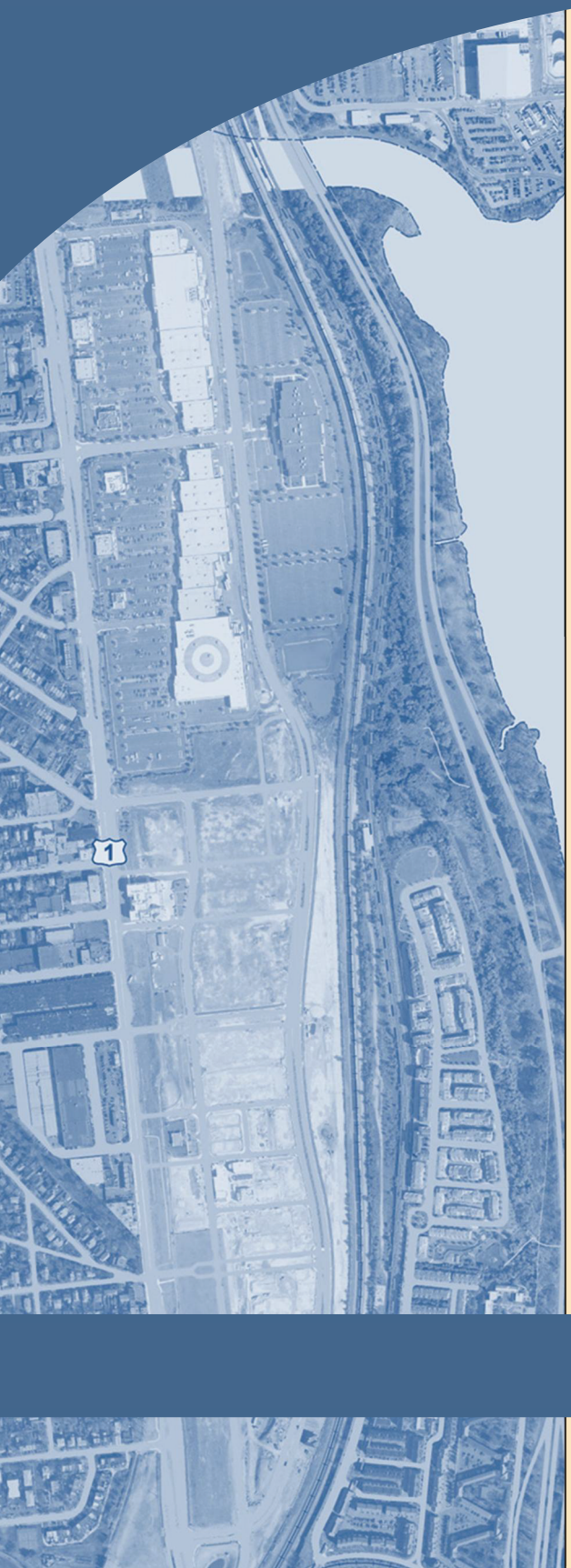
APPENDIX O

Phase I and II Environmental Site Assessments

POTOMAC YARD METRORAIL STATION
ENVIRONMENTAL IMPACT STATEMENT



Administrative Review Draft

Phase I Environmental Site Assessment and Hazardous & Contaminated Materials Technical Memorandum

February 2013

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1.0 INTRODUCTION

The Federal Transit Administration (FTA), as the lead federal agency, and the City of Alexandria, as the project sponsor and joint lead agency, have prepared a Draft Environmental Impact Statement (Draft EIS) in accordance with the National Environmental Policy Act (NEPA) for the proposed Potomac Yard Metrorail Station ("the project"). The Draft EIS has been prepared in cooperation with the Washington Metropolitan Area Transit Authority (WMATA) and the National Park Service (NPS).

This technical memorandum identifies the potential effects due to hazardous and contaminated materials for the No Build and three Build Alternatives. The memorandum describes the following:

- Project alternatives
- Applicable regulations and guidance
- Methodology
- Opening year conditions
- Potential effects of each alternative
- Mitigation

The findings of this analysis are incorporated in the Draft EIS. Temporary construction effects are described separately in the *Construction Impacts Technical Memorandum*. The findings of this analysis are incorporated in the Draft EIS.

This document is a Phase I Environmental Site Assessment (ESA) for the project which also serves as the technical memorandum for the preparation of the Draft EIS. The Phase I ESA is a due diligence task that includes the review of previous analyses and reports, provides confirmation of this information, and provides additional information as needed. All work was completed pursuant to American Society of Testing and Materials (ASTM) E1527-05 *Standard Practice for Environmental Site Assessments*; Phase I Environmental Site Assessment Process; and the U.S. Environmental Protection Agency (USEPA) All Appropriate Inquiries (AAI) - 40 CFR Part 312.

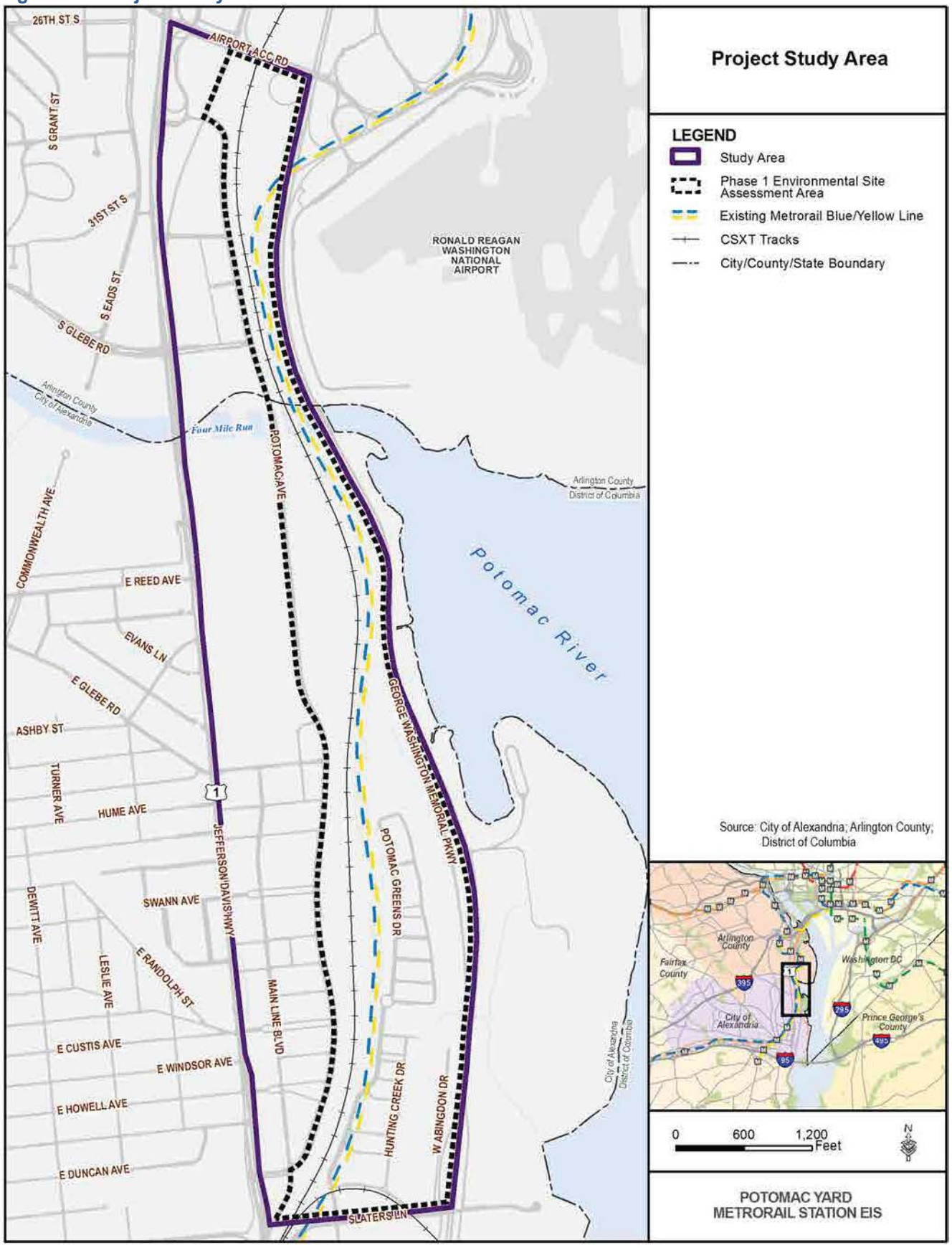
The Phase I ESA included the following tasks:

- Review of historical documentation including historic aerial photographs and historic topographic maps;
- Review of federal and state online database records and publications for known contaminated sites and for sites containing or generating hazardous substances;
- Review of Potomac Yard's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigation records and reports acquired through the Freedom of Information Act (FOIA), the USEPA's on-line administrative record, the Virginia Department of Environmental Quality (VDEQ), and the City of Alexandria Office of Environmental Quality;
- Meetings with VDEQ and City of Alexandria staff regarding past investigations; and
- A site reconnaissance which focused on potential Recognized Environmental Condition Sites (RECs) in the project study area. To assess what RECs could directly impact the project, the study area was refined to use a narrower Phase I ESA area, which encompasses the site of the Build Alternatives ("the Site"). For the purposes of this Phase I ESA investigation, the Site includes the rail yard between Potomac Avenue in the west and the George Washington Memorial Parkway (GWMP) in the east (see **Figure 1-1**). Historic potential RECs which were located relatively far from the Phase I ESA area, such as along Route 1, were not further evaluated for potential impacts to the project. Potential RECs which were in or nearby the Phase I ESA area, such as potential RECs on the former Potomac Yard, were retained for further analysis.

This Phase I ESA has been completed to assist the NEPA compliance efforts for the project, identify any potential RECs that could impact the development and construction of the project, and identify potential mitigation or remedial options to avoid or lessen impacts from hazardous and contaminated materials that may exist at the former Potomac Rail Yard.

Construction of the project is consistent with the US Department of Transportation (USDOT) Brownfields Policy, adopted in 1998, which encourages participation in transportation projects that include the use and redevelopment of potentially contaminated sites, when appropriate, in support of the USEPA's Brownfields Initiative. Brownfields are abandoned, idled, or underused industrial and commercial properties where redevelopment is complicated by real or perceived contamination. The project site is not a registered USEPA Brownfield, however, the former Potomac Rail Yard has been the subject of extensive federal and state regulated remedial actions.

Figure 1-1: Project Study Area



The document is organized as follows:

- Section 1.1 provides an overview of the Project Alternatives and the Phase I ESA study area;
- Section 2 describes the regional and site setting of the project;
- Section 3 provides Phase I ESA findings, including topographic mapping, aerial photography, and historic database search results of potential RECs in the Phase I ESA study area;
- Section 4 describes former Potomac Yard historic site operations and potential RECs;
- Section 5 summarizes previous remedial actions taken at former Potomac Yard RECs;
- Section 6 describes existing RECs within the study area;
- Section 7 summarizes which RECs may be affected by the project alternatives;
- Section 8 describes potential impacts from RECs, risk mitigation and remedial options;
- Section 9 summarizes potential regulatory requirements and coordination related to RECs;
- Section 10 provides a summary of the findings of the Phase I ESA and Hazardous and Contaminated Materials Technical Memorandum;
- Section 11 provides the qualifications of the authors; and
- Section 12 provides the references for the Phase I ESA and Hazardous and Contaminated Materials Technical Memorandum.

1.1 Project Alternatives

The Draft EIS evaluates a No Build Alternative and three Build Alternatives. Each Build Alternative includes the same area improvements as the No Build Alternative in addition to construction and operation of a Metrorail station.

1.1.1 No Build Alternative

The No Build Alternative is defined as the existing highway and transit network and committed transportation improvements from the National Capital Region Transportation Planning Board's Financially Constrained Long Range Plan (CLRP). The Draft EIS assumes that any improvements that are anticipated to be implemented by the project horizon year of 2040, whether physical or operational, are part of the No Build Alternative, with the exception of the new Metrorail Station at Potomac Yard.

The No Build Alternative includes the build-out of an internal street network within Potomac Yard (roughly from Four Mile Run to Braddock Road) and additional investments in transit and bicycle/pedestrian facilities, including a pedestrian bridge over the Metrorail and CSX Transportation (CSXT) rights-of-way between Potomac Greens and Potomac Yard. Anticipated transit investments include the Crystal City/Potomac Yard (CCPY) Transitway and an expansion of local transit service.

1.1.2 Build Alternatives

The Build Alternatives are described below and shown in Table 1-1 and Figure 1-2

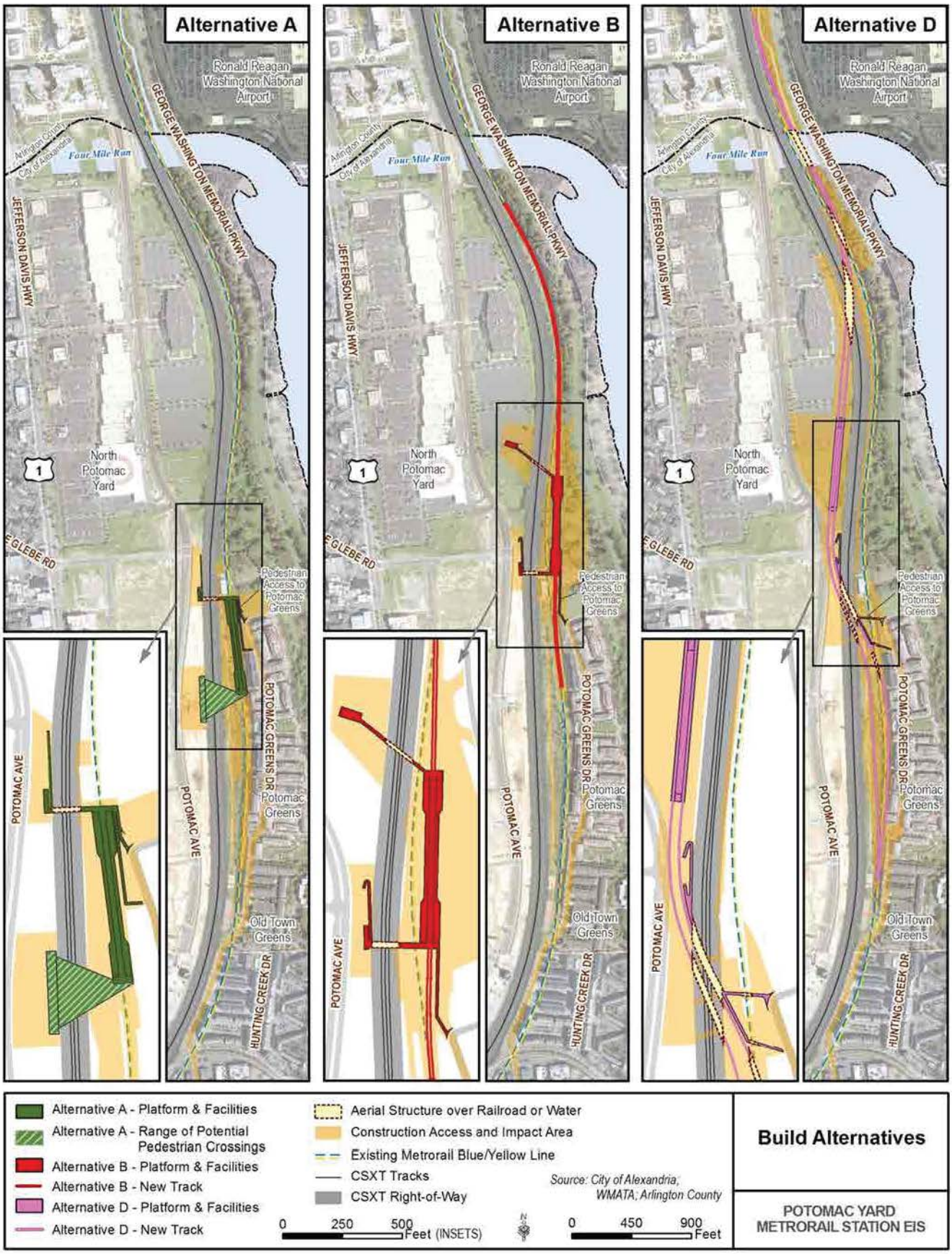
Build Alternative A

Build Alternative A would be located on the existing Metrorail tracks between the CSXT right-of-way and the north end of the Potomac Greens neighborhood, generally within the existing Metrorail Reservation easement designated during earlier planning efforts for the Potomac Yard area. The station would be at-grade with a side platform layout. Additional station facilities would include two pedestrian bridges from the station over the CSXT right-of-way to the planned development in Potomac Yard. The bridge at the northern end of the station would provide 24-hour pedestrian/bicycle access between Potomac Yard and the Potomac Greens neighborhood.

