting the potable use of groundwater will be filed.

Groundwater is considered a potential media of concern for construction workers. A deed restriction governing groundwater encountered during excavation activities will

provide protection for construction workers associated with future excavations at the Site. The proposed health and safety controls outlined in Section 9.1 and the site-specific Health and Safety Plan (HASP) will also mitigate the potential risk to construction workers from contacting impacted groundwater at the Site.

5.1.3 Surface Water and Sediment

Surface water and sediment are not present at the Site. Therefore, these media are not considered media of concern.

5.1.4 Soil Gas

No volatile organic compounds or mercury were detected above MDE cleanup standards in soil or groundwater at the Site. Therefore, soil gas is not a media of concern at the Site.

5.2 Potential Exposure Pathways and Receptors of Concern

Under the proposed future use (Tier 3B), potential human receptors include future construction workers (construction workers for redevelopment activities and cap installation), future adult workers, and visitors. Potential exposure pathways associated with impacted soil at the Site include incidental ingestion, dermal contact, and inhalation of particulates entrained as dust. Potential exposure pathways associated with impacted groundwater include dermal contact and incidental ingestion for the construction worker.

Future adult workers and visitors may potentially contact impacted surface soils in open landscaped areas unless the exposure pathway is eliminated through the use of a containment remedy or another technology. Construction workers are likely to contact impacted soil during earth movement activities associated with future construction activities.

Without the containment remedy, the following potential human exposure pathways were identified for evaluation:

Media	Potential Exposure Pathway	Potentially Exposed Populations
Surface Soil	Incidental ingestion	Future construction worker, adult worker, visitor
	Dermal contact	Future construction worker, adult worker, visitor
	Inhalation of soil particles	Future construction worker, adult worker, visitor
Groundwater	Incidental ingestion	Construction worker

	Dermal contact	Construction worker

5.3 Risk-Based Screening and Selection of Chemicals of Potential Concern

Risk-based screening was conducted by comparing the maximum detected chemical concentrations for each media to the MDE NRCS, ATC, or GWS as referenced in the *MDE Cleanup Standards for Soil and Groundwater, Interim Final Guidance* (Update No. 2.1) dated June 2008. In addition, maximum detected concentrations were compared to the USEPA RSLs for Industrial Soil or MCL/Tap Water RSLs obtained from the *Regional Screening Levels for Chemical Contaminants at Superfund Sites*, November 2014. Given the future use of the Site, analytes in any medium for which the maximum measured concentration exceeded the applicable MDE Cleanup Standard or USEPA RSLs were considered a Chemical of Potential Concern (COPC). Analytes detected above the applicable MDE Cleanup Standards and/or USEPA RSLs are listed below.

- Surface Soil - Metals (arsenic, cadmium, iron, manganese, vanadium, and zinc), Aroclor 1260, PAHs (benzo(a)pyrene and dibenzo(a,h)anthracene), and TPH (DRO); and

- Groundwater – Metals (aluminum, cadmium, iron, manganese, vanadium, and zinc) and alpha-BHC.

The metals listed above for groundwater are based on concentrations for dissolved metals, since dissolved concentrations are more representative of mobile groundwater impacts.

With the exception of cadmium and zinc in surface soil and groundwater and alpha-BHC in groundwater, the above analytes are considered COPCs for both surface soil and groundwater. Cadmium, zinc, and alpha-BHC were only detected at concentrations exceeding the MDE Cleanup Standards and/or USEPA RSLs in soil and/or groundwater at soil boring SWM-2. This boring and the surrounding area have been carved out of the Parcel A1 property boundary. Therefore, these three constituents have been removed from the list of COPCs identified for the Site. The COPCs for each identified media of concern are listed below:

- Surface Soil - Metals (arsenic, iron, manganese, and vanadium), Aroclor 1260, PAHs (benzo(a)pyrene and dibenzo(a,h)anthracene), and TPH (DRO); and

- Groundwater – Metals (aluminum, iron, manganese, and vanadium).

5.4 Complete Exposure Pathways

The following complete exposure pathways have been identified for the Site:

- Future Construction Worker – Possible incidental ingestion of soil and groundwater, dermal contact with soil and groundwater, and possible inhalation of soil particles.

- Future Adult Worker: Possible incidental ingestion of surface soil, dermal contact with surface soil, and inhalation of soil particles.

- Future Visitor: Possible incidental ingestion of surface soil, dermal contact with surface soil, and inhalation of soil particles.

Engineering and institutional controls consisting of a containment remedy (asphalt or concrete cap, clean fill cap, and concrete slab barrier) and deed restrictions (prohibiting potable groundwater use and restricting land use) are proposed to mitigate potential risks to human health and the environment at the Site (refer to **Section 7.0**). The proposed health and safety controls as discussed in **Section 9.1** and the site-specific HASP will mitigate the potential risk to future construction workers associated with contacting impacted media at the Site.

6 CLEANUP CRITERIA

The selected cleanup criteria for soil and groundwater at the Site are the MDE NRCS or ATC for Eastern Maryland and MDE GWS, respectively, as referenced in the *MDE Cleanup Standards for Soil and Groundwater: Interim Final Guidance* (Update No. 2.1) dated June 2008. The USEPA RSLs for Industrial Soil and MCLs or Tap Water RSLs (if MCLs are not available) are also considered relevant cleanup criteria for the Site. Based on the future Site use (Tier 3B), the following cleanup standards are proposed for the Site:

COPC	MDE Cleanup Criteria	USEPA Cleanup Criteria**
Soil (milligrams per kilogram)		
Arsenic	3.6*	3.0
Iron	72,000	820,000
Manganese	2,000	26,000
Vanadium	100	5,800
Aroclor 1260	1.4	1.0
TPH - DRO	620	440
Benzo(a)pyrene	0.39	0.29
Dibenzo(a,h) anthracene	0.39	0.29
Groundwater (milligrams per liter)		
Aluminum	0.05	20
Iron	0.3	14
Manganese	0.05	0.43
Vanadium	0.0037	0.086

* - Selected ATC as criteria since value is greater than MDE NRCS
** - MCL or Tap Water RSL
Note: Both the MDE and USEPA cleanup criteria are applicable at the Site.

Potential risks to future adult workers and visitors associated with impacts to soil and groundwater exceeding the above criteria will be addressed through a presumptive remedy consisting of engineering controls (capping of designated areas) and institutional controls (deed restrictions) as outlined in **Section 7.0**.

7 SELECTED TECHNOLOGIES AND LAND USE CONTROLS

Currently, the plans are to redevelop the Site as a Federal Express facility with associated parking lots and landscaped areas primarily around the perimeter of the Site. (see Schematic Design Documents in **Appendix B**). Certain aspects of the proposed redevelopment including the concrete building slab and asphalt/concrete paved areas have been incorporated into the proposed response actions.

The selected technologies to address the soil and groundwater impacts at the Site include engineering and institutional controls, as well as health and safety protocols for construction workers. The engineering and institutional controls will address the exposure pathways (incidental ingestion, dermal contact, and inhalation of soil particles) from the media of concern (surface soil and groundwater) to the potential receptors (future adult workers and visitors). Additionally, the health and safety protocols developed for future construction of capped areas in conjunction with redevelopment construction activities will ensure construction workers are not exposed to an unacceptable risk.

The engineering controls will consist of capping techniques, including concrete covered areas (future building slab/foundation and concrete paving) and asphalt-paved areas. Additionally, designated landscaped areas located within impacted soils will consist of a two-foot thick combination of clean fill and/or top soil overlying an MDE-approved geotextile fabric marker barrier.

The proposed institutional controls will provide an effective means of mitigating potential exposure to impacted media. Specifically, a restriction will be placed on the deed requiring maintenance of the designated capped areas. Groundwater will not be used for potable purposes since the Site will be serviced by municipal water. To maintain this protocol, a restriction will be placed on the deed to prevent the potable use of groundwater. Lastly, a site-specific HASP will specify the methods to protect construction workers engaged in intrusive activities at the Site. During construction in designated impacted areas, on-site personnel and visitors will be notified of the HASP. A copy of the HASP and associated signature log will be present on site for MDE inspection, if requested, during RAP and redevelopment construction activities.

It is believed that the above proposed remedies for the soil and groundwater impacts are protective for the intended use of the Site as restricted industrial, provided the capped areas are properly maintained. Further details regarding the selected technologies are provided in the sections below.

7.1 Paved and Concrete Areas

During redevelopment, the Site will be re-graded and certain areas will be paved with newly placed asphalt or concrete as shown in Drawing No. C-4 (Site Plan) of the Schematic Design Documents (**Appendix B**). Proposed asphalt and concrete paved areas are also shown on **Figure 3** of this report. The grading plans are specified in Drawing No. C-5 (Grading Plan). The asphalt paved areas will consist of a 9 or 12-inch thick combination of road base and newly placed asphalt. The concrete paved areas will consist of six inches of concrete with four inches of base course. The concrete and asphalt paving details are shown in Drawing No. C-7 (Site Details) of the Schematic Design Documents.

Soil analytical results exceeding the identified cleanup criteria are shown in **Figure 4**. Soil exhibiting exceedances of the applicable criteria in borings/probes B-3, B-4, B-7, SP-4, SP-6, SP-17, and SP-32 will be capped by the concrete floor slab of the building. Additionally, impacted surface soil in the vicinity of borings SP-8, SP-9, SP-27, SP-28, SP-32, and B-11 will be capped by either concrete or asphalt paving as shown in **Figure 4**.

A deed restriction requiring maintenance of the concrete/asphalt paved areas associated with impacted areas is proposed as part of the institutional controls (see **Section 7.5**). The building slab and paved areas subject to the maintenance requirements are shown in **Figure 5**.