Build Alternative A would include construction of a double crossover located approximately 900 feet south of the station. Build Alternative B

Build Alternative B would be located between the George Washington Memorial Parkway and the CSXT right-of-way, north of the Potomac Greens neighborhood and east of the south end of the existing Potomac Yard Shopping Center in North Potomac Yard. The station would be located within the Greens Scenic Area easement administered by NPS. The station would be at-grade. Additional station facilities would include two pedestrian bridges from the station over the CSXT right-of-way to the planned development in Potomac Yard. The bridge at the southern end of the station would provide 24-hour pedestrian/bicycle access between Potomac Yard and the Potomac Greens neighborhood.

Figure 1-2: Build Alternatives



Build Alternative B would require the realignment of approximately 650 feet of existing track, as well as the installation of approximately 1,450 feet of new track. Special track work – a double crossover – would be required approximately 100 feet north of the station.

The new track and station would be built on retained fill, and a new retaining wall would be constructed on the east side of the track and station to support the structures.

Build Alternative D

Build Alternative D would be located west of the CSXT right-of-way near the existing Potomac Yard Shopping Center in North Potomac Yard. The station would be aerial with a center platform layout. One pedestrian/bicycle bridge over the CSXT right-of-way would be constructed, providing 24-hour pedestrian/bicycle access between Potomac Yard and the Potomac Greens neighborhood. The pedestrian/bicycle bridge would be parallel to the new Metrorail bridge over the CSXT right-of-way.

Build Alternative D would require the realignment of approximately 550 feet of existing track, as well as the installation of approximately 5,800 feet of new track. The majority of new track would be elevated. Build Alternative D would also include construction of two Metrorail aerial bridges crossing the CSXT right-of-way to the north and south of the station, and a new Metrorail bridge over Four Mile Run. Construction of a double crossover would be required in a location approximately 100 feet north of the station. Following completion of construction, the old Metrorail tracks would be removed from service.

Additional structural improvements would include the removal and replacement of the existing retaining wall near the Potomac Greens neighborhood and the removal of an additional retaining wall west of the existing Metrorail tracks, north of the portal at the southern end of the neighborhood. The ballast and sub-ballast of the existing Metrorail alignment will be left in place with the timber ties handled in accordance with all applicable solid waste regulations.

Table 1-1: Potomac Yard Metrorail Station Build Alternatives

Alternative	Type and Layout	Track Work	Facilities for Station Access	Additional Structures Required
Build Alternative A	At-grade, side platform	Minimal track work	Two pedestrian bridges over CSXT right-of-way; access to Potomac Greens via walkway	None
Build Alternative B	At-grade, side platform	Moderate track work	Two pedestrian bridges over CSXT right-of-way; access to Potomac Greens via walkway	Structures (retaining wall) to support new track and station
Build Alternative D	Aerial, center platform	Major track work	One pedestrian bridge over CSXT right-of-way to provide access between Potomac Yard and Potomac Greens	Two aerial structures over CSXT right-of-way, one Metrorail bridge over Four Mile Run, aerial track and supports, and retaining wall replacement on the east and west sides of the tracks north of the existing Metrorail portal. New structures would pass over the existing Metrorail tracks, which would be removed following construction.

Note: Track work for Build Alternatives B and D assumes existing Blue and Yellow Line Metrorail track would be removed where track is realigned

2.0 SITE SETTING

This section details the regional and local site setting of the former Potomac Rail Yard and project study area and Phase I ESA area of investigation.

2.1 Project Location

Potomac Yard is located in the City of Alexandria and Arlington County, Virginia. The former Potomac Rail Yard site spans about 342 acres of land and is bordered by 27th Street to the north, Braddock Road to the south, U.S. Route 1 (Jefferson Davis Highway) to the west and the GWMP to the east. As described in Section 1.0, the Phase I ESA area comprises of portions of the former Potomac Rail Yard bordered by the Airport Access Road to the north, Slaters Lane to the south, Potomac Avenue to the west, and the GWMP to the east (referred to as "the Site").

2.2 Surrounding Land Use

The surrounding land use is a densely populated area, which continues to be developed for residential and commercial uses. A new plan for the redevelopment of the former Potomac Yard and the existing Potomac Yard Shopping Center was adopted by the City of Alexandria in 2010. The new redevelopment is planned as a mixed-use transit orientated development containing office, retail and residential uses, as well as open space.

2.3 Surface Waters and Hydrology

Major surface water bodies in the vicinity of the Site are the Potomac River and Four Mile Run. Four Mile Run crosses the former Potomac Yard from west to east in the northern portion of the property, and the Potomac River is located approximately 800 feet to the east. Regional drainage generally flows from west to east toward the Potomac River. The Potomac River in the vicinity of the Site is tidal. The tidal zone extends approximately 9 miles upstream from the mouth of Four Mile Run at the Potomac River. The tidal influence at Potomac Yard was reported to be approximately 3 feet in previous studies (*ETI,* 1995).

Drainage patterns in the vicinity of the Site are controlled principally by topographic relief and urbanization. In urban settings, such as the Potomac Yard, stormwater is managed predominantly in subsurface pipes and drainage ponds. Drainage from the Site generally flows to either Four Mile Run (in the northern portion of the Site), which in turn discharges to the Potomac River, or directly to the Potomac River. The Potomac River flows south and ultimately discharges to the Chesapeake Bay (*ETI,* 1995).

Previous studies at the Site have shown that shallow groundwater occurs at the former Potomac Yard under an unconfined water table and perched water table[1] conditions. The unconfined water table occurs at depths ranging from approximately 10 feet to 25 feet below ground surface (bgs). The perched water table is localized and may be seasonal in nature. The perched groundwater was encountered as shallow as 2 to 3 feet bgs. The water table groundwater elevations in monitoring wells during previous environmental site investigations generally ranged from about 5 feet to 33 feet mean sea level (msl) (*ETI,* 1995). Previous studies at the Site also identified groundwater contaminants from the historic rail yard activities. The groundwater contaminants are discussed in more detail in Section 6.3 of this Report.

Regional geology and previous site-specific subsurface investigations show a dense confining clay layer that impedes the movement of the water table and perched groundwater through the confining unit to underlying confined aquifers. The direction of flow and discharge of groundwater from the perched and water table aquifer within the study area is eastward toward the Potomac River. The direction of flow and discharge of groundwater from the perched and water table aquifer in the northern portion of the Potomac Yard is toward Four Mile Run.

Beneath the perched and water table aquifers are the middle (Patapsco) and lower (Patuxent) aquifers which exist under confined to semi-confined conditions. The lower (Patuxent) is the deepest confined aquifer in the regional geological framework. This unit was deposited directly on the bedrock surface at approximately 300 feet bgs. **Figure 2-1** depicts the aquifers and confining units beneath the Site.

[1] Perched groundwater is defined as "Unconfined groundwater separated from an underlying body of groundwater by an unsaturated zone. Its water table is a perched water table. Perched ground water is held up by a perching bed whose permeability is so low that water percolating downward through it is not able to bring water in the underlying unsaturated zone above atmospheric pressure." U.S. Geological Survey, Glossary of Hydrologic Terms, accessed at: http://or.water.usgs.gov/projs_dir/willgw/glossary.html#P.

The middle and lower aquifers were once important sources of fresh water for public and commercial use in the region. Well yields from the aquifers ranged from 10 to 800 gallons per minute (gpm). However, public water supplies are now almost exclusively obtained from surface water sources. In the area of the Site, the middle and lower aquifers are only designated for use as a public water supply in an emergency. There are two City of Alexandria emergency public water supply wells located 3,500 feet southwest of the Site that are completed into the lower aquifer.

According to the Site Progress Report No. 51 for the former Potomac Yard USEPA CERCLA Site, dated August 1996, up to 94 monitoring and trench wells were located on the Potomac Yard. Forty-three of the wells were abandoned at the site from July 17 through July 25, 1996. According to the April 23, 2012 meeting with representatives of VDEQ, all monitoring wells at the site have since been abandoned.

2.4 Geology and Soils

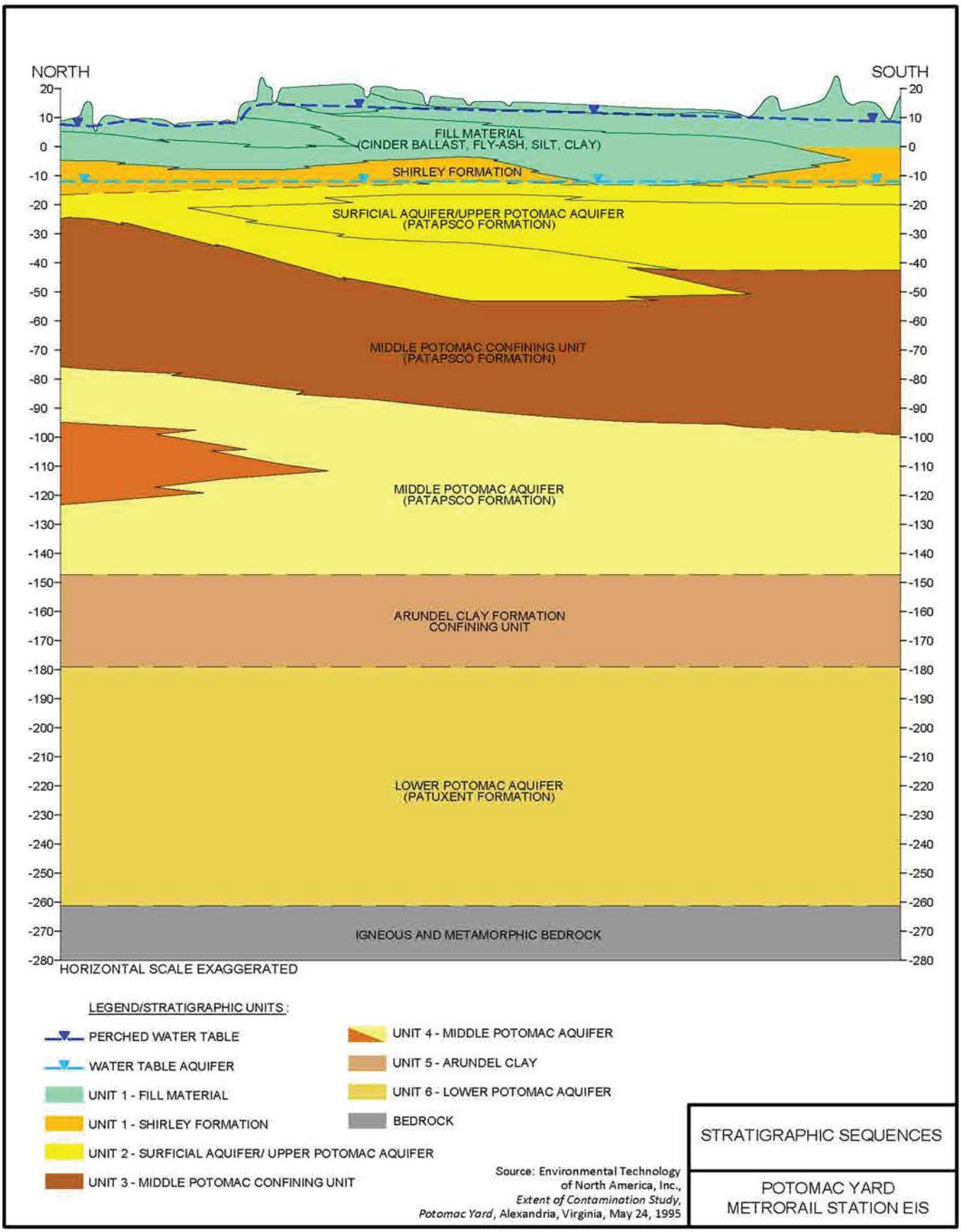
The study area is located near the western edge of the Coastal Plain physiographic province. The “Fall Line”, located less than 5 miles west of the study area, marks the boundary between the Coastal Plain and the Piedmont physiographic provinces. The Coastal Plain is an eastward-thickening wedge of sedimentary deposits overlying igneous and metamorphic bedrock. The bedrock dips eastward from the Piedmont at approximately 125 feet per mile. The Coastal Plain sediments consist of clays, silts, sands, and gravels deposited in river and marine environments.

Depositional environments of the sediments varied during the formation of the Coastal Plain. Repeated marine transgressions and regressions occurred, interrupted by periods of erosion. Deposits found in such a dynamic environment are characterized by a variety of sediment types that often form inter-fingering units. This lateral and vertical variation in sediment types occurs on both regional and local scales. It is common to encounter discontinuous, localized units of one sediment type within a formation consisting of another sediment type (*Meng and Harsh,* 1988).