7.2 Landscaped Areas

The redevelopment plans include landscaped areas primarily around the perimeter of the Site as shown on Drawing No. C-4 of the Schematic Design Documents (**Appendix B**). Landscaped areas will be re-graded as shown on Drawing No. C-5. In select landscaped areas with impacted surface soil, capping will include an MDE-approved geotextile fabric followed by placement of a two-foot thick clean fill and/or top soil layer. The portions of the landscaped areas that are subject to capping are shown in **Figure 5**. Proposed capped areas include surface soil in the vicinity of soil borings/probes SWM-1, SWM-5, SP-10, SP-14, SP-15, and SP-26.

A deed restriction requiring maintenance of the capped landscaped areas is proposed as part of the institutional controls (see **Section 7.5**).

Landscape plants in the designated areas will be limited to those with root systems that do not penetrate the geotextile marker barrier. If landscaped plants have root systems that extend deeper than two feet, the thickness of the clean fill cap will be adjusted accordingly.

The remaining impacted soil borings (SP-2, SP-12, and SWM-4) associated with the landscaped areas are located in areas where grading plans indicate surface fill material

will be removed for installation of the storm water facilities. The storm water facilities are designed as submerged gravel wetlands. Assuming that the soils are geotechnically suitable, soil removed from these areas during grading will be placed beneath the building area or paved areas and re-graded.

7.3 Future Excavation/Utility Trenching

In order to limit exposure to impacted media of future workers installing or repairing utilities, utility trenches will be over excavated approximately one foot wider than the width/depth required to install a utility. This protocol will be followed in areas with impacted soil to depths of 2-3 feet bgs, below which impacted soil is not anticipated to be encountered based on the soil analytical data. Soil excavated during trenching for utilities will be re-graded beneath the capped areas of the Site.

7.4 Site Access and Control

The main facility gate where access is granted through a security officer presently limits access to the Sparrows Point Property as a whole, including the Site. A gate security officer will need to be notified in advance in order to allow access to the Property.

The responsible party will also comply with local, state, and federal laws and regulations by obtaining necessary approvals and permits to conduct the activities pursuant to an approved RAP.

As previously discussed in **Section 5.2**, the potential exists for exposure to COPCs by construction workers during redevelopment activities through incidental ingestion of soil and/or groundwater, dermal contact with soil and/or groundwater, and inhalation of soil particles. Therefore, future construction contractors must comply with requirements of the site-specific HASP and the health and safety protocols described herein. The primary actions to be taken to mitigate potential exposure by future construction workers will be dust control measures, worker hygiene, and the appropriate use of personal protective equipment (PPE) during construction activities.

7.5 Institutional Controls (Future Land Use Controls)

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

- A restriction prohibiting potable use of groundwater at the Site;
- Implementation of inspection procedures and maintenance of the containment remedies as outlined in **Section 7.6** below.

The responsible party will file the above deed restrictions as defined by the MDE VCP in the NFA Letter and COC. Designated areas of the Site as shown in **Figure 5** are subject to the proposed response action containment remedy and the maintenance requirement. The Site will be subject to the potable groundwater use restriction.

7.6 Post Remediation Requirements

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

Maintenance requirements will include maintenance of the capped areas to minimize degradation of the cap and exposure to the underlying soil as discussed in **Section 9.4**. An Operations and Maintenance Plan (O&M Plan) for the capped areas is included in **Appendix E**. The O&M Plan includes the inspection protocols and a maintenance schedule.

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

8 EVALUATION CRITERIA FOR SELECTED TECHNOLOGIES

8.1 Criteria for Certificate of Completion

The criteria to be met for issuance of a COC by the MDE include the following:

- Written notification to the MDE at least ten business days prior to beginning RAP implementation activities in the field;
- Implementation of the health and safety protocols outlined in the site-specific HASP;
- Submittal to MDE of documentation related to monitoring implementation of health and safety measures and oversight of RAP construction activities to ensure accurate construction of the containment remedies;
- Submittal of quarterly progress reports to MDE documenting progress of the RAP implementation activities;
- Upon completion of the RAP activities, submittal of a Response Action Completion Report to the MDE. The Response Action Completion Report will include field visit documentation, photo documentation, documentation of implementation of health and safety measures during RAP implementation activities, and as-built Site plans illustrating paved areas, open landscaped areas, building footprint(s), and final elevations of the Site. The appropriate RAP Clean fill documentation will also be included in the report.
- Submittal of a copy of the recorded deed restrictions to MDE within 30 days of receipt of the COC from the MDE VCP.

8.2 Criteria for Contingency Measures

If previously undiscovered contamination is encountered during implementation of the RAP, the remediation schedule is revised, or a written citation related to health and safety practices is received from a regulatory entity, the MDE will be verbally notified in a timely manner. Written notifications will be provided to the VCP at the following address:

Maryland Department of the Environment
Remedial Project Manager
Land Management Administration
Attention: Barbara Brown
1800 Washington Boulevard
Baltimore, Maryland 21230
Barbara.Brown@maryland.gov
(410) 537-3212

In addition to verbal notifications, the MDE VCP will be provided with documentation and/or laboratory analytical reports generated as a result of newly identified conditions.

9 PROPOSED RESPONSE ACTION IMPLEMENTATION

The sections below include protocols for implementation of the proposed RAP, including:

- General health and safety procedures;
- Reporting requirements;
- Maintenance requirements;
- Excavation protocols; and
- Specifications for clean fill characterization.

9.1 General Health and Safety Protocols

During cap installation and redevelopment activities, the potential exists for exposure to COPCs through incidental ingestion of soil and/or groundwater, dermal contact of soil and/or groundwater, and inhalation of soil particles by construction workers. Therefore, future construction contractors are required to comply with the RAP health and safety protocols, the Occupational Safety and Health Administration (OSHA) guidelines for managing contaminated materials, and the site-specific HASP. A site-specific HASP will be prepared prior to implementation of the RAP activities, once a contractor has been selected for the RAP implementation oversight activities. The site-specific HASP will be similar in form and content to the HASP previously submitted to MDE and USEPA by EnviroAnalytics Group (EAG) for the Sparrows Point Property. For reference, the HASP prepared by EAG is included as **Appendix F**.

The primary actions proposed to manage potential exposures to future construction workers will be dust control as described in **Section 9.2** and the use of appropriate personal protective equipment (PPE) during construction activities.

A copy of the site-specific HASP will be present on Site during RAP activities. In addition, all construction personnel will be advised of the requirements of the HASP prior to working on the Site.

9.2 Dust Control Requirements

General construction operations, including soil grading, trenching for utilities, and cap construction activities will be performed at the Site. These activities are anticipated to be performed in areas of soil impacted with select metals, Aroclor 1260, select PAHs, and/or TPH (DRO). To limit worker exposure to contaminants borne on dust and windblown particulates, dust control measures will be implemented, if warranted, in

accordance with local regulations when activities are performed in areas with impacted soil. If visible dust is generated in the breathing zone, dust suppression measures will be implemented. The dust suppression measures may include wetting or misting through use of a hose connected to an available water supply or a water truck stationed on Site.

9.3 Reporting Requirements

Reporting required during the implementation of the RAP will consist of RAP addendums (as applicable) including final development plans, the initial written notification prior to beginning RAP field activities, the final proposed construction schedule, quarterly progress reporting, and submission of the Response Action Completion Report following completion of the RAP activities. The RAP implementation schedule and final development plans will be forwarded to the MDE prior to beginning RAP field activities. A preliminary schedule is presented below.

The Response Action Completion Report will include field visit documentation including implementation of health and safety measures, photo documentation, as-built Site plans illustrating paved areas, open landscaped areas, building footprint(s), and final elevations of the Site, and copies of applicable clean fill documentation.

9.4 Maintenance Requirements

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

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

9.5 Soil Excavation, Staging, Sampling, and Disposal

Impacted soil excavated during redevelopment of the Site is anticipated to be placed under the capped areas, assuming it is suitable from a geotechnical standpoint. Otherwise, such materials will be properly managed in accordance with applicable requirements. Based on the currently available grading plan, on a site-wide basis, excess soils are not anticipated during redevelopment and RAP implementation activities. Details regarding management of excavated soil, including the cut/fill

excavation plan and soil storage locations and procedures, are provided in the Soil Management Plan (SMP) included as **Appendix G**.

9.6 Clean Fill

In general, the RAP proposes containment remedies to mitigate exposure to impacted soil. In order to implement this remedy, clean fill materials from a designated location(s) will be utilized for construction of the cap in selected landscaped areas. Additionally, based on the grading plan, clean fill will be imported for re-grading of the Site. Requirements and procedures for selection of clean fill imported for capping and redevelopment activities are discussed in **Section 3.0** of the SMP included as **Appendix G**.

9.7 Asbestos, Lead, and Oil

RAP activities are not expected to include the removal of asbestos or lead-based paint from the Site. If an underground storage tank(s) is discovered during intrusive activities or a release of petroleum occurs at the Site, the MDE Oil Control Program and VCP will be notified.

9.8 Groundwater

It is anticipated that shallow groundwater may be encountered during intrusive construction activities and dewatering of the excavation area(s) and/or utility trenches may be necessary. If groundwater is removed from excavation areas and/or utility trenches, it will be routed to the storm water sewer system on the south side of the new Cold Mill, which flows into the Humphrey Creek Waste Water Treatment Plant on the Sparrows Point Property.

10 PERMITS, NOTIFICATIONS, AND CONTINGENCIES

10.1 Preliminary Implementation Schedule

A final construction schedule has not been developed as of the date of this submittal. However, future RAP milestones are anticipated to begin and be completed according to the schedule below.