The sedimentary deposits of the Coastal Plain in the vicinity of the study area are the Potomac Group of Cretaceous age. The Potomac Group is subdivided into three formations. In ascending order, these are the Patuxent Formation (Patuxent), the Arundel Clay Formation (Arundel), and the Patapsco Formation (Patapsco). Overlying the Potomac Group are river terrace and alluvial deposits of Quaternary age identified as the Shirley Formation and fill material. **Figure 2-1** depicts the Site specific geology and soils at the Site.

The geology of the study area was delineated from ground surface to the bedrock during previous environmental and geotechnical investigations. The stratigraphic sequence of the study area consists of six units. In descending order, these units include: fill material (ballast-cinder, fly-ash, silt and clay), Shirley Formation, Patapsco Formation, Arundel Clay Formation, Patuxent Formation, and bedrock.

Figure 2-1: Site Geology



3.0 PHASE I ESA HISTORIC MAPS, AERIALS, AND DATABASE FINDINGS

The first step in the analysis process was to obtain an EDR Radius Map™ Report with GeoCheck® from the company Environmental Data Resources (EDR). The EDR Radius Map™ Report with GeoCheck® satisfies ASTM E1527-05 and USEPA's All Appropriate Inquiry rule. As part of the report, EDR utilizes a proprietary database, referred to as the National Environmental Data Information System (NEDIS), which integrates environmental records and land use information from thousands of federal, state, tribal, local, and private sources. The EDR report for the Potomac Yard Metrorail Station EIS provides a variety of data sources for the purpose of identifying potential RECs. The data sources include:

- Historical Sanborn Fire Insurance Maps
- Historical Aerial Photographs
- Historical Topographic Maps
- City Directory Abstract
- NEDIS (including federal and state environmental regulatory databases)

The topographic maps, aerial photography, and NEDIS regulatory database information were reviewed to determine historical land modification and the type of development through time at Potomac Yard. RECs, such as potential releases, retail gasoline operations, underground storage tanks (USTs), dry cleaners, and locations that may have distributed or stored hazardous materials and potential former fill/dump/landfill sites may be discerned and documented from these reports.

EDR conducted a search for historical Sanborn fire insurance maps of the study area. However, no fire insurance maps covering the property were found. In addition, EDR conducted a search of available city directory data for the subject property to evaluate the occupancy and ownership history of the study area for years spanning 1921 through 2003. No other business address or ownership information was provided by EDR for the study area. EDR's notification letters are included in **Appendix B**.

3.1 Historical Topographic Maps

The EDR Radius Map™ Report with GeoCheck® included historical topographic maps of the study area dating from 1885, 1894, 1943, 1951, 1956, 1965, 1971, 1972, 1983, and 1994. These topographic maps were developed by the United States Geological Survey (USGS). The topographic maps illustrate general land use and topographic conditions for each time period including the location of transportation facilities such as railroad corridors and rail yards, as well as the names and locations of surface water features. These maps were reviewed to evaluate historic land uses of the study areas and to document changes in land use over time. Findings from this review are presented in chronological order in this section. Copies of the historic topographic maps are provided in **Appendix C**.

1885 Topographic Map

The 1885 map depicts the Alexandria and Washington Railroad along the eastern portion of the study area along an approximately north-south axis. The Four Mile Run Railroad Station is present on the Alexandria and Washington Railroad line at the northeast corner of the study area, adjacent to the Potomac River. The Washington Ohio and Western Railroad crosses the southern portion of the study area along an approximate northwest-southeast axis, meeting the Alexandria and Washington Railroad at the Washington and Ohio Junction. An unnamed road appears to parallel the Washington Ohio and Western Railroad within the study area. No other improvements to the study area are depicted. The Four Mile Run stream is present in the northern portion of the study area, discharging to the Potomac River to the east.

1894 Topographic Map

Conditions in the 1894 map are generally consistent with those depicted on the 1885 map.

1943 Topographic Map

The Ronald Reagan Washington National Airport (National Airport) is present to the northeast of the study area, north of Four Mile Run. The study area is improved by a network of rail lines identified as the Potomac Yard. The study area is bound to the west by U.S. Route 1 and to the east by Mount Vernon Memorial Highway (MVMH). Several unnamed roads are present to the west of U.S. Route 1, while the MVMH is surrounded by vegetated land. The Washington Ohio and Western Railroad is labeled as the Washington and Old Dominion (W&OD) Railroad.

1951-1972 Topographic Maps

The 1951 topographic maps show a sailing marina and radio range towers are present to the east of MVMH along the Potomac River. A large development of residential buildings is present along the northeast side of the study area, west of Mount Vernon Memorial Highway. Otherwise conditions are generally similar to those depicted on the 1943 map. Conditions in the 1956 map are generally consistent with those shown on the 1951 map. In the 1965 map, several large buildings are present immediately adjacent to the west of U.S. Route 1. Otherwise conditions are generally consistent with those shown on the 1956 map. The W&OD Railroad is no longer present in the 1971 map, otherwise conditions are generally consistent with those shown on the 1965 map. Conditions in the 1972 map are generally consistent with those shown on the 1971 map.

1983 Topographic Map

The Four Mile Run stream is channelized, flowing in a generally straight line from west to east beneath U.S. Route 1 and the GWMP into the Potomac River. Otherwise, conditions are generally consistent with those shown on the 1972 map.

1994 Topographic Map

The majority of the rail lines and yards have been removed from the Potomac Yard, with only two lines running along the eastern portion of the study area. The remainder of the former Potomac Yards appears to be dismantled and vacant.

3.2 Historical Aerial Photographs

EDR provided historical aerial photographs dating from 1949, 1957, 1959, 1962, 1964, 1970, 1974, 1980, 1994, 1998, 2000, and 2002. These photographs were reviewed to determine the historic land uses of the project Site and to document the areas modified over time. Findings from this review are presented in chronological order in this section. Copies of the historic aerial photographs are provided in **Appendix D**.

1949 Aerial Photograph

The 1949 aerial shows the Potomac Rail Yard to the west and GWMP to the east. The W&OD Railroad right-of-way crosses the rail yard at the southern end of the study area. Air fields associated with the current Ronald Reagan Washington National Airport are located to the northeast of the study area. Four Mile Run passes under the northern portion of Potomac Yard and discharges into the Potomac River to the east.

Structures consistent with those detailed in the Central Operations Area of the rail yard (see **Section 4.3**) are identifiable in the aerial photograph. A wetlands/vegetated area is present east of the Central Operations Area and GWMP.

1957 Aerial Photograph

Between 1949 and 1957, vegetation was cleared from the land located between GWMP and Potomac Yard, in the location which is now called the Potomac Greens Park (north and east of the Potomac Greens neighborhood). Apparent deposition or staging of materials are present which could be consistent with fly ash (detailed in Section 4.6.3). Development and land use conditions in Potomac Yard in the 1957 aerial appear consistent with those shown on the 1949 aerial.

1962 Aerial Photograph

Between 1957 and 1962, more vegetation was cleared from the land located between GWMP and Potomac Yard extended southward. Apparent deposition or staging of materials appear to be more prevalent which could be consistent with fly ash detailed in Section 4.6.3. Conditions at Potomac Yard appear to be similar to those shown on the 1957 aerial.

1964 Aerial Photograph

By 1964, the W&OD Railroad right-of-way is no longer present across the Potomac Rail Yard. More vegetation is apparent on the deposition and materials staging area land located between the GWMP and Potomac Yard. Structures consistent with those detailed in the Central Operations Area of the rail yard (see **Section 4.3**) are identifiable in the aerial photograph. The conditions at Potomac Yard appear to be similar to those shown on the 1962 aerial.

1974 Aerial Photograph

More vegetation since 1964 is apparent on the deposition area/materials storage area land located between GWMP and Potomac Yard. An apparent storage yard for train storage or assembly has been cleared south and east of Potomac Yard in this area consistent with the location of the current Potomac Greens neighborhood (see Section 4.6). Conditions at Potomac Yard appear to be similar to those shown on the 1964 aerial.

1980 Aerial Photograph

Four Mile Run is channelized into a straight course perpendicular to the bridges of Potomac Yard. The apparent staging area at the Potomac Greens area appears to be larger. Conditions at Potomac Yard appear to be similar to those shown on the 1974 aerial.

1994 Aerial Photograph

The resolution and quality of the photograph are poor. No observations can be made.

1998 Aerial Photograph

The tracks in Potomac Yard have been removed. Apparent commercial buildings and parking lots are located within the north central portion of the former rail yard. WMATA's Blue/Yellow Line is visible to the east. Development within the Potomac Greens area appears to be more extensive extending towards the north.

2000 Aerial Photograph

Additional commercial buildings and paved parking areas are present in the north central portion of the former rail yard. Development and grading activities appear to be present throughout. Otherwise, conditions in the 2000 aerial are generally similar with those shown on the 1998 aerial.

2002 Aerial Photograph

Only the north and central areas of Potomac Yard are shown. Conditions appear to be generally similar with those shown on the 2000 aerial.

3.3 State and Federal Database Findings

As part of the EDR Radius Map™ Report with GeoCheck®, the NEDIS database provides a query to identify hazardous and contaminated materials sites found within a ½-mile of the Build Alternative locations. These sites are then identified and placed on the Radius Map. These sites are identified through records search of both Federal and Virginia (VA) databases. The Radius Map and NEDIS database search results are provided in **Appendix E**. As summarized in **Table 3-1**, the NEDIS database search identified the following types of reports within the study area. Note, multiple databases can be reported for individual sites.

Federal Programs

- CERCLA/CERCLIS – Comprehensive Environmental Response, Compensation, and Liability Act / Comprehensive Environmental Response, Compensation, and Liability Information System
- ERNS – Emergency Response Notification System
- FINDS – Facility Index System
- ICIS – Integrated Compliance Information System
- RCRA – Resource Conservation and Recovery Act
  - CESQG – Conditionally Exempt Small Quantity Hazardous Waste Generators
  - LQG – Large Quantity Hazardous Waste Generators
  - NonGen – Generators no longer generating hazardous waste
  - SQG – Small Quantity Hazardous Waste Generators

Commonwealth of Virginia Programs

- INST CONTROL – Virginia Sites with Institutional Controls
- SPILLS and SPILL SITES –VDEQ's Pollution Response Program of spill incidents
- VA AST – VDEQ Above Ground Storage Tanks
- VA UST – VDEQ Underground Storage Tanks
- VA LUST and L TANKS – VDEQ Leaking Underground Storage Tanks
- VA TIER 2 – VDEQ facilities which store or manufacture hazardous materials
- VRP – VDEQ Voluntary Remediation Program

EDR Proprietary NEDIS Database Source

- HISTORIC AUTO STATIONS – EDR NEDIS database of historic gas stations

Table 3-1: Federal and State Databases and Records Reports within ½-Mile of the Project Site

Database	1/4-Mile to 1/2 Mile Radius	1/8-Mile to 1/4-Mile Radius	100-Foot to 1/8-Mile Radius	100-Foot Radius	Study Area
CERCLA/CERCLIS	0	0	0	0	1
ERNS	0	1	0	0	0
FINDS	2	0	0	0	0
ICIS	1	0	0	0	1
VRP	0	1	0	0	0
INST CONTROL	1	0	0	0	0
VA TIER 2	1	2	0	0	1
VA UST	3	21	0	0	1
VA AST	1	1	0	0	0
VA LUST	7	9	0	0	2
LTANKS	13	15	0	0	2
SPILLS	5	2	0	0	0
Historic Auto Station	0	11	0	0	0
RCRA-NonGen	1	2	0	0	1
RCRA-SQG	1	9	0	0	0
RCRA-CESQG	0	5	1	1	0
Report Totals	34	79	1	1	9

Source: Environmental Data Resources Inc. Report, U.S. Route 1, Jefferson Davis Highway, Alexandria, VA, dated April 3, 2012.

Table 3-2 and **Figure 3-1** further refine potential RECs identified within or adjacent to the Phase I ESA study area. Other reports detailed in **Table 3-1** are located north and west of the former Potomac Yard and U.S. Route 1 and are not anticipated to impact the development of the Build Alternatives due to their distance from the Phase I ESA study area, and therefore are not shown in **Figure 3-1** or **Table 3-2**.

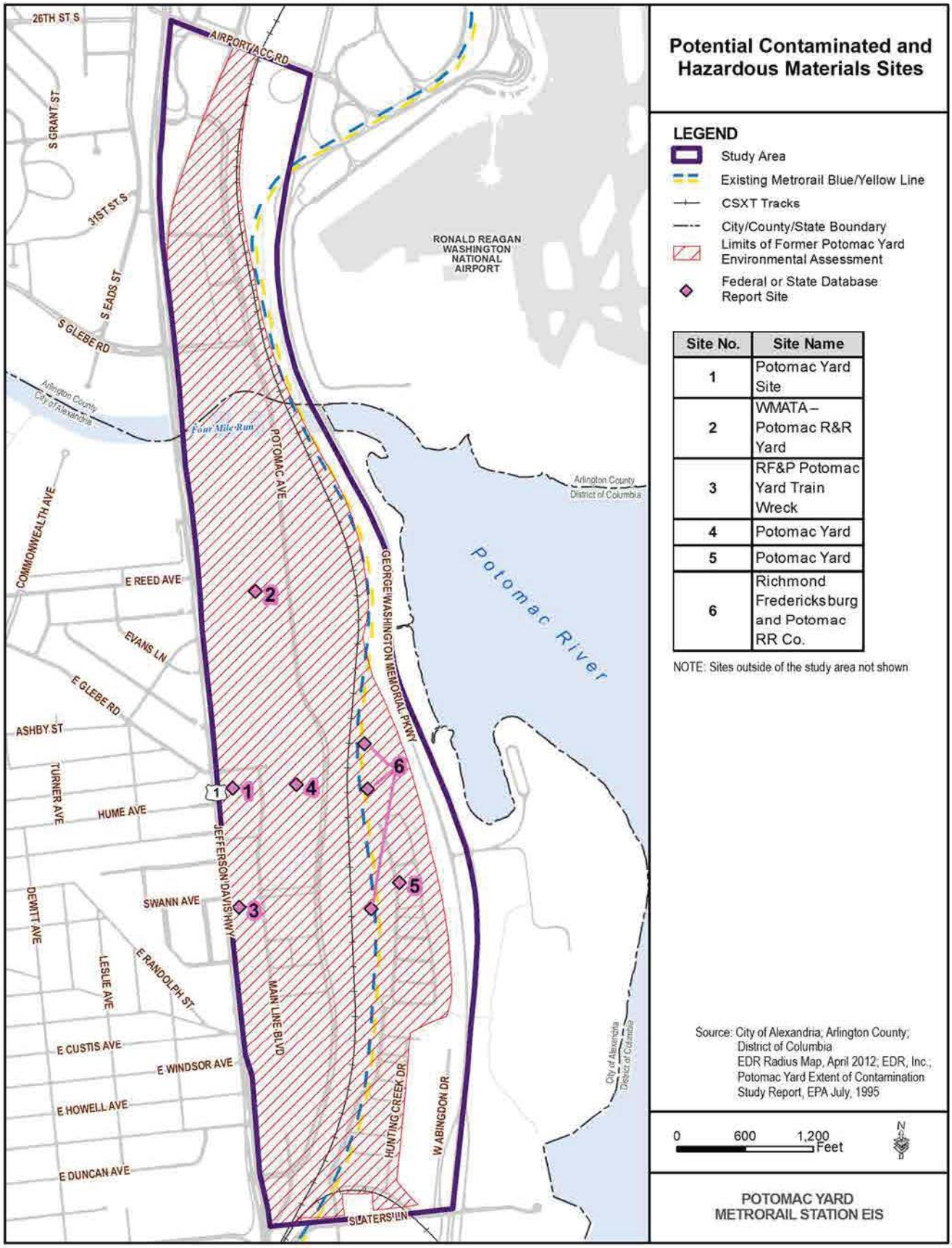
Due to the multiple historic federal and state databases searched during the Phase I ESA, and multiple addresses utilized in the database records for Potomac Yard, multiple addresses are listed for reports at the Potomac Yard on **Table 3-2.** Clarification is provided in the description of **Table 3-2**, where available.