RAP Milestones	Start Date	Completion Date
Final Construction Document / Development Plan Submissions	April 1, 2015	May 1, 2015
Pre-RAP Activities Health and Safety Meeting	April 1, 2015	May 1, 2015
Site Grading Activities (including cap placement)	May 1, 2015	September 1, 2015
Utility Excavations and Installation	June 1, 2015	November 1, 2015
Final Environmental Cap Construction/Placement	February 1, 2016	March 1, 2016
Quarterly Progress Reporting	July 1, 2015	March 1, 2006
Response Action Completion Report Submittal	May 1, 2016	May 1, 2016

An updated implementation schedule will be provided to the MDE prior to initiating RAP field activities.

10.2 Administrative Requirements

A copy of the VCP written agreement and certified zoning statement are provided in **Appendix H**. The written agreement was prepared in accordance with Section 7-512 of the Environmental Article, Annotated Code of Maryland, and states that the Participant will comply with the provisions of this RAP. Further, the Participant acknowledges that there are significant penalties for falsifying any information required by MDE under Title 7, Subtitle 5 of the Environmental Article, Annotated Code of Maryland, and that the certified zoning statement is required to be included in the RAP for the VCP pursuant to Title 7, Subtitle 5 of the Environmental Article, Annotated Code of Maryland.

11 REFERENCES

1. Maryland Department of the Environment *Voluntary Cleanup Program Guidance Document,* March 2006.
2. State of Maryland Department of the Environment *Cleanup Standards for Soil and Groundwater Interim Final Guidance, Update No. 2.1*, June 2008.
3. United States Environmental Protection Agency *Regional Screening Level Summary Table,* http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/
4. Weaver Boos Consultants *Phase I Environmental Site Assessment Report, Former RG Steel Facility, 1430 Sparrows Point Boulevard and 5111 North Point Boulevard, Sparrows Point, Maryland*, May 2014.
5. Weaver Boos Consultants *Phase I Environmental Site Assessment, Parcel A1, Sparrows Point Maryland*, February 2015.

Tables

Table 1
Soil Analytical Summary
Parcel A1
Sparrows Point, Maryland

Parameter	Units	MDE Soil Standards[a]	U.S. EPA Regional Screening Levels[b]	Anticipated Typical Concentrations/ Reference Levels[c]	Phase II Environmental Site Assessment November 10 to November 13, 2014														
		Non-Residential Clean-up Standard	Industrial Soil		SWM-1 0-2'	SWM-1 6-8'	SWM-2 0-1.5'	SWM-4 2-4'	SWM-4 8-10'	SWM-5 0-1.5	B-2 1-2.5'	B-3 1-2.5'	B-4 1-2.5'	B-4 3.5-5'	B-5 0-1.5'	B-6 1-2.5'	B-6 8.5-10'	B-7 1-2.5'	B-11 0-1.5'
Volatile Organic Compounds (VOCs)[d]																			
Acetone	mg/kg	92,000	670,000	--	NA	0.035*	0.021*	0.026*	0.013*	0.025*	NA	NA	NA	0.048*	0.014*	NA	0.03*	NA	0.024*
Benzene	mg/kg	52	5.1	--	NA	<0.0044	<0.0027	0.00058*	<0.0022	<0.0044	NA	NA	NA	<0.0039	0.00060*	NA	<0.0041	NA	<0.0027
2-Butanone	mg/kg	61,000	190,000	--	NA	0.0039*	0.0025*	0.0038*	0.0027*	0.0048*	NA	NA	NA	0.0076*	0.0019*	NA	<0.0082	NA	0.0037*
Carbon Disulfide	mg/kg	10,000	3,500	--	NA	<0.0088	<0.0054	0.00098*	0.00082*	0.026	NA	NA	NA	0.0062*	0.018	NA	<0.0082	NA	0.0051*
Ethylbenzene	mg/kg	10,000	25	--	NA	<0.0044	<0.0027	<0.0026	<0.0022	<0.0044	NA	NA	NA	0.00092*	<0.0024	NA	<0.0041	NA	<0.0027
Toluene	mg/kg	8,200	47,000	--	NA	0.0009*	0.00063*	0.00085*	<0.0022	0.011	NA	NA	NA	0.0019*	0.00093*	NA	0.0013*	NA	<0.0027
m,p-Xylene	mg/kg	--	--	--	NA	<0.0044	<0.0027	<0.0026	<0.0022	<0.0044	NA	NA	NA	0.0020*	<0.0024	NA	<0.0041	NA	<0.0027
o-Xylene	mg/kg	--	2,800	--	NA	<0.0044	<0.0027	<0.0026	<0.0022	<0.0044	NA	NA	NA	0.00095*	<0.0024	NA	<0.0041	NA	<0.0027
Total Xylenes	mg/kg	20,000	2,500	--	NA	<0.0044	<0.0027	<0.0026	<0.0022	<0.0044	NA	NA	NA	0.0030*	<0.0024	NA	<0.0041	NA	<0.0027
Semivolatile Organic Compounds (SVOCs)[d]																			
Acenaphthylene	mg/kg	6,100	--	--	NA	NA	0.018*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.051*
Anthracene	mg/kg	31,000	230,000	--	NA	NA	0.024*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.13*
Benzo(a)anthracene	mg/kg	3.9	2.9	--	NA	NA	0.088*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.16*
Benzo(a)pyrene	mg/kg	0.39	0.29	--	NA	NA	0.096*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.660
Benzo(b)fluoranthene	mg/kg	3.9	2.9	--	NA	NA	0.13*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.660
Benzo(g,h,i)perylene	mg/kg	3,100	--	--	NA	NA	0.05*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.100*
Benzo(k)fluoranthene	mg/kg	39	29	--	NA	NA	0.046*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.660
Bis(2-ethylhexyl)phthalate	mg/kg	200	160	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.660
Chrysene	mg/kg	390	290	--	NA	NA	0.092*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.160*
Dibenzo(a,h)anthracene	mg/kg	0.39	0.29	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.660
Dibenzofuran	mg/kg	100	1,000	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.660
Fluoranthene	mg/kg	4,100	30,000	--	NA	NA	0.19*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.320*
Indeno(1,2,3-cd)pyrene	mg/kg	3.9	2.9	--	NA	NA	0.053*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099*
Naphthalene	mg/kg	2,000	17	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.660
Phenanthrene	mg/kg	31,000	--	--	NA	NA	0.077*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.130*
Pyrene	mg/kg	3,100	23,000	--	NA	NA	0.14*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.280*
Pesticides[d]/Herbicides/PCBs[d]																			
4,4'-DDD	mg/kg	12	9.6	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.330
4,4'-DDE	mg/kg	8.4	6.8	--	NA	NA	0.0067*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.330
4,4'-DDT	mg/kg	8.4	8.6	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.330
Aldrin	mg/kg	0.17	0.14	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.330
beta-BHC	mg/kg	1.6	1.3	--	NA	NA	**0.020***	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.013***
Endosulfan Sulfate	mg/kg	610	--	--	NA	NA	<0.330	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.330
Total Herbicides	mg/kg	--	--	--	NA	NA	<0.0427	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0417
Aroclor 1260	mg/kg	1.4	1.0	--	NA	NA	<0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.033
Aroclor 1268	mg/kg	--	--	--	NA	NA	<0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.064
Inorganics																			
Aluminum	mg/kg	100,000	1,100,000.0	11,000	5,500	12,000	3,800	11,000	8,500	17,000	13,000	14,000	18,000	16,000	17,000	16,000	NA	14,000	8,500
Antimony	mg/kg	41	470	6.0	<5.1	<5.7	<5.3	<4.5	<5.3	<5.6	0.11*	0.15*	<5.9	0.16*	<5.3	0.11*	NA	<5.6	<4.8
Arsenic	mg/kg	1.9	3.0	3.6	5.7	<5.7	12	12	<5.3	7.3	0.61	4.1	<5.9	1.1	<5.3	0.44*	NA	8.9	<4.8
Barium	mg/kg	20,000	220,000	73	66	28	72	120	42	86	210	20	290	230	93	80	NA	73	35
Beryllium	mg/kg	200	2,300	0.66	<1.0	<1.1	<1.1	<0.90	<1.1	<1.1	1.3*	0.62*	2.2	1.6	<1.1	0.56*	NA	1.3	<0.95
Cadmium	mg/kg	51	980**	0.73	<1.0	<1.1	3,200	<0.90	<1.1	<1.1	1.5	0.23	<1.2	0.7	<1.1	0.19*	NA	<1.1	<0.95
Chromium, Total	mg/kg	310	--	28	9.0	17	6.5	830	9.9	28	150	22	21	17	29	21	NA	25	18
Chromium, Trivalent	mg/kg	150,000	--	--	9.0*	17*	<20	830	<20	28	150	22	21	17*	29	21	NA	25	<20
Chromium, Hexavalent	mg/kg	310	6.3	--	<20	<20	<20	<20	<19	<19	<19	<20	<19	<20	<19	<19	NA	<20	<19
Copper	mg/kg	4,100	47,000	12	14	3.1	780	110	9.1	23	12	9.3	10	18	13	11	NA	17	9.2
Iron	mg/kg	72,000	820,000	15,000	7,700	16,000	28,000	160,000	9,800	29,000	29,000	18,000	11,000	13,000	22,000	6,900	NA	21,000	12,000
Lead	mg/kg	1,000	800	45	62	22	690	150	8.4	34	55	10	68	31	27	9.2	NA	11	33
Manganese	mg/kg	2,000	26,000	480	64	13	1,700	13,000	82	600	5,000	43	2,600	1,800	630	41	NA	54	280
Mercury	mg/kg	31	350***	0.51	0.19	0.029	0.56	0.055	<0.029	0.037	0.035*	0.0011*	<0.029	0.024	0.042	0.0073*	NA	<0.029	0.090
Nickel	mg/kg	2,000	--	13	6.5	5.3	21	95	18	11	5.9	15	7.2	8.0	10	13	NA	13	6.8
Selenium	mg/kg	510	5,800	2.2	<5.1	<5.7	<5.3	<4.5	<5.3	<5.6	0.97	0.36	<5.9	0.96	<5.3	0.13*	NA	<5.6	<4.8
Silver	mg/kg	510	5,800	0.94	<1.0	<1.1	21	<0.90	<1.1	<1.1	0.091*	0.042*	<1.2	0.083*	<1.1	0.044*	NA	<1.1	<0.95
Thallium	mg/kg	7.2	12	3.9	<1.0	<1.1	<1.1	1.1	<1.1	1.1	0.081*	0.23	<1.2	0.12*	<1.1	0.21	NA	<1.1	<0.95
Tin	mg/kg	61,000	700,000	--	7.9	<5.7	110	13	<5.3	<5.6	1.7	0.77*	8.9	1.6	<5.3	0.79*	NA	<5.6	<4.8
Vanadium	mg/kg	100	5,800	30	<20	41	<21	3,500	24	61	120	29	34	34	55	17	NA	53	29
Zinc	mg/kg	31,000	350,000	63	52	17	290,000	690	58	150	280	35	50	130	150	32	NA	38	120
General Chemistry																			
Cyanide, Total	mg/kg	2,000	130	--	<0.28	0.30	0.29	3.8	<0.31	0.58	NA	NA	2.1	0.16*	<0.30	NA	NA	<0.29	<0.28
pH	s.u.	--	--	--	9.10	8.46	6.20	9.41	8.57	8.80	11.7	4.74	11.4	11.0	9.03	4.66	NA	7.75	8.44
Total Petroleum Hydrocarbon (TPH)																			
Gasoline Range Organics (GRO)	mg/kg	620	2,200****	--	NA	NA	<500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.500
Diesel Range Organics (DRO)	mg/kg	620	440****	--	NA	NA	11*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,800

[a] Soil Standards obtained from State of Maryland Department of the Environment (MDE) , Cleanup Standards for Soil and Groundwater, June 2008, Interim Final Guidance (Update No. 2.1), Tables 1 and 2

[b] U.S. EPA Regional Screening Levels obtained from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" screening level/preliminary remediation goal website (RSL Summary Table, Target Cancer Risk = 1E-6, Target Hazard Quotient = 1, November 2014).

[c] Anticipated Typical Concentrations (ATCs)/Reference Levels for metals obtained from Appendix 2 - Attachment 2 for the Eastern Maryland Region of MDE Cleanup Standards for Soil and Groundwater, June 2008 (utilized if greater than MDE Soil

[d] Sample results for VOCs, SVOCs, pesticides, and PCBs that are below laboratory detection limits are not listed in the table.

-- Not listed in Table 1 or 2 of MDE Cleanup Standards for Soil and Groundwater, June 2008.

<0.330 Concentration below laboratory reporting limit.

Concentration exceeds U.S. EPA industrial soil screening level.

Concentration exceeds MDE non-residential soil cleanup standard.

Concentration exceeds ATC (utilized if greater than MDE standards) .

mg/kg Milligrams per kilogram

NA Not analyzed

* Analyte concentration detected between reporting limit and method detection limit.

** Screening level for Cadmium (Diet).

*** Screening level for Mercuric Chloride (and other Mercury salts).

****TPH (Aliphatic Low) screening level used for GRO.

****TPH (Aliphatic Medium) screening level used for DRO.

Table 1
Soil Analytical Summary
Parcel A1
Sparrows Point, Maryland

Parameter	Units	MDE Soil Standards[a]	U.S. EPA Regional Screening Levels[b]	Anticipated Typical Concentrations/ Reference Levels[c]	Phase II Environmental Site Assessment November 24, 2014														
		Non-Residential Clean-up Standard	Industrial Soil		SP-1 1-1.5'	SP-2 1-1.5'	SP-3 1-1.5'	SP-4 1-1.5'	SP-5 1-1.5'	SP-6 1-1.5'	SP-7 1-1.5'	SP-8 1-1.5'	SP-9 1-1.5'	SP-10 1-1.5'	SP-11 1-1.5'	SP-12 1-1.5'	SP-13 1-1.5'	SP-14 1-1.5'	SP-15 1-1.5'
Volatile Organic Compounds (VOCs)[d]																			
Acetone	mg/kg	92,000	670,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	mg/kg	52	5.1	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	mg/kg	61,000	190,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	mg/kg	10,000	3,500	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	mg/kg	10,000	25	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	mg/kg	8,200	47,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	mg/kg	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	mg/kg	--	2,800	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	mg/kg	20,000	2,500	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs)[d]																			
Acenaphthylene	mg/kg	6,100	--	--	NA	NA	<0.320	0.070*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Anthracene	mg/kg	31,000	230,000	--	NA	NA	<0.320	0.055*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Benzo(a)anthracene	mg/kg	3.9	2.9	--	NA	NA	<0.320	0.200*	NA	0.060*	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Benzo(a)pyrene	mg/kg	0.39	0.29	--	NA	NA	<0.320	**0.250***	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Benzo(b)fluoranthene	mg/kg	3.9	2.9	--	NA	NA	<0.320	0.390	NA	<0.660	NA	NA	NA	NA	0.024*	NA	<1.300	NA	NA
Benzo(g,h,i)perylene	mg/kg	3,100	--	--	NA	NA	<0.320	0.190*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Benzo(k)fluoranthene	mg/kg	39	29	--	NA	NA	<0.320	0.140*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Bis(2-ethylhexyl)phthalate	mg/kg	200	160	--	NA	NA	<0.320	<0.320	NA	0.052*	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Chrysene	mg/kg	390	290	--	NA	NA	<0.320	0.2*	NA	0.087*	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Dibenzo(a,h)anthracene	mg/kg	0.39	0.29	--	NA	NA	<0.320	0.049*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Dibenzofuran	mg/kg	100	1,000	--	NA	NA	<0.320	0.019*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Fluoranthene	mg/kg	4,100	30,000	--	NA	NA	<0.320	0.310*	NA	0.084*	NA	NA	NA	NA	0.026*	NA	<1.300	NA	NA
Indeno(1,2,3-cd)pyrene	mg/kg	3.9	2.9	--	NA	NA	<0.320	0.170*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Naphthalene	mg/kg	2,000	17	--	NA	NA	<0.320	0.034*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Phenanthrene	mg/kg	31,000	--	--	NA	NA	<0.320	0.140*	NA	<0.660	NA	NA	NA	NA	<0.320	NA	<1.300	NA	NA
Pyrene	mg/kg	3,100	23,000	--	NA	NA	0.018*	0.260*	NA	0.094*	NA	NA	NA	NA	0.024*	NA	<1.300	NA	NA
Pesticides[d]/Herbicides/PCBs[d]																			
4,4'-DDD	mg/kg	12	9.6	--	NA	NA	<0.330	0.0099*	NA	<0.330	NA	NA	NA	NA	<0.330	NA	<1.600	NA	NA
4,4'-DDE	mg/kg	8.4	6.8	--	NA	NA	<0.330	<0.330	NA	0.013*	NA	NA	NA	NA	<0.330	NA	<1.600	NA	NA
4,4'-DDT	mg/kg	8.4	8.6	--	NA	NA	<0.330	0.0066*	NA	<0.330	NA	NA	NA	NA	<0.330	NA	<1.600	NA	NA
Aldrin	mg/kg	0.17	0.14	--	NA	NA	<0.330	<0.330	NA	0.0067*	NA	NA	NA	NA	<0.330	NA	<1.600	NA	NA
beta-BHC	mg/kg	1.6	1.3	--	NA	NA	<0.170	<0.170	NA	<0.170	NA	NA	NA	NA	<0.170	NA	<0.840	NA	NA
Endosulfan Sulfate	mg/kg	610	--	--	NA	NA	<0.330	<0.330	NA	0.120*	NA	NA	NA	NA	<0.330	NA	<1.600	NA	NA
Total Herbicides	mg/kg	--	--	--	NA	NA	<0.0432	<0.0430	NA	<0.0672	NA	NA	NA	NA	<0.0410	NA	<21.6	NA	NA
Aroclor 1260	mg/kg	1.4	1.0	--	NA	NA	<0.033	<0.033	NA	2.1	NA	NA	NA	NA	<0.033	NA	<0.033	NA	NA
Aroclor 1268	mg/kg	--	--	--	NA	NA	<0.033	<0.033	NA	<0.330	NA	NA	NA	NA	<0.033	NA	0.170	NA	NA
Inorganics																			
Aluminum	mg/kg	100,000	1,100,000.0	11,000	6,100	7,600	9,700	30,000	8,400	12,000	24,000	22,000	14,000	9,600	18,000	10,000	23,000	10,000	6,800
Antimony	mg/kg	41	470	6.0	0.25	6.0	0.086*	0.21	0.057*	0.095*	0.36	0.072*	0.55	0.38*	0.053*	1.1	0.050*	0.62	0.31
Arsenic	mg/kg	1.9	3.0	3.6	1.8	3.4	2.4	<0.50	1.1	1.1	0.53	2.1*	1.6	**9.5**	3.0	**15***	<0.50	2.6	2.5
Barium	mg/kg	20,000	220,000	73	72	66	42	310	34	85	300	300	250	140	180	290	200	130	110
Beryllium	mg/kg	200	2,300	0.66	0.44*	0.69*	0.50*	4.0*	0.68*	0.86*	2.0*	2.1	3.7*	0.67*	2.5*	1.3*	4.0*	0.84*	0.4*
Cadmium	mg/kg	51	980**	0.73	0.23	0.27	0.15*	5.2	1.2	1.2	0.97	0.99	2.1	1	0.36*	1.1	0.81	0.91	0.51
Chromium, Total	mg/kg	310	--	28	10	14	16	270	19	350	24	16	360	20	16	130	33	200	34
Chromium, Trivalent	mg/kg	150,000	--	--	<20	<20	<20	270	<20	350	24	<20	360	20	<20	130	33	200	34
Chromium, Hexavalent	mg/kg	310	6.3	--	<20	<20	<19	<20	<19	<20	<20	<20	<20	<20	<20	<20	<19	<19	<20
Copper	mg/kg	4,100	47,000	12	20	17	7.2	45	11	11	32	18	38	39	7.9	160	27	18	57
Iron	mg/kg	72,000	820,000	15,000	8,200	11,000	14,000	31,000	15,000	120,000	29,000	26,000	91,000	29,000	21,000	160,000	16,000	38,000	41,000
Lead	mg/kg	1,000	800	45	63	58	13	210	34	77	130	11	480	130	22	210	210	160	140
Manganese	mg/kg	2,000	26,000	480	160	290	140	9,300	240	2,300	1,800	2,400	10,000	330	1,900	3,300	3,600	6,100	710
Mercury	mg/kg	31	350***	0.51	0.22	0.53	0.13	0.020	0.077	0.093	0.084	0.0078	0.21	0.11	0.030*	0.19	0.039	0.078	0.090
Nickel	mg/kg	2,000	--	13	5.1	7.7	7.8	5.3	14	7.5	7.5	9.6	12	14	6.3	46	6.2	13	16
Selenium	mg/kg	510	5,800	2.2	0.61	0.49	0.33*	2.4	0.37*	0.46	3.3	1.0	0.19*	0.82*	1.8*	4.3*	1.4	0.27*	0.38*
Silver	mg/kg	510	5,800	0.94	0.13*	0.15*	0.057*	0.77	0.077*	0.15*	0.14*	0.11*	0.39*	0.16*	0.057*	0.28*	0.11*	0.14*	0.14*
Thallium	mg/kg	7.2	12	3.9	0.16*	0.12*	0.11*	0.061*	0.12*	0.046*	0.051*	0.045*	0.085*	0.093*	0.076*	0.090*	0.024*	0.052*	0.033*
Tin	mg/kg	61,000	700,000	--	6.1	39	1.1	9.1	1.9	2.2	3.0	1.0	10	5.1	0.86*	16	6.8	8.7	5.7
Vanadium	mg/kg	100	5,800	30	13	18	20	2,200	18	79	94	66	430	33	28	400	69	120	110
Zinc	mg/kg	31,000	350,000	63	77	92	27	650	650	2,200	230	400	490	320	51	590	150	97	67
General Chemistry																			
Cyanide, Total	mg/kg	2,000	130	--	<0.25	<0.23	<0.24	0.31	<0.24	<0.25	0.39	0.65	3.8	0.77	0.15*	1.6	<0.24	0.26	0.16
pH	s.u.	--	--	--	7.53	8.00	7.54	9.66	7.23	11.8	10.4	9.78	11.8	8.60	10.4	10.8	9.64	11.7	8.44
Total Petroleum Hydrocarbon (TPH)																			
Gasoline Range Organics (GRO)	mg/kg	620	2,200****	--	NA	NA	<0.480	<0.500	NA	<0.470	NA	NA	NA	NA	<0.470	NA	1.2	NA	NA
Diesel Range Organics (DRO)	mg/kg	620	440****	--	NA	NA	12*	26,000	NA	630	NA	NA	NA	NA	20*	NA	520	NA	NA