Table 3-2: Federal and State Database Regulatory Database Report for the Study Area

Map ID No.	Site Name	Address	Database	Site ID	Description
1	Potomac Yard Site	2900 Jefferson Davis Highway, Alexandria, VA	ICIS	03-2004-0173	CERCLA Agreement For Cost Recovery. Status: closed.
				03-1997-0263	CERCLA 106 Administrative Order for Response Action/Immediate Hazard Status: closed.
			FINDS	110010717055	FINDS provides a single point of access for sites regulated or monitored by the USEPA. Status: closed. *Note: This database report refers to site wide EPA regulated CERCLA remedial activities detailed in Section 5.0.*
2	WMATA – Potomac R&R Yard	3601 Jefferson Davis Highway, Alexandria, VA	VA TIER 2	S110070052	Sulfuric acid and mineral oil. Status: Unknown.
3	Richmond Fredericks-burg & Potomac (RF&P) Potomac Yard Train Wreck	2500 Block Jefferson Davis Highway, Alexandria, VA	VA LUST	89-0460	Release date: 10/28/1988. Closed date: 6/23/1995.
				90-0555	Release date: 1/30/1990. Closed date: 5/11/2000.
				90-0955	Release date: 1/30/1990. Closed date: 1/25/2001.
				91-1566	Release date: 4/24/1991. Closed date: 10/25/1995.
			LTANKS	19993399	Reported: 1/6/1999. Status: closed. *Note: This report database refers to VQEQ regulated petroleum remedial actions detailed in Section 5.0.*
4	Potomac Yard	2801 Jefferson Davis Highway, Alexandria, VA	VA UST	3012524	Multiple USTs removed from the ground Status: closed. *Note: This report refers to VQEQ regulated actions at the Former Central Operations Area detailed in Section 5.0.*
5	Potomac Yard	Town of Slaters Village, Alexandria, VA	VA LUST	98-3508	Release date: 7/10/1997. Closed date: 3/9/1998.
			LTANKS	19953508	Reported: 7/10/1997. Status: closed.
6	RF&P Railroad Company Potomac Yard	Potomac Yard, Alexandria, VA	CERCLIS	0303314	Three retention ponds for spent oil, grease and water from Site. Status: closed.
			RCRA-NonGen	VAD020312013	No violations found.
			FINDS	110009315570	FINDS provides a single point of access for sites regulated or monitored by the USEPA. *Note: This report refers to EPA CERCLA remedial activities at Former oil/water Retention Ponds detailed in Section 5.0.*

Source: Environmental Data Resources Inc. Report, U.S. Route 1, Jefferson Davis Highway, Alexandria, VA, dated April 3, 2012; and Historical Aerial Photographs, 1949 – 2002.

Figure 3-1: Potential Contaminated and Hazardous Materials Sites



4.0 FORMER POTOMAC YARD SITE OPERATIONS AND POTENTIAL RECS

This section describes the former Potomac Yard site operations and the potential RECs reported within each area of the former rail yard. Section 5.0 summarizes the remedial actions taken at RECs within each area of the former Potomac Yard as documented in available referenced reports.

Potomac Yard is a former rail yard, which was operated by the Richmond Fredericksburg and Potomac (RF&P) railroad from approximately 1906 to 1990. Historic operations at the Site were characterized by reports obtained from the USEPA CERCLA Administrative Record, VDEQ and the City of Alexandria Office of Environmental Quality. The 1995 Extent of Contamination Study (ECS) completed for the entire Potomac Yard by Environmental Technology of North America, Inc., (ETI) in 1995, is the primary source of historic site operations information.

The following discussion summarizes the findings and is organized according to seven former distinctive "Sub-Areas" of Potomac Yard, as designated based on past rail yard activities. These former Sub-Areas include the North Yard Tail, North Yard, Central Operations Area, South Yard, South Yard Tail, Potomac Greens, and Intermodal Area. The former Sub-Areas at Potomac Yard are shown on **Figure 4-1**.

4.1 North Yard Tail

The North Yard Tail was situated at the northernmost boundary of Potomac Yard. This area is bounded by Four Mile Run on the south, Crystal City on the north, U.S. Route 1 on the west, and the Metrorail Blue/Yellow Line and the National Airport on the east. Located west of the Site is the WMATA bus maintenance and repair facility which has been in service since the 1930s. Various light industries and businesses are also located along the western side of U.S. Route 1.

The North Yard Tail consisted mainly of railroad switching tracks, which narrowed to the north and merged into five main rail lines near the northern terminus of the Site. A previous Environmental Assessment Report of the northern portion of the Potomac Yard site identified a lube oil tank and switch air compressor building (ETI, 1995). Small aboveground storage tanks (ASTs) with a 250-gallon capacity were also present and were used to store fuel for de-icing switches, fueling, and/or heating track signal buildings.

4.2 North Yard

The North Yard was the area located south of Four Mile Run, east of U.S. Route 1, west of the Metrorail Blue/Yellow Line, and north of the southbound hump parking lot (see **Figure 4-1**). The North Yard contained railroad tracks, a rail car maintenance shop, and other buildings used for storage and maintenance. Solvents to remove oil and grease from building floors were reportedly used in maintenance buildings. Other buildings in this area included an air compressor building and a waste oil storage building.

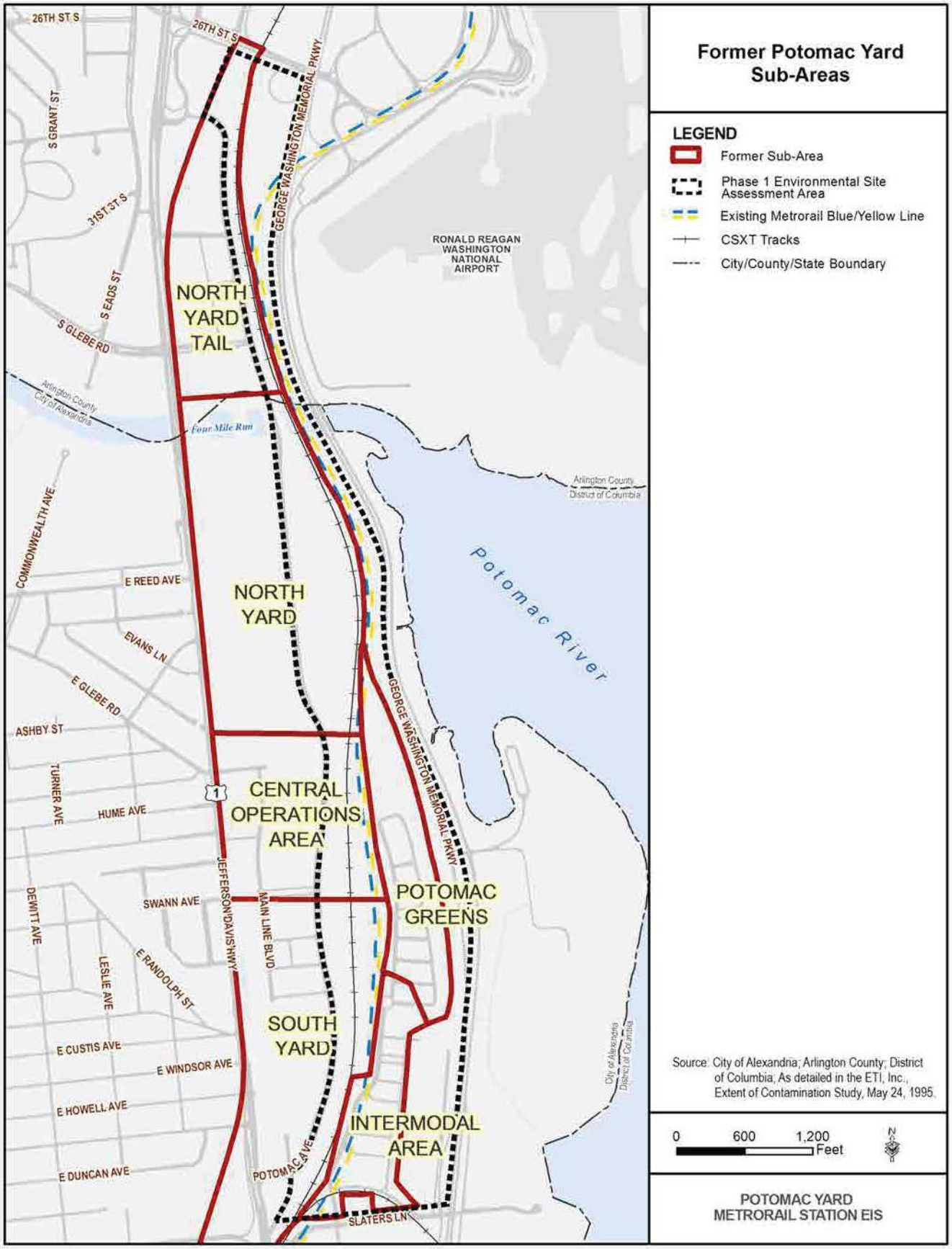
This general area also comprised the former Electric Locomotive Service Yard where minor repairs, service, and maintenance of the electric locomotives were performed. An electrical switching substation was also formerly located north of the car shop and immediately south of Four Mile Run. The locations of former storage tanks and fuel lines can be referenced in the ECS 1995 Report, **Figures 2-2** and **2-3** (*ETI*, 1995).

A concrete oil/water separator was installed northwest of and adjacent to the southbound hump area as part of an oil-collection system. This separator collected oils that accumulated as a result of automatic oiling operations on the railroad cars. The separator was installed in the late 1970s or early 1980s and was removed by RF&P in 1994 (ETI, 1995).

4.3 Central Operations Area

The former Central Operations Area was bordered by U.S. Route 1 to the west and the Metrorail Blue/Yellow Line to the east and extends south to Swann Avenue and north to the northern edge of a parking lot (see **Figure 4-1**). The Central Operations Area covered the portion of the rail yard where the majority of the former rail yard buildings were located and most refueling operations took place.

Figure 4-1: Former Potomac Yard Sub-Areas



A 105-foot locomotive turntable and roundhouse area were located at the Central Operations Area. The turntable was excavated and removed in 1994. This area was used to service, maintain, clean, and repair "yard" locomotives used on site. Just west of the main turntable, an 80-foot turntable was used until the 1930s or 1940s before being backfilled and subsequently uncovered during downsizing activities in 1993. Excavation of the turntable led to the discovery of an underground storage tank (UST) which held 30 gallons of oil containing 231 milligrams per liter (mg/l) of polychlorinated biphenyls (PCBs). The tank, its contents, and the smaller turntable were removed and disposed of offsite by RF&P in 1994 (*ETI*, 1995).

The refueling area consisted of a minimum of eight underground storage tanks (USTs) located in and around the Central Operations Area, four large 25,000-gallon ASTs, and one smaller AST of approximately 10,000 to 15,000 gallons. All the USTs and ASTs were removed by RF&P as a part of the CERCLA and VDEQ remedial activities discussed in Section 5.0.

A transformer and equipment storage area were located south of the 105-foot turntable. This storage area contained two transformer shells, three unused capacitors, several cable spools, and various other pieces of unused track equipment. An electrical substation was located immediately south of the transformer and equipment storage area. All remnants of this substation, as well as a second substation near Four Mile Run, have been removed. More than 80 electrical transformers were present in these substations and in other locations throughout the former rail yard. In 1984, RF&P removed all regulated transformers from the rail yard property. In 1992 and 1993, RF&P inventoried and removed 85 remaining non-essential transformers from the rail yard (*ETI*, 1995).

4.4 South Yard

The former South Yard extended from Swann Avenue to the Monroe Avenue Bridge, located between U.S. Route 1 to the west and the Metrorail Blue/Yellow Line to the east (see **Figure 3-1**). Beginning in the 1950s, the South Yard was used for southbound classification and northbound receiving of freight rail cars. A rail car oil tank was located near the center of the South Yard.

4.5 South Yard Tail

The former South Yard Tail area was defined as the area bounded by Braddock Road to the south, the Monroe Avenue Bridge to the north, and the Metrorail Blue/Yellow Line to the east (south of the **Figure 4-1** map extent). The South Yard Tail consisted mainly of railroad switching tracks, which narrowed to the south and merged into four main rail lines near the southern terminus of the Site. The area is surrounded by residential areas and businesses.

4.6 Potomac Greens

Potomac Greens, at the time of rail yard site operations, consisted of approximately 38 acres in the area located to the east of the Metrorail Blue/Yellow Line and west of GWMP (see **Figure 4-1**). At that time, Potomac Greens occupied the lowest elevation of Potomac Yard. Potomac Greens was not used for rail operations. However, three former oil/water separator ponds, a fly ash deposition area, and a dredge spoils deposition area were located within the Potomac Greens Sub-Area and are further detailed below.

4.6.1 Oil/Water Separator Ponds

Three oil/water separator ponds were located in the north, middle, and south portions of Potomac Greens which collected surface water containing grease and spilled fuel oil from refueling and maintenance operations in the Central Operations Area, North Yard, and South Yard Sub-Areas. These ponds discharged into the Potomac River through drainage channels. During 1977 and 1978, the three oil/water separator ponds were moved from their original locations to clear a path for the Metrorail Yellow Line. The original oil/water separator ponds were then filled with soil and fly ash. On the downstream side of each pond, wooden baffles served to retain the floating oil and grease in the ponds while allowing water to discharge. Oil and grease were periodically removed and properly disposed off-site (ETI, 1995).