[a] Soil Standards obtained from State of Maryland Department of the Environment (MDE) , Cleanup Standards for Soil and Groundwater, June 2008, Interim Final Guidance (Update No. 2.1), Tables 1 and 2

[b] U.S. EPA Regional Screening Levels obtained from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" screening level/preliminary remediation goal website (RSL Summary Table, Target Cancer Risk = 1E-6, Target Hazard Quotient = 1, November 2014).

[c] Anticipated Typical Concentrations (ATCs)/Reference Levels for metals obtained from Appendix 2 - Attachment 2 for the Eastern Maryland Region of MDE Cleanup Standards for Soil and Groundwater, June 2008 (utilized if greater than MDE Soil

[d] Sample results for VOCs, SVOCs, pesticides, and PCBs that are below laboratory detection limits are not listed in the table.

-- Not listed in Table 1 or 2 of MDE Cleanup Standards for Soil and Groundwater, June 2008.

<0.330 Concentration below laboratory reporting limit.

Concentration exceeds U.S. EPA industrial soil screening level.

Concentration exceeds MDE non-residential soil cleanup standard.

Concentration exceeds ATC (utilized if greater than MDE standards) .

mg/kg Milligrams per kilogram

NA Not analyzed

* Analyte concentration detected between reporting limit and method detection limit.

** Screening level for Cadmium (Diet).

*** Screening level for Mercuric Chloride (and other Mercury salts).

****TPH (Aliphatic Low) screening level used for GRO.

****TPH (Aliphatic Medium) screening level used for DRO.

Table 2
Groundwater Analytical Summary
Parcel A1
Sparrows Point, Maryland

Parameter	Units	MDE Groundwater Standards[a]	U.S. EPA Regional Screening Levels[b]	Limited Phase II Environmental Site Assessment November 11, 2014				
		Type I and II Aquifers	MCL	SWM-2	SWM-4	SWM-5	B-5	B-11
Volatile Organic Compounds (VOCs)[c]								
Acetone	mg/L	0.55	--	0.0013*	<0.050	NA	0.0043*	0.0088*
Benzene	mg/L	0.005	0.005	<0.005	<0.005	NA	<0.005	0.00053*
2-Butanone	mg/L	0.7	--	<0.010	<0.010	NA	<0.010	0.0013*
Carbon Disulfide	mg/L	0.1	--	<0.010	0.00026*	NA	<0.010	<0.010
1,1-Dichloroethane	mg/L	0.09	--	<0.005	<0.005	NA	<0.005	0.0077
1,1-Dichloroethene	mg/L	0.007	0.007	<0.005	<0.005	NA	<0.005	0.0029*
Trichloroethene	mg/L	0.005	0.005	0.00032*	<0.005	NA	<0.005	0.0014*
Semivolatile Organic Compounds (SVOCs)[c]								
Benzoic acid	mg/L	--	--	0.00063*	<0.051	NA	0.00094*	0.00062*
Butyl benzyl phthalate	mg/L	--	--	0.0012*	<0.010	NA	0.004*	<0.010
Diethyl phthalate	mg/L	2.9	--	0.00085*	<0.010	NA	0.0011*	0.0015*
Di-n-butyl phthalate	mg/L	0.37	--	0.0018*	<0.010	NA	0.00094*	<0.010
Pesticides[c]/Herbicides/PCBs								
4,4'-DDD	mg/L	0.00028	--	0.00003*	0.00003*	NA	NA	NA
alpha-BHC	mg/L	0.000011	--	0.00003*	<0.000050	NA	NA	NA
beta-BHC	mg/L	0.000037	--	0.00001*	<0.00020	NA	NA	NA
Endrin	mg/L	0.002	0.002	<0.001	0.00003*	NA	NA	NA
Heptachlor	mg/L	0.0004	0.0004	0.00006*	0.00005*	NA	NA	NA
Heptachlor epoxide	mg/L	0.0002	0.0002	0.00002*	<0.00010	NA	NA	NA
Methoxychlor	mg/L	0.040	0.040	0.00039*	<0.001	NA	NA	NA
Total Herbicides	mg/L	--	--	<0.00200	<0.00200	NA	NA	NA
Total PCBs	mg/L	--	--	<0.0005	<0.0005	NA	NA	NA
Inorganics, Total								
Aluminum	mg/L	0.05	--	20	3.0	9.3	3.1	1.8
Antimony	mg/L	0.006	0.006	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Arsenic	mg/L	0.01	0.01	0.026	0.0036	0.0057	0.0059	0.0022
Barium	mg/L	2.0	2.0	0.10	0.044	0.051	0.048	0.069
Beryllium	mg/L	0.004	0.004	0.0022	<0.0010	<0.0010	<0.0010	<0.0010
Cadmium	mg/L	0.005	0.005	2.0	<0.00050	<0.00050	0.0014	0.00051
Chromium, Total	mg/L	0.1	0.1	0.025	0.0040	0.013	0.0045	0.0023
Chromium, Trivalent	mg/L	0.1	--	0.025	<0.0050	<0.0050	<0.0050	<0.0050
Chromium, Hexavalent	mg/L	0.1	--	<0.0050	0.023	0.0090	0.0070	0.020
Copper	mg/L	1.3	1.3	0.039	0.0033	0.017	0.0065	0.019
Iron	mg/L	0.3	--	110	4.4	11	26	4.2
Lead	mg/L	0.015	0.015	0.039	0.0068	0.017	0.0044	0.0023
Manganese	mg/L	0.05	--	6.6	0.22	1.1	2.2	0.36
Mercury	mg/L	0.002	0.002	0.00036	<0.00020	<0.00020	<0.00020	<0.00020
Nickel	mg/L	0.073	--	0.072	<0.0050	0.052	0.029	0.044
Selenium	mg/L	0.05	0.05	<0.0050	<0.0050	0.012	<0.0050	<0.0050
Silver	mg/L	0.1	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Thallium	mg/L	0.002	0.002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tin	mg/L	2.2	--	0.20	<0.20	<0.20	<0.20	<0.040
Vanadium	mg/L	0.0037	--	0.046	0.012	0.040	0.010	<0.0050
Zinc	mg/L	5.0	--	290	0.030	0.079	0.16	0.14

Table 2
Groundwater Analytical Summary
Parcel A1
Sparrows Point, Maryland

Parameter	Units	MDE Groundwater Standards[a]	U.S. EPA Regional Screening Levels[b]	Limited Phase II Environmental Site Assessment November 11, 2014				
		Type I and II Aquifers	MCL	SWM-2	SWM-4	SWM-5	B-5	B-11
Inorganics, Dissolved								
Aluminum	mg/L	0.05	--	0.074	0.11	<0.010	<0.010	0.026
Antimony	mg/L	0.006	0.006	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Arsenic	mg/L	0.01	0.01	0.0047	0.0032	<0.0020	0.0043	<0.0020
Barium	mg/L	2.0	2.0	0.028	0.028	0.027	0.037	0.053
Beryllium	mg/L	0.004	0.004	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cadmium	mg/L	0.005	0.005	2.0	<0.00050	<0.00050	<0.00050	<0.00050
Chromium, Total	mg/L	0.1	0.1	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Chromium, Trivalent	mg/L	0.1	--	NA	NA	NA	NA	NA
Chromium, Hexavalent	mg/L	0.1	--	NA	NA	NA	NA	NA
Copper	mg/L	1.3	1.3	0.012	<0.0010	0.0023	0.0016	0.0020
Iron	mg/L	0.3	--	46	<0.025	<0.025	18	0.73
Lead	mg/L	0.015	0.015	0.0015	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	0.05	--	6.1	0.13	0.98	2.1	0.24
Mercury	mg/L	0.002	0.002	NA	NA	NA	NA	NA
Nickel	mg/L	0.073	--	0.056	<0.0050	0.033	0.024	0.032
Selenium	mg/L	0.05	0.05	<0.0050	<0.0050	0.013	<0.0050	<0.0050
Silver	mg/L	0.1	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Thallium	mg/L	0.002	0.002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tin	mg/L	2.2	--	0.14	<0.040	<0.040	<0.040	<0.040
Vanadium	mg/L	0.0037	--	<0.0050	<0.0050	0.013	<0.0050	<0.0050
Zinc	mg/L	5.0	--	280	0.0056	0.014	0.057	0.058
General Chemistry								
Cyanide, Total	mg/L	0.2	0.2	<0.0050	<0.0050	<0.0050	<0.0050	0.012
Total Petroleum Hydrocarbon								
Gasoline Range Organics (GRO)	mg/L	0.047[d]	--	0.066*	0.075*	NA	NA	NA
Diesel Range Organics (DRO)	mg/L	0.047[d]	--	0.83	0.41	NA	NA	NA

[a] Groundwater Standards obtained from State of Maryland Department of the Environment (MDE) , Cleanup Standards for Soil and Groundwater, June 2008, Interim Final Guidance (Update No. 2.1), Tables 1 and 2.

[b] U.S EPA Maximum Contaminant Levels from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" screening level/preliminary remediation goal website (RSL Summary Table, November 2014).

[c] Sample results for VOCs, SVOCs, and pesticides that are below laboratory detection limits are not listed in the table.

[d] Residential Cleanup Standard; non-residential standards for GRO and DRO are not listed in Table 2.

-- Not listed in Table 1 of MDE Cleanup Standards for Soil and Groundwater, June 2008.

<0.330	Concentration below laboratory reporting limit.
NA	Not analyzed
	Concentration exceeds groundwater standard for Type I and II Aquifers.
	Concentration exceeds U.S. EPA Maximum Contaminant Level (MCL).
mg/L	Milligrams per liter
*	Analyte concentration detected between reporting limit and method detection limit.

Table 3
Soil Analytical Summary
Parcel A1
Sparrows Point, Maryland

Parameter	Units	MDE Soil Standards[a]	U.S. EPA Regional Screening Levels[b]	Anticipated Typical Concentrations/ Reference Levels[c]	Supplemental Phase II Environmental Site Assessment																						
					February 5, 2015																						
					SP-16		SP-17		SP-18	SP-22		SP-23		SP-24		SP-25		SP-26		SP-27		SP-28	SP-29		SP-30	SP-31	SP-32
		Non-Residential Clean-up Standard	Industrial Soil		Surface	6-8'	Surface	6-8'	Surface	Surface	6-8'	Surface	6-8'	Surface	6-8'	Surface	10-12'	Surface	6-8'	Surface	6-8'	Surface	Surface	6-8'	Surface	Surface	Surface
Semivolatile Organic Compounds (SVOCs)[d]																											
Acenaphthene	mg/kg	6,100	--	--	<0.050	<0.050	0.18	<0.050	<0.050	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Acenaphthylene	mg/kg	6,100	--	--	0.30	<0.050	0.96	<0.050	0.095	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Anthracene	mg/kg	31,000	230,000	--	0.16	<0.050	1.4	<0.050	0.062	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Benzo(a)anthracene	mg/kg	3.9	2.9	--	0.10	<0.050	1.7	<0.050	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Benzo(a)pyrene	mg/kg	0.39	0.29	--	**0.16**	<0.050	1.9	<0.050	0.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Benzo(b)fluoranthene	mg/kg	4	2.9	--	0.30	<0.050	3.0	<0.050	0.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Benzo(g,h,i)perylene	mg/kg	3,100	--	--	0.41	<0.050	1.8	<0.050	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Benzo(k)fluoranthene	mg/kg	39	29	--	0.093	<0.050	1.1	<0.050	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Chrysene	mg/kg	390	290	--	0.097	<0.050	1.9	<0.050	0.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Dibenzo(a,h)anthracene	mg/kg	0.39	0.29	--	0.074	<0.050	0.36	<0.050	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Fluoranthene	mg/kg	4,100	30,000	--	0.094	<0.050	3.4	<0.050	0.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Fluorene	mg/kg	4,100	30,000	--	<0.050	<0.050	0.19	<0.050	<0.050	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Indeno(1,2,3-cd)pyrene	mg/kg	3.9	2.9	--	0.27	<0.050	1.4	<0.050	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Naphthalene	mg/kg	2,000	17	--	<0.050	<0.050	0.21	<0.050	<0.050	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Phenanthrene	mg/kg	31,000	--	--	0.17	<0.050	1.3	<0.050	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Pyrene	mg/kg	3,100	23,000	--	0.11	<0.050	3.5	<0.050	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.050	NA	NA	NA	NA	<0.050	NA	NA	NA
Pesticides[d]/Herbicides/PCBs[d]																											
4,4'-DDD	mg/kg	12	9.6	--	NA	NA	NA	0.0017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0017	NA	NA	NA	NA	0.0021	NA	NA	NA
beta-BHC	mg/kg	1.6	1.3	--	NA	NA	NA	0.00086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0013	NA	NA	NA	NA	<0.017	NA	NA	NA
Endrin ketone	mg/kg	31.0	--	--	NA	NA	NA	0.0091	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012	NA	NA	NA	NA	0.016	NA	NA	NA
Aroclor 1260	mg/kg	1.4	1.0	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.022	<0.033	4.1
Inorganics																											
Aluminum	mg/kg	100,000	1,100,000.00	11,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	49,000	31,000	25,000	14,000	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	mg/kg	41	470	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	0.084	0.061	0.098	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	mg/kg	1.9	3	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	1.8	1.5	21	NA	NA	NA	NA	NA	NA	NA	NA
Barium	mg/kg	20,000	220,000	73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	380	280	470	35	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	mg/kg	200	2,300	0.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.1	2.6	2.8	0.63	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	mg/kg	51	980**	0.73	NA	NA	NA	NA	NA	7.2	23	240	8.0	2.1	0.22	3.6	4.3	7.5	1.7	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Total	mg/kg	310	--	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.6	13	49	28	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Trivalent	mg/kg	150,000	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.6	13	49	28	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Hexavalent	mg/kg	310	6.3	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4.75	<50.0	<52.8	<12.4	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	mg/kg	--	350	--	NA	NA	NA	NA	NA	12	0.29	6.3	3.3	1.9	1.8	1.0	2.6	3.1	4.1	NA	NA	NA	NA	NA	NA	NA	NA
Copper	mg/kg	4,100	47,000	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0	75	22	13	NA	NA	NA	NA	NA	NA	NA	NA
Iron	mg/kg	72,000	820,000	15,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,800	16,000	27,000	34,000	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	1,000	800	45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.3	39	23	15	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	mg/kg	2,000	26,000	480	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,600	3,700	4,600	79	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	mg/kg	2,000	--	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9	4.9	6.6	10	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	mg/kg	510	5,800	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.7	2.4	2.5	0.42	NA	NA	NA	NA	NA	NA	NA	NA
Silver	mg/kg	510	5,800	0.94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20	0.16	0.32	0.085	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	mg/kg	7.2	12	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.020	0.045	0.096	0.13	NA	NA	NA	NA	NA	NA	NA	NA
Tin	mg/kg	61,000	700,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.73	3.4	1.9	1.2	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	mg/kg	100	5,800	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14	29	140	49	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/kg	31,000	350,000	63	NA	NA	NA	NA	NA	280	1,400	33,000	1,200	280	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbon (TPH)																											
Gasoline Range Organics (GRO)	mg/kg	620	2,200****	--	NA	NA	NA	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	NA	NA	NA	NA	0.17	NA	NA	NA
Diesel Range Organics (DRO)	mg/kg	620	440****	--	350	24	2,500	19	55	NA	NA	NA	NA	NA	NA	NA	NA	NA	33	29	1,000	14,000	71	260	NA	NA	NA

[a] Soil Standards obtained from State of Maryland Department of the Environment (MDE) , Cleanup Standards for Soil and Groundwater, June 2008, Interim Final Guidance (Update No. 2.1), Tables 1 and 2

[b] U.S. EPA Regional Screening Levels obtained from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" screening level/preliminary remediation goal website (RSL Summary Table, Target Cancer Risk = 1E-6, Target

[c] Anticipated Typical Concentrations (ATCs)/Reference Levels for metals obtained from Appendix 2 - Attachment 2 for the Eastern Maryland Region of MDE Cleanup Standards for Soil and Groundwater, June 2008 (utilized if greater than MDE

[d] Sample results for SVOCs,pesticides, and PCBs that are below laboratory detection limits are not listed in the table.