After 1990, when locomotive servicing operations were discontinued at the rail yard, the three oil/water separator ponds collected only stormwater runoff from portions of the rail yard and from the City Of Alexandria (across U.S. Route 1) to the west. During 1993, RF&P removed the three ponds from Potomac Greens. Prior to pond removal, RF&P estimated these ponds to be approximately 2,570 square feet (Middle Pond), 3,200 square feet (North Pond), and 3,370 square feet (South Pond) in area and 5 to 8 feet deep. The water was pumped from each pond and the sediments were solidified with kiln dust and disposed off-site. The soil beneath the ponds was excavated

until the concentration of total petroleum hydrocarbons (TPH) in the underlying soil was less than 100 milligrams per kilogram (mg/kg). The contaminated soil was then properly disposed of offsite. The areas once occupied by the ponds were subsequently refilled under the oversight of the VDEQ (*Roy F. Weston*, 1996).

4.6.2 Dredge Spoils Area

Dredge spoils from the mouth of Four Mile Run were placed at the Potomac Greens Sub-Area by the U.S. Army Corps of Engineers (USACE) in 1983. The USACE constructed a rectangular impoundment located in the south-central portion of Potomac Greens to contain the dredged material. The spoils were deposited within a 10 to 15 foot-high embankment and distributed in a layer that varied from 1 to 12 feet in thickness. The dredge spoils were removed from the site during the redevelopment of the Potomac Greens Sub-Area.

4.6.3 Fly Ash Deposition Areas

Geotechnical investigations within the Potomac Greens Sub-Area identified a widespread layer of fly ash, 5 to 20 feet thick, deposited throughout Potomac Greens Sub-Area. The source of this fly ash was reported to be Potomac Electric Power Company (PEPCO). Historical aerial photographs indicate most of this fill was deposited between the mid-1950s and 1963 (See Section 3.2). In 1962 and 1963, additional fly ash was deposited in the northern portion of the Potomac Greens Sub-Area. This Fly Ash Deposition Area covered approximately 270 feet by 435 feet and was covered by 6 inches to 1 foot of topsoil and by vegetation. The 270 by 435 foot fly ash disposal area was removed and properly disposed during the redevelopment of the Potomac Greens Sub-Area (*ECS*, 2002).

4.7 Intermodal Area

The Intermodal Area was bounded to the north by the vegetation line marking the southern border of Potomac Greens. Potomac Crossing residential units lie along its eastern side. The area is bounded to the south by commercial property along Slaters Lane. The western border of this area is marked by the Metrorail Blue/Yellow Line (see **Figure 4-1**).

A W&OD Railroad overpass crossed Potomac Yard in this area and existed from the 1800s until its demolition in 1969. An engine house associated with the W&OD line was located in the southeast portion of the Intermodal Area from the early 1960s until 1990. Previous site assessments could not document specific activities associated with the engine house prior to 1969, but engine houses are typically used for engine repair, maintenance, and storage. From 1969 until its demolition in 1990, the engine house was used for office space and for repairs of trailers. During the same time period, the garage portion of the building was used for sheet metal repair of trailers and tractors (*ETI*, 1995).

5.0 FORMER REMEDIAL ACTIONS AND REPORTS

This section summarizes remedial actions and reports for RECs at Potomac Yard conducted under the 1992 USEPA CERCLA Administrative Order (see Section 5.1). Petroleum cleanup actions for RECs were undertaken accordance with Virginia UST regulations and under the authority of VDEQ, These actions are also described (see Section 5.2). Recent assessments of RECs and risk mitigation measures conducted during redevelopment activities at Potomac Yard are also summarized (see Section 5.3). A summary of the former RECs identified in the previously conducted remedial actions and potentially present within the Phase I ESA area is provided in Section 5.4.

Extensive remedial investigations and reports have been completed for Potomac Yard in compliance with federal, state and local laws. **Appendix G** contains a report log of over 250 environmental assessment reports or remediation documents which were obtained from the USEPA Administrative Record, VDEQ, and the City of Alexandria. **Table 5-1** lists the ten most relevant and extensive documents that have been discussed above and that are frequently referenced below to describe the site regulatory history. A complete reference list is provided in Section 12.0.

Table 5-1: Potomac Yard Remedial Investigations and Reports

Published Date	Report Name
July 21, 1995	Potomac Yard Extent of Contamination Study
October 14, 1995	Potomac Yard Human Health Risk Assessment and On-Site Ecological Risk Assessment
June 19, 1996	Potomac Yard Engineering Evaluation/Cost Analysis
March 20, 1997	Potomac Yard Off-Site Ecological Risk Assessment
November 13, 1998	Potomac Yard Removal Response Action
August 4, 1999	Site Characterization Report Addendum, Potomac Yard, Central Operations Area
October 9, 2000	Potomac Yard Central Operations Area Closure Report for Corrective Action Plan Implementation
February 15, 2011	Site Characterization Report, Potomac Yards Landbay D
February 15, 2011	Site Characterization Report, Potomac Yards Landbay E
October 18, 2011	Remedial Action Plan, Potomac Yards Landbay G

5.1 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

5.1.1 Consent Order (1992)

In September 1992, USEPA and RF&P signed a CERCLA Administrative Order by Consent requiring RF&P to study the extent of contamination at the Potomac Rail Yard. This order also required RF&P to assess the risks that could be posed to people, plants and animals from site contaminants at the former Potomac Yard. USEPA approved the extensive Extent of Contamination Study (ECS) and Human Health and Ecological Risk Assessment (RA) in September and October 1995, respectively. These documents are discussed below.

5.1.2 Extent of Contamination Study (1995)

Pursuant to the requirements of the Administrative Order by Consent, RF&P undertook an extensive investigation of soil, sediment, groundwater, and surface water at Potomac Yard, known as the ECS. Samples of soil, sediment, surface water, and groundwater were collected and analyzed during this investigation from more than 600 sampling points. The analyses of these samples produced more than 83,000 data points that were evaluated. After the work was completed, the ECS was submitted to USEPA in February 1995, subsequently revised and re-submitted at USEPA's direction to take into account the comments of USEPA and other participating agencies, and then approved by USEPA in September 1995. The ECS identified chemical residuals, metals, and petroleum hydrocarbons present on the property.

5.1.3 Human Health and Ecological Risk Assessment (1995)

The primary objective of the 1995 RA was to evaluate potential risks associated with exposure to chemicals at the former Potomac Yard as a result of anticipated redevelopment activities. Chemicals of potential concern (COPC) were identified for each of the six Site Sub-Areas based on the extensive environmental sampling results

presented in the ECS and anticipated development plans at that time. These Sub-Areas included the North Tail, North Yard, Central Operations Area, South Yard, South Tail, and Potomac Greens (see previous **Figure 4-1**).

An analysis of potential exposure pathways was conducted in the RA for each of the six Sub-Areas under current, interim, and future land-use scenarios. The most important receptors identified by the RA were current trespassers and construction workers, on-site and off-site residents, utility workers, landscape workers, and commercial workers for interim and future land-use. Potential inhalation of chemicals present in on-site soil and incidental ingestion of soil were concluded to be the most important routes of potential exposure for quantitative evaluation *(Weinberg Consulting Group, 1995).*

According to the RA, the highest potential exposures would be to construction workers from the potential inhalation and ingestion of dust and potential inhalation of petroleum hydrocarbons in the Central Operations Area. Because the majority of the Site was planned to be paved and/or capped with clean fill during redevelopment, the RA concluded that little potential for exposure to future residents existed (*Weinberg Consulting Group*, 1995).

5.1.4 Off Site Ecological Risk Assessment (1996)

The USEPA also required an Off-Site Ecological Risk Assessment in 1996 to assess potential impacts from site contaminants in areas adjacent to the Site. The pertinent findings of the Off-Site Ecological Risk Assessment showed that site contamination could have led to a lowered abundance and diversity of aquatic and bottom-dwelling species in Four Mile Run and the Potomac River (*Weinberg Consulting Group*, 1997). The Off-Site Ecological Risk Assessment was approved in 1997 by USEPA.

5.1.5 Engineering Evaluation/Cost Analysis (1996)

As a result of the Off-Site Ecological Risk Assessment, USEPA required RF&P to conduct an Engineering Evaluation/Cost Analysis (EE/CA) to study actions to lessen the pollution threats to these ecological receptors. The EE/CA was approved by USEPA in June 1996. The scope of the EE/CA was focused on the North Yard Tail, North Yard, and Potomac Greens areas of Potomac Yard because the drainage outfalls from Potomac Yard to Four Mile Run and the Potomac River were located in these areas. The scope of the EE/CA was to provide interim solutions within each of the drainage pathways until the areas had been re-developed and the migration pathways (outfalls) were removed or permanently closed. As directed by USEPA, and approved in the EE/CA and work plans, RF&P conducted a CERCLA Removal Action to close the remaining outfalls to Four Mile Run, eliminate the oil/water separator ponds and ditches, and remove sediments from the remaining outfall to the Potomac River from Potomac Greens Sub-Area.

5.1.6 CERCLA Removal Action (1999)

In a letter dated March 25, 1999, USEPA deemed the CERCLA Removal Action complete, with the exception of ongoing quarterly stormwater discharge monitoring activities that were later completed in August 1999. The results of the stormwater discharge monitoring activities indicated that no stormwater discharges occurred from the closed outfalls under the Removal Action to Four Mile Run or the Potomac River, and that the concentrations of site-related COPCs discharging from the remaining permitted outfalls were well below USEPA-approved limits. USEPA declared the Potomac Yard CERCLA site closed in accordance with all applicable regulatory requirements in a letter dated October 20, 1999 (see **Appendix F**).

5.2 VDEQ Corrective Action Plan

Concurrent with the USEPA CERCLA studies and removal actions, petroleum-saturated soils were observed in the subsurface soils and on groundwater at the former Central Operations Area. A Corrective Action Plan (CAP) was prepared to satisfy petroleum cleanup requirements under the regulatory authority of VDEQ in accordance with Virginia UST regulations.

As per the VDEQ approved CAP, an area encompassing approximately 1.23 acres was excavated to an average depth of 12 feet and a total of 35,341 tons of petroleum-impacted soil was transported off site for proper treatment and disposal. Additional site work included removal and disposal of 7,695 gallons of petroleum product and water from groundwater recovery wells, and 400 gallons of petroleum-impacted sludge. The excavation was backfilled with 23,880 cubic yards of available onsite soils. Analytical results of soil samples collected from the limits of the excavation indicated that soil did not exhibit TPH concentrations above the VDEQ approved remedial end point of 4,400 mg/Kg (*Earth Tech*, 2000).

The CAP for the removal of petroleum-saturated soils in the Central Operations Area was completed in December 1999. Regulatory site closure for the Central Operations Area was granted by VDEQ on October 16, 2000 (see

Appendix F). No other areas in Potomac Yard were required by VDEQ to implement corrective action for petroleum-impacted soils.

5.3 Potomac Yard Landbay Environmental Assessment Reports

Following USEPA CERCLA and VDEQ regulatory closure in 1999, Sub-Areas of former Potomac Yard Site (at this time conceptually referred to as "Landbays") were sold and redeveloped, or are currently planned to be redeveloped, into a mixed use development consisting of office, residential, retail, and hotel buildings. As part of Landbay development planning activities, property owners have summarized the environmental conditions, conducted additional voluntary site assessment, and developed site construction management plans to ensure compliance with Virginia solid waste management regulations and City of Alexandria planning requirements. The Potomac Yard Landbay concept development is shown on **Figure 5-1**.

Multiple assessment reports conducted for individual Landbay development are available at the City of Alexandria and/or the VDEQ Voluntary Remediation Program (VRP) office locations, including reports for adjacent Landbay D, Landbay E, and Landbay G, which are in proximity to the Build Alternatives. Based on the conclusions of the Landbay assessments, much of the shallow fill that was used to level the former rail yard appears to have contained petroleum products and/or heavy metals. Cinder ballast, the bottom ash left over from coal burning, was used as fill material throughout large portions of the former Potomac Yard. Cinder ballast was found to contain elevated levels of lead and arsenic. There is no definable pattern to the use of cinder ballast as fill; it was used to fill in holes and depressions along with other fill, resulting in cinder ballast interspersed with other fill material across the site (*ECS*, 2010).

Site management work plans or equivalent plans detailing risk management methods for potential subsurface contaminants encountered during redevelopment were prepared for Landbay D, Landbay E, and Landbay G. The work plans have included recommendations for removal and management of contaminated soils and placement of a clean cap over impacted areas during redevelopment activities. Additional risk mitigation measures and health and safety practices are implemented as needed, to maintain a level of no significant risk and address residual contamination. A brief summary of the Landbay report conclusions and recommendations for Landbay D, Landbay E, and Landbay G are provided below.

5.3.1 Landbay D

A site characterization was conducted at Landbay D in 2011. A total of ten soil borings were advanced across the site to depths of 4 to 20 feet bgs. Soil samples were collected and analyzed for Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO), PCBs, and metals. Soil analysis indicated TPH-DRO greater than 50 mg/kg in six of twenty samples taken. Lead exceeded VDEQ Tier II Risk Based Screening Level (RBSL) for industrial/commercial property reuse in two of twenty samples and silver exceeded this level in ten of twenty samples. One soil boring (B-8), located south of the proposed Metrorail Station Alternative D indicated a Toxicity Characterization Leaching Procedure (TCLP) analysis result of 5.4 mg/L for lead at 4 feet bgs. The TCLP lead result is slightly above USEPA's hazardous soil designation level of 5 mg/L for lead. Perched groundwater conditions were encountered at 4 to 6 feet bgs. The *Site Characterization Report* (SCR) recommended that the ground surface be capped with 2 feet of clean soil surface as a way of encapsulating the contaminated soil to prevent exposure (*ECS*, 2011).