-- Not listed in Table 1 or 2 of MDE Cleanup Standards for Soil and Groundwater, June 2008.

<0.330 Concentration below laboratory reporting limit.

Concentration exceeds U.S. EPA industrial soil screening level.

Concentration exceeds MDE non-residential soil cleanup standard.

Concentration exceeds ATC (utilized if greater than MDE standards) .

mg/kg Milligrams per kilogram

NA Not analyzed

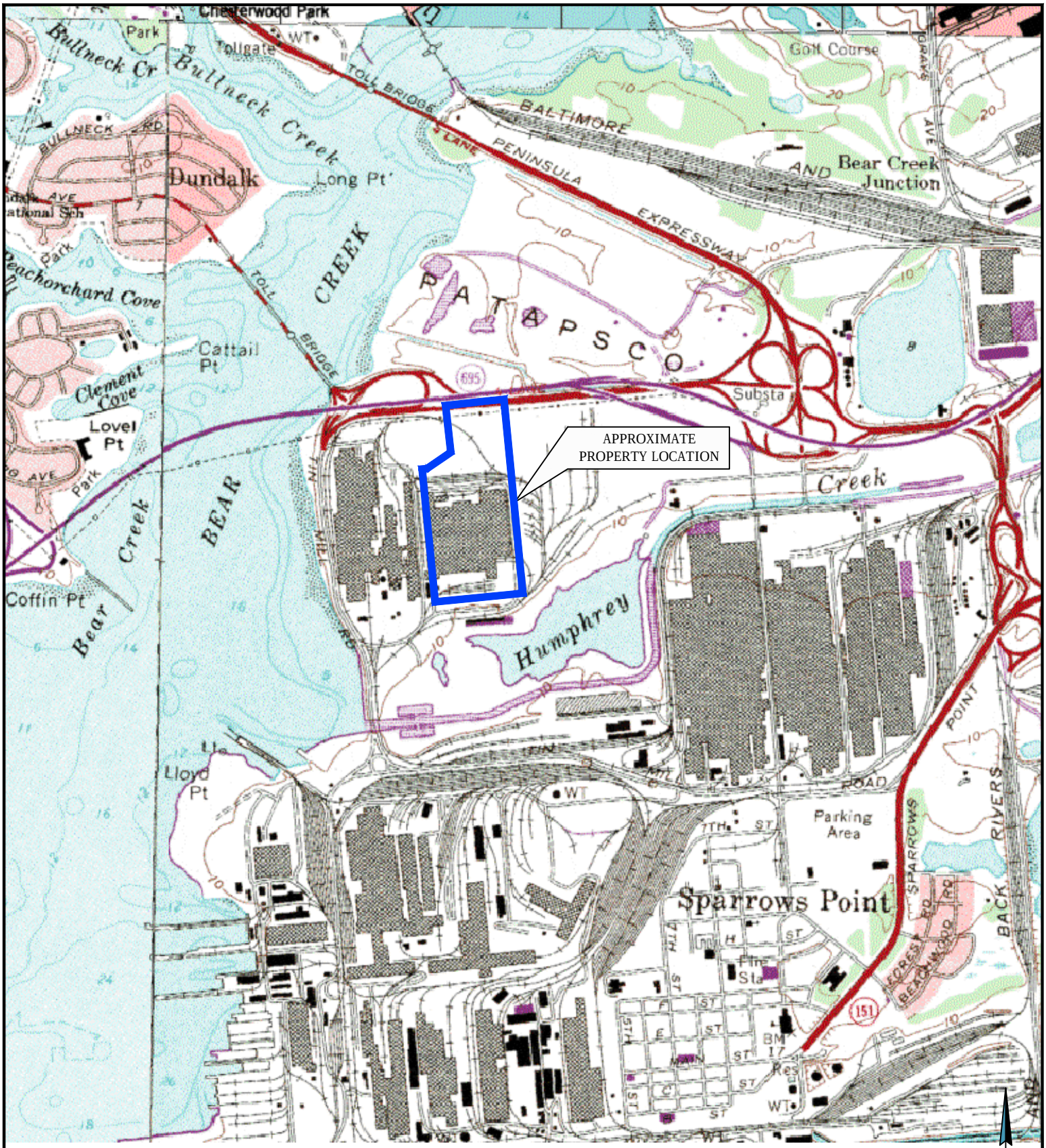
* Analyte concentration detected between reporting limit and method detection limit.

** Screening level for Cadmium (Diet).

*** Screening level for Mercuric Chloride (and other Mercury salts).

****TPH (Aliphatic Low) screening level used for GRO.
****TPH (Aliphatic Medium) screening level used for DRO.

Figures



APPROXIMATE GRAPHIC SCALE

1500 0 750 1500 3000

1 inch = 1500 ft.

N

SOURCE: IMAGE ADAPTED FROM MAPCARD SPARROWS POINT, MD DATED 1974.

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SITE LOCATION MAP

PARCEL A1
FORMER SPARROWS POINT STEEL MILL
SPARROWS POINT, MD

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FILE: 3751-300-01
CAD: BASE MAP.dwg

FIGURE 1

APPROXIMATE GRAPHIC SCALE

400 0 200 400 800

1 inch = 400 ft.

SOURCE: IMAGE ADAPTED FROM GOOGLE EARTH IMAGERY DATED AUGUST 2010.

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SITE LAYOUT MAP

PARCEL A1
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FIGURE 2

REC 6C - FORMER EAST POND

EX BGE SUBSTATION

SWM-1

SWM-2/TW

SWM-4/TW

SWM-5/TW

631 - EMPLOYEE PARKING INCLUDING 13 HANDICAP AND 6 MOTORCYCLE SPACES

PROPOSED PAVEMENT AREA

GATEWAY BLDG

15 - INBOUND PARKING

25 - TRACTOR PARKING

53 - LONG TRAILER PARKING

44 - LONG TRAILER PARKING

35 - 28' TRAILER PARKING

44 - 28' TRAILER PARKING

21 - 28' TRAILER PARKING

20 - 28' TRAILER PARKING

50 - HOME DELIVERY VAN PARKING

10 - DEAD LINE PARKING

27 - DOLLY PARKING

SALT STORAGE BLDG

PROPOSED FED EX BUILDING

FED EX WAREHOUSE

MAINTENANCE GARAGE

FUTURE FUEL STATION

WEST COAL MILL ROAD

48

49

Z

Y

SP-1 SP-2 SP-4 SP-5 SP-6 SP-7 SP-8 SP-9 SP-10 SP-11 SP-12 SP-13 SP-14 SP-15 SP-16 SP-17 SP-18 SP-19 SP-20 SP-21 SP-22 SP-23 SP-24 SP-25 SP-26 SP-27 SP-28 SP-29 SP-30 SP-31 SP-32 SP-33 SP-34 SP-35

B-2 B-3 B-4 B-5/TW B-6 B-7 B-11/TW

N

APPROXIMATE GRAPHIC SCALE

150 0 75 150

1 inch = 150 ft.

LEGEND

- APPROXIMATE UPDATED PARCEL BOUNDARY
- APPROXIMATE PRIOR PARCEL BOUNDARY
- SP-3 SOIL PROBE LOCATION (NOVEMBER 2014) (WCG)
- B-30 SOIL BORINGS (KCI)
- /TW SOIL BORING/ TEMPORARY GROUNDWATER MONITORING WELL LOCATIONS (KCI)
- Y AREA OF CONCERN
- 48 SOLID WASTE MANAGEMENT UNIT
- SP-16 APPROXIMATE SOIL PROBE LOCATIONS (FEB. 2015)
- BUILDING
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT

SOURCE: BASE IMAGE ADAPTED FROM KCI TECHNOLOGIES SITE MAP AND SOIL BORING PLAN DATED JANUARY 9, 2015.

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APPROXIMATE BORING LOCATION PLAN

PARCEL A1
FORMER SPARROWS POINT STEEL MILL
SPARROWS POINT, MD

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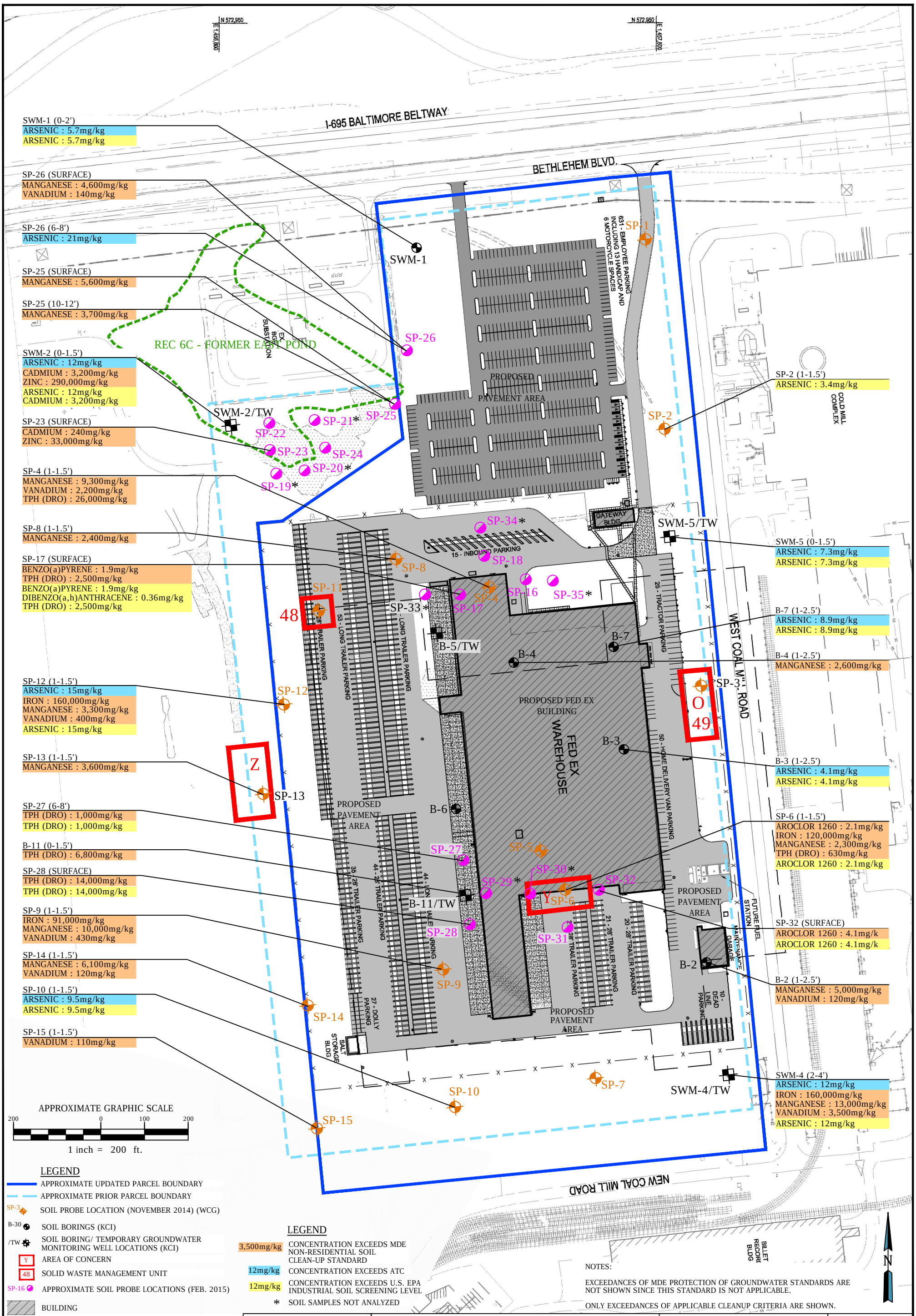
FIGURE 3



LEGEND

- APPROXIMATE UPDATED PARCEL BOUNDARY
- APPROXIMATE PRIOR PARCEL BOUNDARY
- SP-3 SOIL PROBE LOCATION (NOVEMBER 2014) (WCG)
- B-30 SOIL BORINGS (KCI)
- /TW SOIL BORING/ TEMPORARY GROUNDWATER MONITORING WELL LOCATIONS (KCI)
- Y AREA OF CONCERN
- 48 SOLID WASTE MANAGEMENT UNIT
- SP-16 APPROXIMATE SOIL PROBE LOCATIONS (FEB. 2015)
- BUILDING
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT

LEGEND

- 3,500mg/kg CONCENTRATION EXCEEDS MDE NON-RESIDENTIAL SOIL CLEAN-UP STANDARD
- 12mg/kg CONCENTRATION EXCEEDS ATC
- 12mg/kg CONCENTRATION EXCEEDS U.S. EPA INDUSTRIAL SOIL SCREENING LEVEL
- * SOIL SAMPLES NOT ANALYZED

NOTES:

EXCEEDANCES OF MDE PROTECTION OF GROUNDWATER STANDARDS ARE NOT SHOWN SINCE THIS STANDARD IS NOT APPLICABLE.

ONLY EXCEEDANCES OF APPLICABLE CLEANUP CRITERIA ARE SHOWN.

SOURCE: BASE IMAGE ADAPTED FROM KCI TECHNOLOGIES SITE MAP AND SOIL BORING PLAN DATED JANUARY 9, 2015.

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SOIL CONSTITUENT CONCENTRATION MAP

PARCEL A1
FORMER SPARROWS POINT STEEL MILL
SPARROWS POINT, MD

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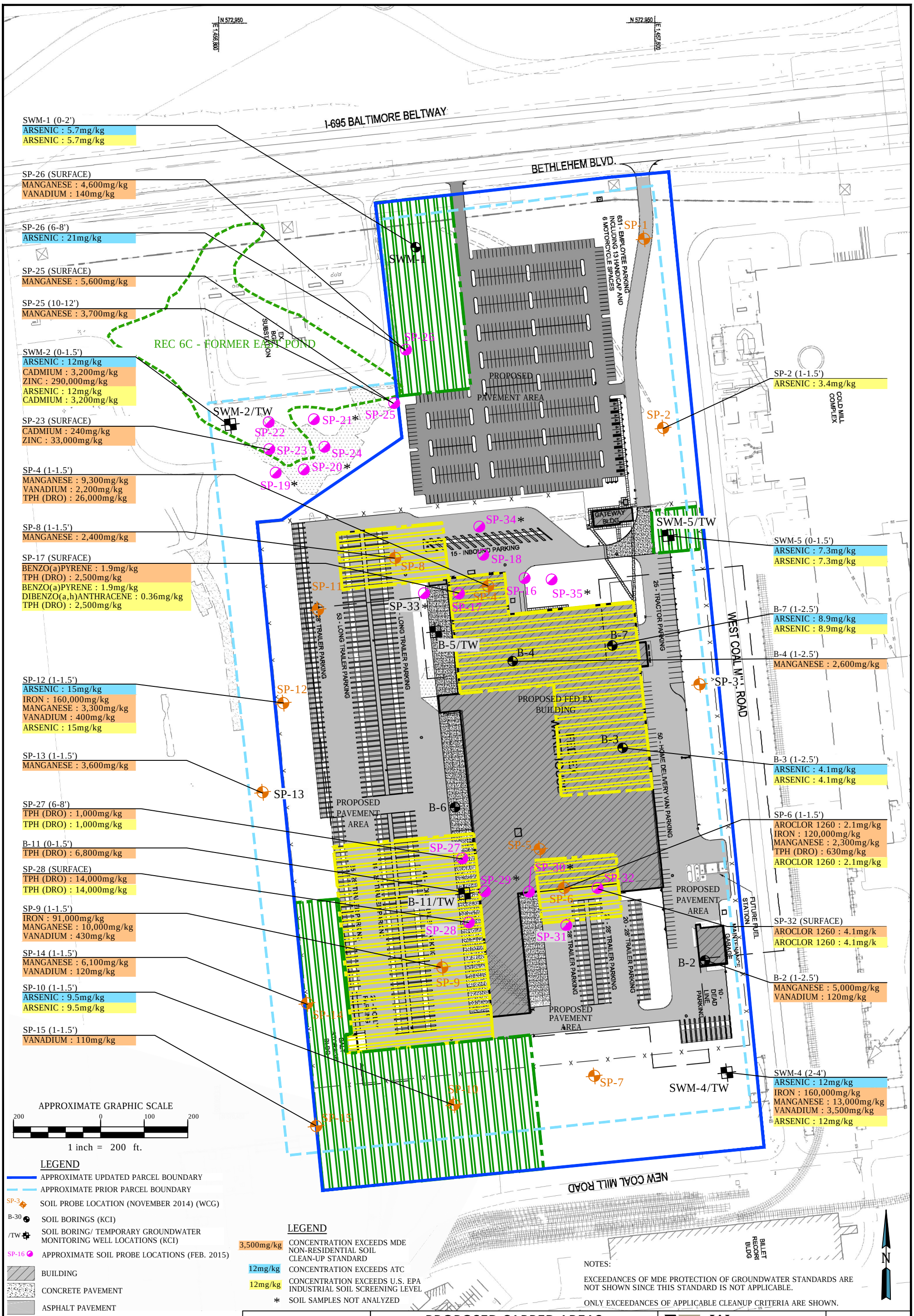
FIGURE 4



APPROXIMATE GRAPHIC SCALE

200 0 100 200

1 inch = 200 ft.

LEGEND

- APPROXIMATE UPDATED PARCEL BOUNDARY
- APPROXIMATE PRIOR PARCEL BOUNDARY
- SP-3 SOIL PROBE LOCATION (NOVEMBER 2014) (WCG)
- B-30 SOIL BORINGS (KCI)
- /TW SOIL BORING/ TEMPORARY GROUNDWATER MONITORING WELL LOCATIONS (KCI)
- SP-16 APPROXIMATE SOIL PROBE LOCATIONS (FEB. 2015)
- BUILDING
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT
- PROPOSED ASPHALT/CONCRETE CAPPED AREAS
- PROPOSED LANDSCAPE CAPPED AREAS

LEGEND

- 3,500mg/kg CONCENTRATION EXCEEDS MDE NON-RESIDENTIAL SOIL CLEAN-UP STANDARD
- 12mg/kg CONCENTRATION EXCEEDS ATC
- 12mg/kg CONCENTRATION EXCEEDS U.S. EPA INDUSTRIAL SOIL SCREENING LEVEL
- * SOIL SAMPLES NOT ANALYZED

NOTES:

EXCEEDANCES OF MDE PROTECTION OF GROUNDWATER STANDARDS ARE NOT SHOWN SINCE THIS STANDARD IS NOT APPLICABLE.

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PREPARED FOR:

SCANNELL PROPERTIES

PROPOSED CAPPED AREAS

PARCEL A1
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FIGURE 5