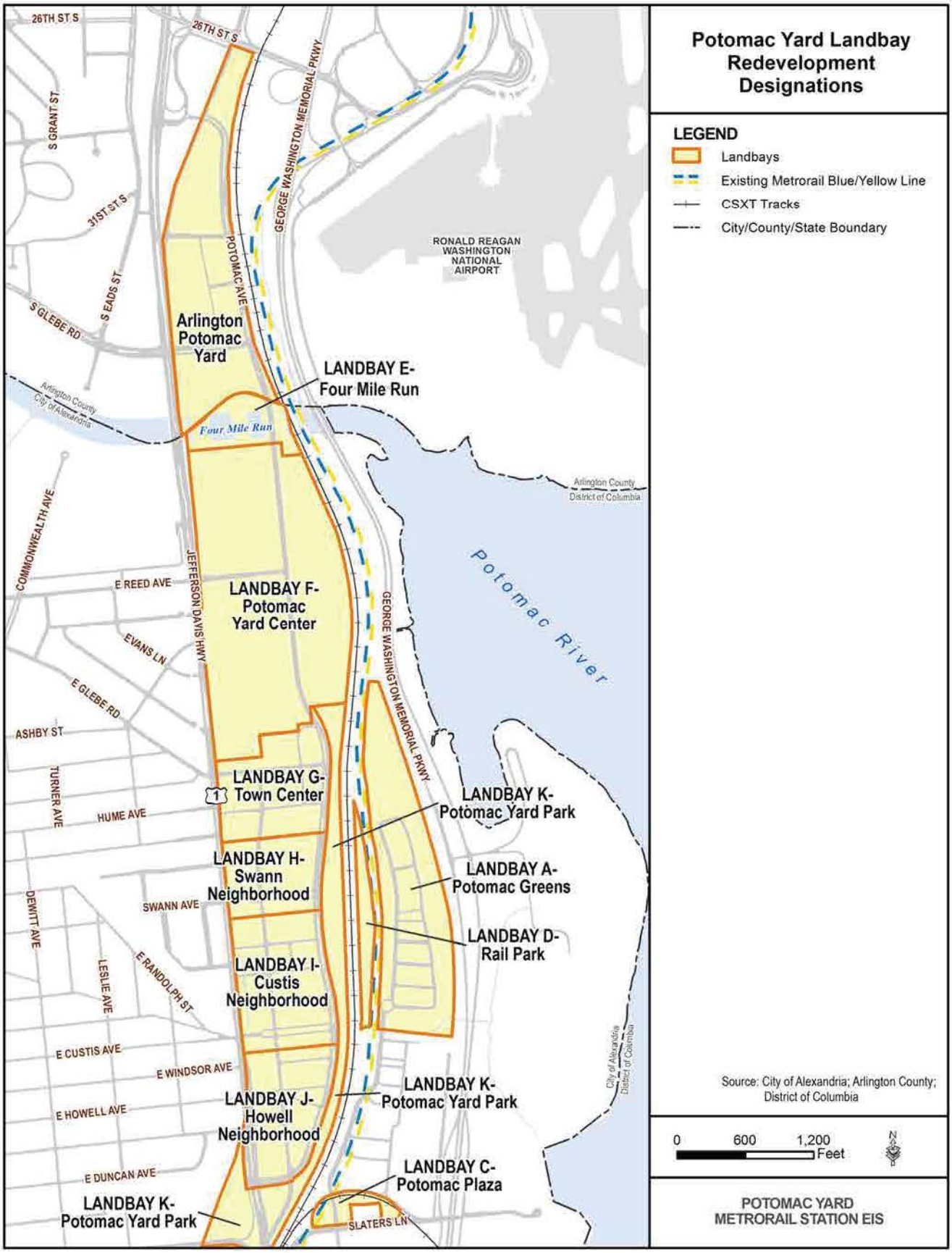
5.3.2 Landbay E

Landbay E consisted of vacant land and three bridges that cross Four Mile Run in the northern portion of the project study area. Four soil borings were conducted at the property for a site characterization in 2011. Soil samples were collected and submitted for TPH-DRO, PCBs, Semi-Volatile Organic Compounds (SVOCs), and metals. Based on the laboratory analysis, multiple SVOCs and silver were detected above the VDEQ Tier II RBSL for commercial/industrial land use in soil samples collected from the upper two feet of soil. The SCR recommended the ground surface be capped with two feet of clean soil as a way of encapsulating the contaminated soil and limiting direct exposure to the contaminated soil.

5.3.3 Landbay G

Landbay G consists of the majority of the former Central Operations Area. The Central Operations Area CAP for the removal of petroleum-saturated soils and petroleum impacted groundwater was completed in December 1999. Regulatory site closure for the Central Operations Area was granted by VDEQ on October 16, 2000 (see **Appendix F**).

Figure 5-1: Potomac Yard Landbay Redevelopment Designations



Two subsurface environmental investigations have been conducted at Landbay G following the VDEQ corrective action described above. The first of these was completed in March 2004 and the second investigation was completed in December 2006. Both of these studies were completed for the proposed redevelopment of Landbay G. The results of these studies are discussed in detail in Section 5.2 of this report and briefly summarized below.

Soil samples from the 2004 and 2006 Landbay G investigations were tested for metals, total petroleum hydrocarbons-gasoline range organics (TPH-GRO), TPH-DRO, VOCs, and PCBs. No metals, PCBs or VOCs were found above USEPA Region III human health RBSLs, with the exception of arsenic, chromium, lead, selenium and naphthalene (ECS, 2010). The TPH-GRO concentrations in soil ranged up to 284 mg/kg and TPH-DRO concentrations ranged up to 18,800 mg/kg. The groundwater sampling conducted at Landbay G in 2004 and 2006 detected TPH-DRO concentrations up to 1,880 mg/L and TPH-GRO concentrations up to 12.5 mg/L (ECS, 2010).

A Remedial Action Plan, dated October 18, 2011, was developed for the property and submitted to the Virginia VRP for approval. The concepts proposed for risk mitigation at Landbay G include groundwater use restriction, a two-foot clean soil cap or paved cover, over-excavated utility corridors, a soil management plan, a construction worker health and safety plan, and a vapor intrusion study and/or vapor mitigation plan. Each of these options is to be applied as necessary at Landbay G.

Appendix G contains a report log of over 250 environmental assessment reports or remediation documents which were obtained from the USEPA Administrative Record, the VDEQ, and from the City of Alexandria. Table 5-1 lists ten of the more relevant or extensive documents that have been discussed above and are frequently referenced to describe the site regulatory history. All of the documents used in this report are referenced in Section 12.

5.4 Summary of Former and Potential RECs

This section describes former RECs which may potentially be within the study area. These RECs were identified from the prior remedial activities completed for the regulatory requirements of USEPA, VDEQ or City of Alexandria described in the previous section. RECs are shown in **Figure 5-2**.

5.4.1 Ballast

Based upon multiple environmental assessment reports conducted across the former Potomac Yard, much of the shallow fill used to level the rail yard appears to have been cinder ballast which potentially contained elevated levels of petroleum products and/or elevated concentrations of metals. Cinder ballast, the bottom ash left over from coal burning, was used as fill material throughout large portions of the former Potomac Yard. Cinder ballast commonly contains elevated levels of arsenic, lead, and copper. The distribution of cinder ballast as fill is not present in a definable pattern; the cinder ballast was used to fill in holes and depressions along with other fill, resulting in ballast interspersed with other types of fill across the site.

Contaminants found in the ballast fill are as follows:

- Concentrations of metals in previous laboratory analysis of cinder ballast vary widely over the site. The metals most commonly associated with cinder ballast, based on the 1995 ECS report were: arsenic (average concentration of 369 mg/kg; lead (average concentration of 210 mg/kg); and copper (average concentration of 112 mg/kg).
- Polynuclear aromatic hydrocarbon (PAH) average concentrations in cinder ballast ranged from 0.410 to 1.675 mg/kg. PCBs were also detected in cinder ballast and soil samples.
- The PCB “Aroclor 1260” was detected in 15 percent of soil samples at an average concentration of 0.278 mg/kg.
- Several common pesticides were detected sporadically. The most common pesticide detected was dichlorodiphenyltrichloroethane (DDT) (11 percent of soil samples) at an average concentration of 0.047 mg/kg.
- 21 VOCs were detected in soil samples. The most wide-spread volatile organic contaminant (VOC) was chloroform, found in 15 percent of soil samples, at an average concentration of 0.0036 mg/kg. Only trichloroethylene (TCE), found in 4 percent of soil samples, exceeded 1 mg/kg in any sample, with a maximum concentration of 3.510 mg/kg detected at the Central Operations Area refueling area.
- Petroleum hydrocarbons, primarily diesel fuel, were found in 101 of 318 soil and ballast samples throughout the former Potomac Yard. The highest concentration detected (12,600 mg/kg) was found in the Central Operations Area refueling area, where petroleum-saturated soils were identified and later removed under VDEQ direction.

5.4.2 Former Oil/Water Separator Ponds

Three former oil/water separator ponds were located in the north, middle, and south portions of Potomac Greens Sub-Area and collected surface water containing grease and spilled fuel oil from refueling and maintenance operations in the Central Operations Area, North Yard, and South Yard areas. During 1977 and 1978, the three ponds were moved slightly from their original locations, from east to west, to clear a path for the Metrorail Blue/Yellow Line (*ETI*, 1995 **Figure 5-2**). The original oil/water separator ponds were then filled with soil and fly ash (ETI, 1995).

During 1993, the three ponds were removed from Potomac Greens Sub-Area under direction of the USEPA-approved EE/CA and *Removal Response Action Plan*. The soil beneath the ponds was excavated until the concentration of TPH in the underlying soil was less than 100 mg/kg. Contaminated soil and pond sludge was then properly disposed offsite. The areas once occupied by the ponds were subsequently refilled with clean soil and seeded. The locations of the three former ponds are shown on **Figure 5-2**.

5.4.3 Potential Fly Ash Area

According to previous geotechnical investigations (*Dames and Moore*, 1986) and the 1995 ECS, a potential widespread layer of fly ash 5 to 20 feet thick was deposited throughout the Potomac Greens Sub-Area between the mid-1950s and 1963. In 1962 and 1963, additional fly ash was potentially deposited in an area approximately 150 feet north of a Dredge Spoils Area (1995 *ECS*, **Figure 5-2**). This Fly Ash Disposal Area was approximately 117 square feet (270 feet by 435 feet) and was covered by 6 inches to 1 foot of topsoil and by vegetation. Based on the ECS results, boring logs (*Dames and Moore*, 1986) and historical aerial photographs (**Appendix D**), the potential limits of fly ash within the Site is shown on **Figure 5-2**.

The previous fly ash analysis results, presented in the 1995 *ECS*, indicate all metals analyzed for by the laboratory contained detectable concentrations. The metals arsenic, lead, and copper were detected most frequently. Arsenic was detected at an average concentration of 106 mg/kg, lead was detected at an average concentration of 34 mg/kg, and copper was detected at an average concentration of 70 mg/kg.

Soil borings completed for the 2011 Landbay D SCR, within the potential fly ash disposal area measured soil concentrations of TPH-DRO greater than 50 mg/kg, with silver and lead above the VDEQ Tier II RBSL for industrial/commercial property reuse. One soil boring (B-8), located south of Alternative D indicated a TCLP analysis result of 5.4 mg/L for lead at 4 feet bgs. The TCLP lead result is slightly above EPA's hazardous soil designation level of 5 mg/L for lead (*ECS*, 2011a).

Central Operations Area

As part of the VDEQ approved CAP for petroleum contamination at the Central Operations Area, a total of 35,342 tons of petroleum-impacted soil was excavated and transported off site for treatment and disposal in 1999. Additional site work included removal and disposal of 7,695 gallons of petroleum product and water from groundwater recovery wells, and 400 gallons of petroleum-impacted sludge. Post-excavation analytical results of soil samples collected from the limits of the CAP excavation indicated soil did not exhibit TPH concentrations above the VDEQ approved remedial end point of 4,400 mg/kg (*Earth Tech*, 2000). The approximate area of former petroleum-impacted soil is shown on **Figure 5-2**.

The CAP for the removal of petroleum-saturated soils and petroleum impacted groundwater in the Central Operations Area of Potomac Yard was completed in December 1999. Regulatory site closure for the Central Operations Area was granted by the VDEQ on October 16, 2000 (see **Appendix F**). No other areas in Potomac Yard were required by the VDEQ to implement corrective action for petroleum-impacted soils.

Two subsurface environmental investigations have been conducted at the Central Operations Area following the VDEQ corrective action described above. The first of these was completed at Landbay G in March 2004 and the second investigation at Landbay G was completed in December 2006. The 2006 investigation was completed to determine the vertical extent of contamination detected during the 2004 investigation. Both of these studies were completed for the proposed redevelopment of Landbay G. A brief summary of these studies is provided below as abstracted from a 2010 SCR for Landbay G (*ECS*, 2010).

Soil samples from the 2004 and 2006 Landbay G investigations were tested for metals, TPH-GRO, TPH-DRO, VOCs, and PCBs. No metals, PCBs or VOCs were found above USEPA Region III human health risk based screening level standards, with the exception of arsenic, chromium, lead, selenium and naphthalene (ECS, 2010). The detected arsenic levels in soil were elevated up to 479 mg/kg. The former studies concluded that elevated

arsenic concentrations at the Potomac Yard property are typically associated with ballast material, and it is likely that arsenic was derived from ballast material that was used as fill at Landbay G. The TPH-GRO concentrations in the Landbay G soil samples ranged up to 284 mg/kg and TPH-DRO concentrations ranged up to 18,800 mg/kg (*ECS*, 2010).

Based on the laboratory results from the previous 2004 study, and subsurface conditions observed during drilling of the supplemental 2006 soil borings, materials above 9 feet in depth were assumed to be contaminated to some degree. Of the ten samples collected from 9 to 12 feet bgs, only one, GP-5, contained TPH above detection limits. All samples from 20 to 40 feet bgs contained no detectable TPH contamination (*ECS*, 2010).

5.4.4 Groundwater

The 1995 *ECS* detected sporadic contaminants in the ground water, with little correlation between contaminants detected in upgradient wells and those detected in nearby downgradient wells at the site. There were two exceptions: a groundwater plume of petroleum saturation in the former refueling area of the Central Operations Area, and an area containing TCE, a VOC, with concentrations ranging from 140 micrograms per liter (µg/L) to 3,400 µg/L, also at the former Central Operations Area refueling area.

The historic 1995 ECS investigation measured groundwater metal concentrations that are most strongly associated with cinder ballast, arsenic, copper, and lead. The site-wide average groundwater concentrations were 218 µg/L for arsenic, 206 µg/L for lead, and 204 µg/L for copper.

More recent groundwater sampling conducted at Landbay G in 2004 and 2006 detected TPH-DRO concentrations up to 1,880 mg/L and TPH-DRO concentrations up to 12.5 mgL. The direction of groundwater flow from Landbay G is east, toward the Potomac River.

6.0 EXISTING CONDITIONS

6.1 Landbay and Developer Commitments

Former RECs within Potomac Yard have either been remediated in accordance with USEPA or VDEQ approvals or have been mitigated by risk management methods during subsequent redevelopment. Risk management methods of contaminants encountered during redevelopment activities have included removal of contaminated soils and the implementation of risk mitigation measures.

Risk mitigation measures, such as soil management and construction health and safety practices are implemented by Landbay developers, as needed, during redevelopment activities to maintain a level of no significant risk to site workers and address residual contamination. Site Management Work Plans or equivalent plans have been requested by the City of Alexandria in recent Landbay redevelopment to document such measures. The level of mitigation and remediation which could be required for the project is dependent upon the degree of potential contamination, how it relates to redevelopment, human and environmental risk factors, and exposure pathways.

Prior Site Management Work Plans have included following elements: construction worker health and safety plans, soil excavation management, dust control, construction dewatering plans, clean cap over contaminants left in place, vapor barrier or mitigation measures, subsurface use and ventilation, over excavation of subsurface utilities in impacted soils, and groundwater use restrictions.

Deed restrictions on land use, such as a prohibition on installation of water wells, have also been requested at redeveloped landbays.

6.2 Former Potential Areas of Concern Current Status

6.2.1 Ballast

Much of the ballast material at the former Potomac Yard has been removed from areas no longer occupied by track during on-going redevelopment activities. However, ballast can still be sporadically encountered in previously undisturbed areas and/or at undisturbed depths. Ballast at the former Potomac Yard can commonly contain elevated levels of arsenic, lead, and copper, and is a potential REC. Based on previous studies conducted across the Potomac Yard, the ballast is usually encountered within the top 12 feet bgs (*ECS*, 2010).

6.2.2 Former Oil/Water Separator Ponds

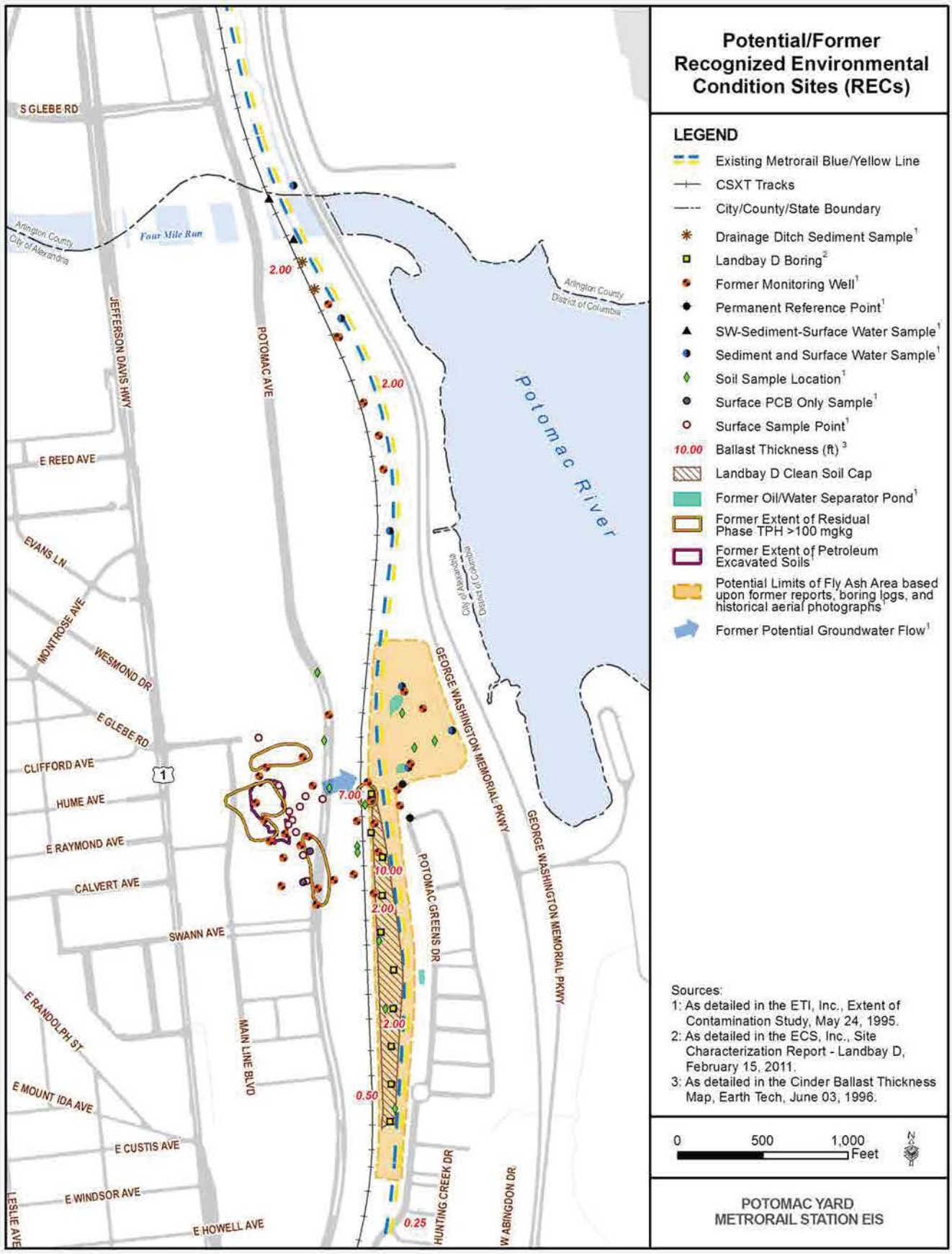
The three former oil/water separator ponds in the Potomac Greens area were excavated and backfilled in 1993. As discussed in Section 5.4.2, the oil/water separator ponds historically collected surface water containing grease and spilled fuel oil from refueling and maintenance operations at the former Potomac Yard Central Operations Area. There is potential for residual petroleum impacted soil and groundwater to remain in undisturbed subsurface areas at and near the former oil/water separator pond locations.

6.2.3 Potential Fly Ash Areas

Based on the 1995 *ECS* results, previous geotechnical boring logs (*Dames and Moore*, 1986), and historical aerial photographs (**Appendix D**), the potential limits of fly ash within the Site are shown in **Figure 6-1**.

Previous laboratory analysis of fly ash from the study area detected arsenic at an average concentration of 106 mg/kg, lead was detected at an average concentration of 34 mg/kg, and copper was detected at an average concentration of 70 mg/kg (*ETI*, 1995). A recent soil boring conducted south of Build Alternative D within the extent of fly ash, indicated a TCLP result of 5.4 mg/L for lead at 4 feet bgs. The TCLP lead result is slightly above USEPA's hazardous soil designation level of 5 mg/L for lead (*ECS*, 2011a).

Figure 6-1: Potential/Former Recognized Environmental Condition Sites (RECs)



6.2.4 Former Central Operating Area Petroleum Hydrocarbons

The VDEQ approved CAP for the removal of petroleum-saturated soils and petroleum impacted groundwater in the Central Operations Area of Potomac Yard was completed in December 1999. Regulatory site closure for the Central Operations Area was granted by VDEQ on October 16, 2000 (see **Appendix F**).

Based on the elevated levels of petroleum, TPH and metals identified in soils and groundwater during Landbay G (former Central Operations Area) environmental site assessment in 2004 and 2006, Landbay G was entered into the Virginia VRP and was assigned VRP Site Number 00548. A *Response Action Plan* (RAP) that details risk mitigation management methods during future construction at Landbay G was submitted and approved by the VDEQ in 2009 (ECS, 2009).

Landbay G is currently undeveloped. The property contains a large stockpile of soil imported from the northern portion of the former Potomac Yard. As approved by the VRP program, the soils in the stockpile are being treated with lime and spread out on various portions of Landbay G property. There are currently no buildings or permanent structures on Landbay G (ECS, 2010).

The former Central Operations Area (Landbay G) is potentially hydraulically up-gradient of Build Alternative B, and to a lesser extent the features of Build Alternative A and Build Alternative D (e.g., pedestrian bridge structures). There is potential for contamination to remain and/or to have migrated toward the Build Alternative locations.

6.3 Groundwater

Site-wide groundwater data from the 1995 ECS indicates contaminants were detected sporadically in ground water, with little correlation between chemicals detected in up-gradient wells and those detected in nearby down-gradient wells at the site. The 1995 ECS investigation focused groundwater analysis on the metals most commonly associated with ballast; arsenic, copper, and lead. The site-wide average groundwater concentrations were 218 µg/L for arsenic, 206 µg/L for lead, and 204 µg/L for copper (*ETI*, 1995).

Recent groundwater sampling conducted at Landbay G in 2004 and 2006 detected concentrations of 1,880 mg/L TPH-DRO and 12.5 mg/L of TPH-DRO respectively (*ECS*, 2010). The historic reported direction of groundwater flow from the former Central Operations Area (Landbay G) is to the east, towards the approximate locations of Build Alternatives A, B, and D.

6.4 Potential Data Gaps

Regulatory contacts at VDEQ and the City of Alexandria Office of Environmental Quality have assisted with the Draft EIS process by providing background information and available environmental assessment reports for Potomac Yard. However, environmental assessment, site characterization, and risk mitigation assessment prior to redevelopment at individual landbays at Potomac Yard is ongoing. Recent or future environmental data reported for an individual Landbay in proximity of the Metrorail project boundary may not have been available at the time of this report.

Potential data gaps could possibly be created by future refinement of the Build Alternative locations and proposed construction techniques. For example, the potential extent of excavation of unsuitable soils prescribed by future geotechnical borings, the extent of fill required, or use of alternative foundation methods may affect the magnitude of potential construction effects of hazardous materials at the project site.

7.0 POTENTIAL EFFECTS

7.1 Permanent Effects

7.1.1 No Build Alternative

The No Build Alternative would have no permanent effects. The No Build Alternative would not disturb potential residual contaminants at RECs. The potential residual contaminants at RECs under current land use conditions do not represent a human health or ecological risk and would remain in place until addressed in the future redevelopment at Potomac Yard.

7.1.2 Build Alternatives

RECs within the limits of disturbance or limits of construction of each Build Alternative are shown in **Figure 7-1** (Build Alternative A), **Figure 7-2** (Build Alternative B), and **Figures 7-3 to 7-5** (Build Alternative D).

7.1.3 Build Alternative A

Build Alternative A would not result in long-term or permanent adverse effects related to RECs identified within the study area due to risk mitigation and engineering controls and measures that would be undertaken.

Build Alternative A and portions of the track alignment may be constructed on soils and fill material with contaminated ballast and fly ash material documented by prior environmental investigations. In addition, Alternative A has the potential to encounter migrated or residual contamination in soil and groundwater from the former Central Operations Area. Potential effects to these RECs would be due to temporary construction activities (discussed in more detail in Section 7.2) and would not be considered permanent impacts.

Major fill or excavation is not anticipated to be required for the construction of this alternative, as the Metrorail tracks would follow their existing alignment and the platforms would be built at-grade. Drilled shafts or driven piles would be used as structural foundations for the station and pedestrian bridge structures. All soil and fill material excavated at the site would be properly disposed off-site and replaced with clean fill.

No significant below-grade structures at this time are proposed for Build Alternative A. Subsurface features would be limited to underground utilities, vaults, or shallow excavations needed to facilitate the installation of the drilled shafts or driven piles. Therefore, little to no dewatering of construction excavations would be anticipated for Build Alternative A.

7.1.4 Build Alternative B

Build Alternative B would not result in long-term or permanent adverse effects related to RECs identified within the study area due to risk mitigation and engineering controls and measures that would be undertaken.

The limits of disturbance and limits of construction for Build Alternative B may cover identified RECs such as the fly ash areas, former oil/water separator ponds, ballast material, and potential residual contamination in soil and groundwater migrated from the former Central Operations Area. Potential effects to these RECs would be due to temporary construction activities (discussed in more detail in Section 7.2) and would not be considered permanent impacts.

Approximately 1,400 linear feet of fill would be required for the Alternative B track alignment and station platforms. The vertical depth of fill required to accommodate the 600-foot station platform ranges from 8 to 16 feet due to existing topographical elevation and a gradual change in slope of the realigned track. Drilled shafts or driven piles would be used as the structural foundations for the station, pedestrian bridge and retaining wall structures. The vertical depth of fill required to accommodate the realigned track ranges from 1 to 15 feet. All soil and fill material required to be excavated at the site would be properly disposed off-site and replaced with clean fill. This clean fill would come from off-site resources and would include soils that are conducive to track functions and load-bearing specifications.

No below-grade structures are proposed for Build Alternative B at this time. New subsurface features would be limited to underground utilities, vaults, or shallow excavations for piles. For the most part, these features would be contained to the clean fill needed to accommodate the station platform and required track.

7.1.5 Build Alternative D

Build Alternative D would not result in long-term or permanent adverse effects related to RECs identified within the study area due to risk mitigation and engineering controls and measures that would be undertaken.

No significant below-grade structures are proposed, and major excavation is not required for Alternative D, which would be built upon aerial structures. Piers or bents that would be constructed for Alternative D would be built on drilled shafts or driven piles.

Realigned and new track for Build Alternative D would be built on aerial structures and retained fill. RECs within the limits of disturbance include locations of fly ash, ballast material, and potential residual contamination in soil and groundwater migrated from the former Central Operations Area primarily towards the southern end of the platform and any pedestrian access ways. Potential effects to these RECs would be due to temporary construction activities (discussed in more detail in Section 7.2) and would not be considered permanent impacts.

No below-grade structures at this time are proposed for Build Alternative D. Subsurface features would be limited to underground utilities, vaults, or shallow excavations needed for piles or piers. Soil disturbance can be lessened at the potential RECs if driven piles, shafts, or sheeting can be used rather than drilled shafts to accommodate any excavations.

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Figure 7-1: Build Alternative A Potential/Former Recognized Environmental Condition Sites (RECs)

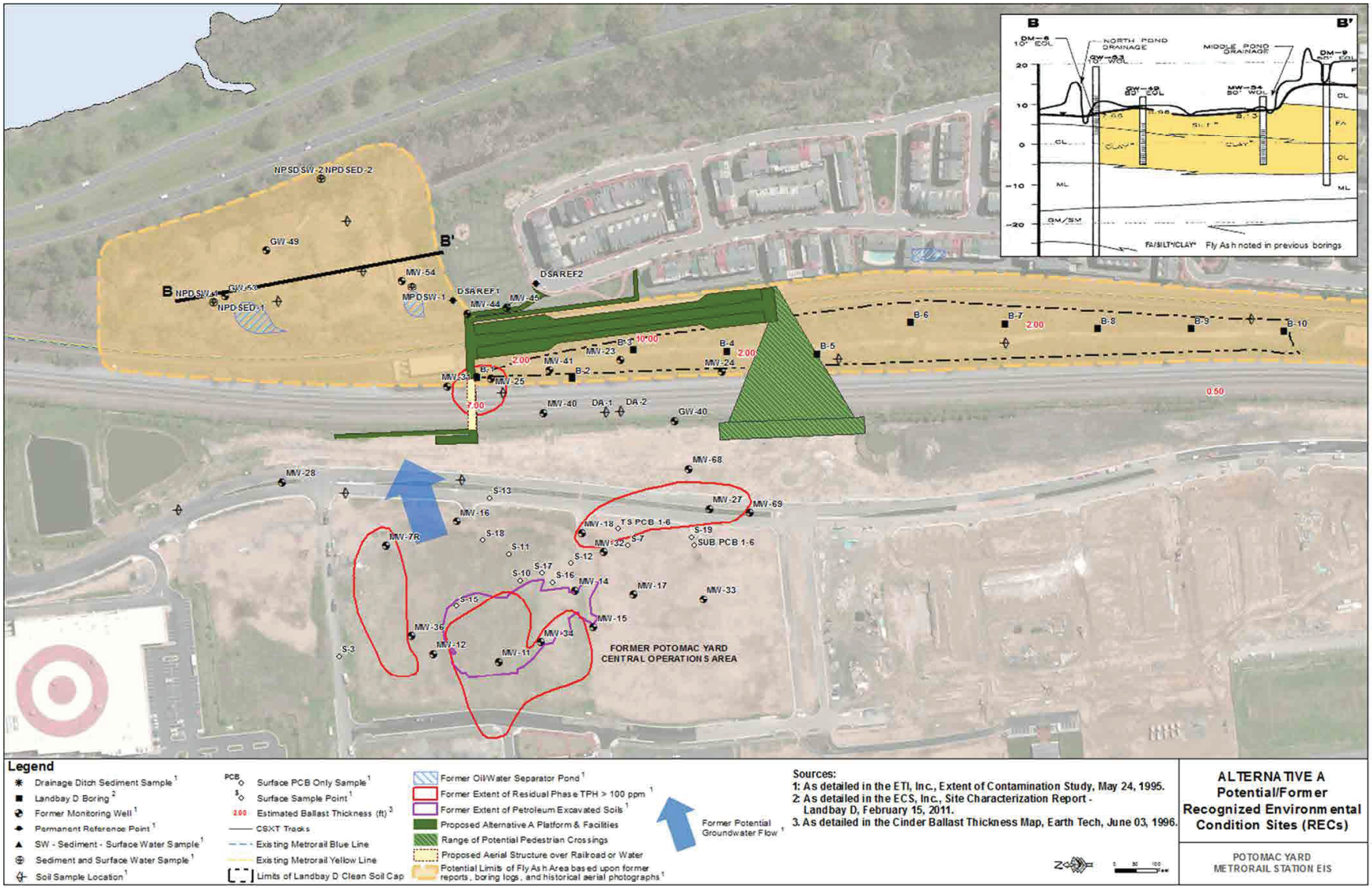


Figure 7-2: Build Alternative B Potential/Former Recognized Environmental Condition Sites (RECs)

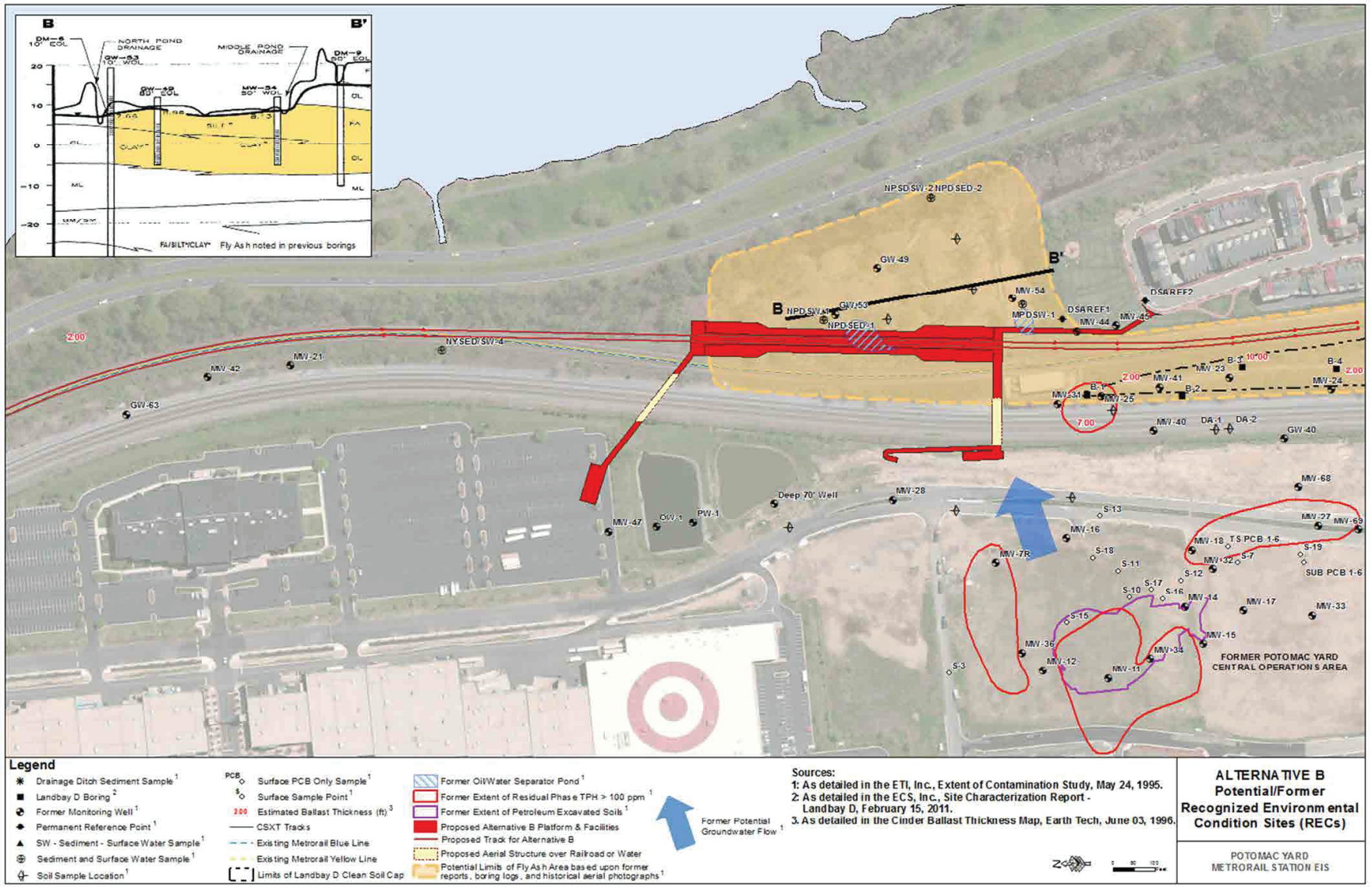


Figure 7-3: Build Alternative D Potential/Former Recognized Environmental Condition Sites (RECs) – North

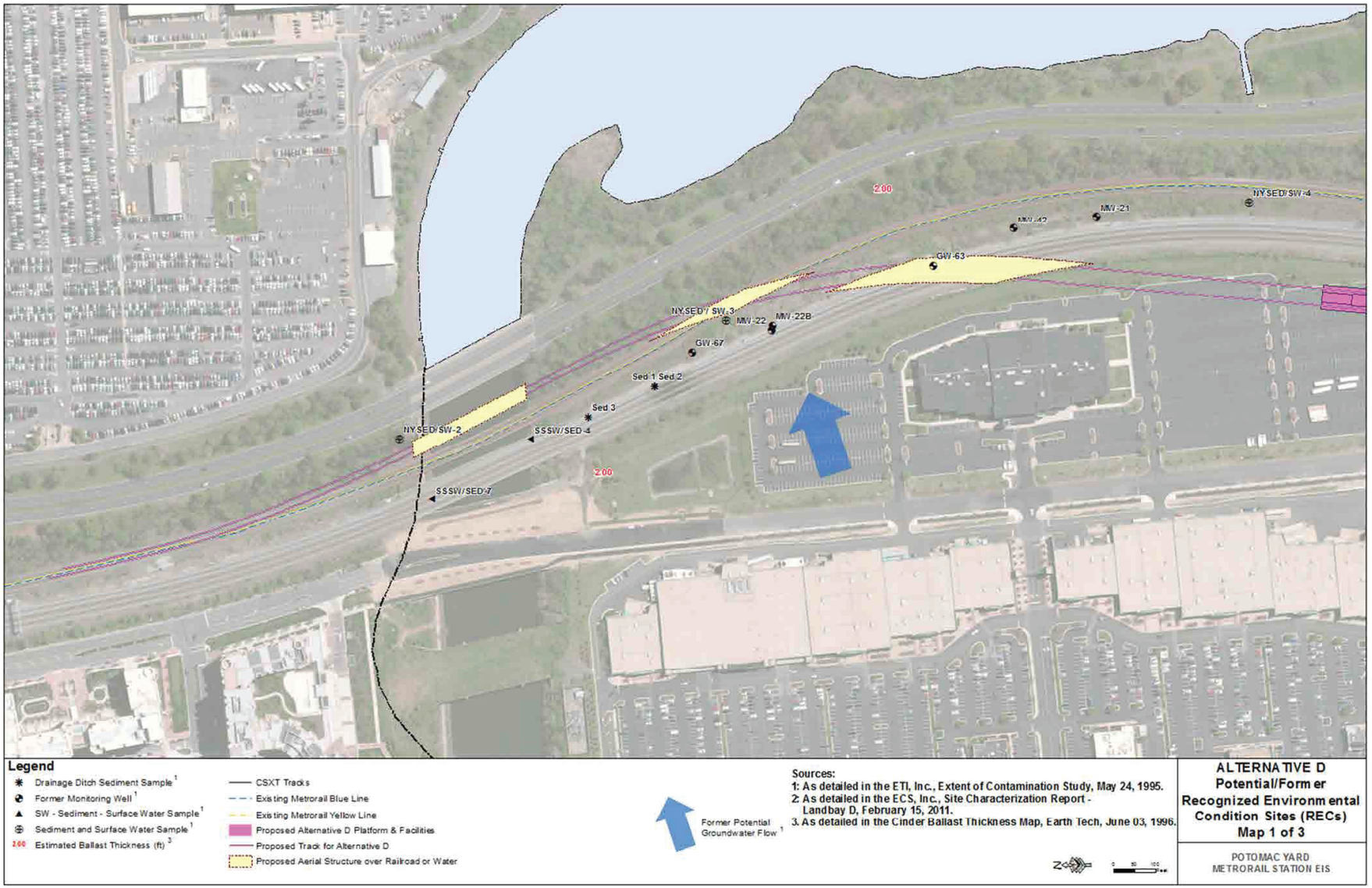


Figure 7-4: Build Alternative D Potential/Former Recognized Environmental Condition Sites (RECs) – Middle

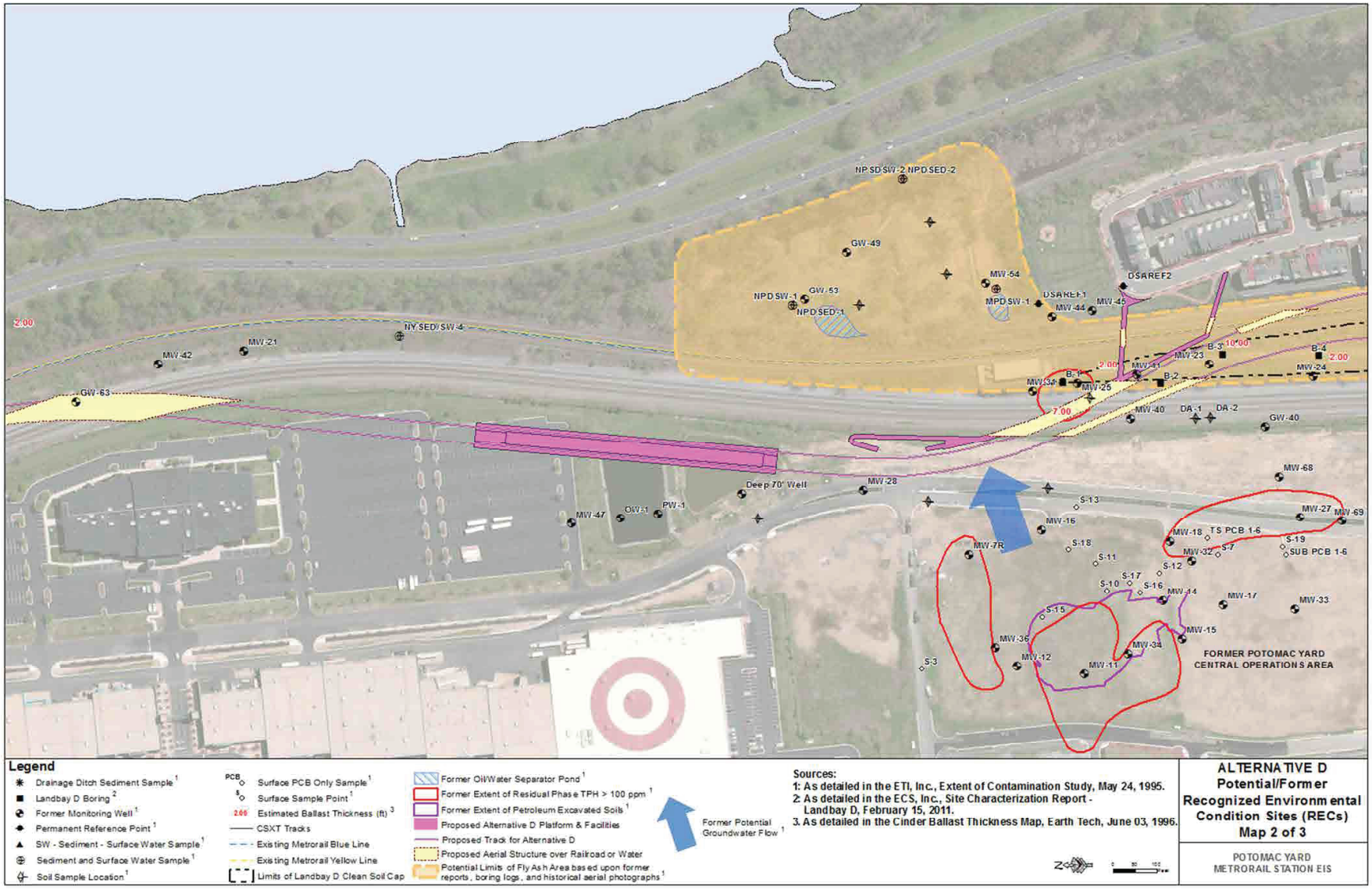
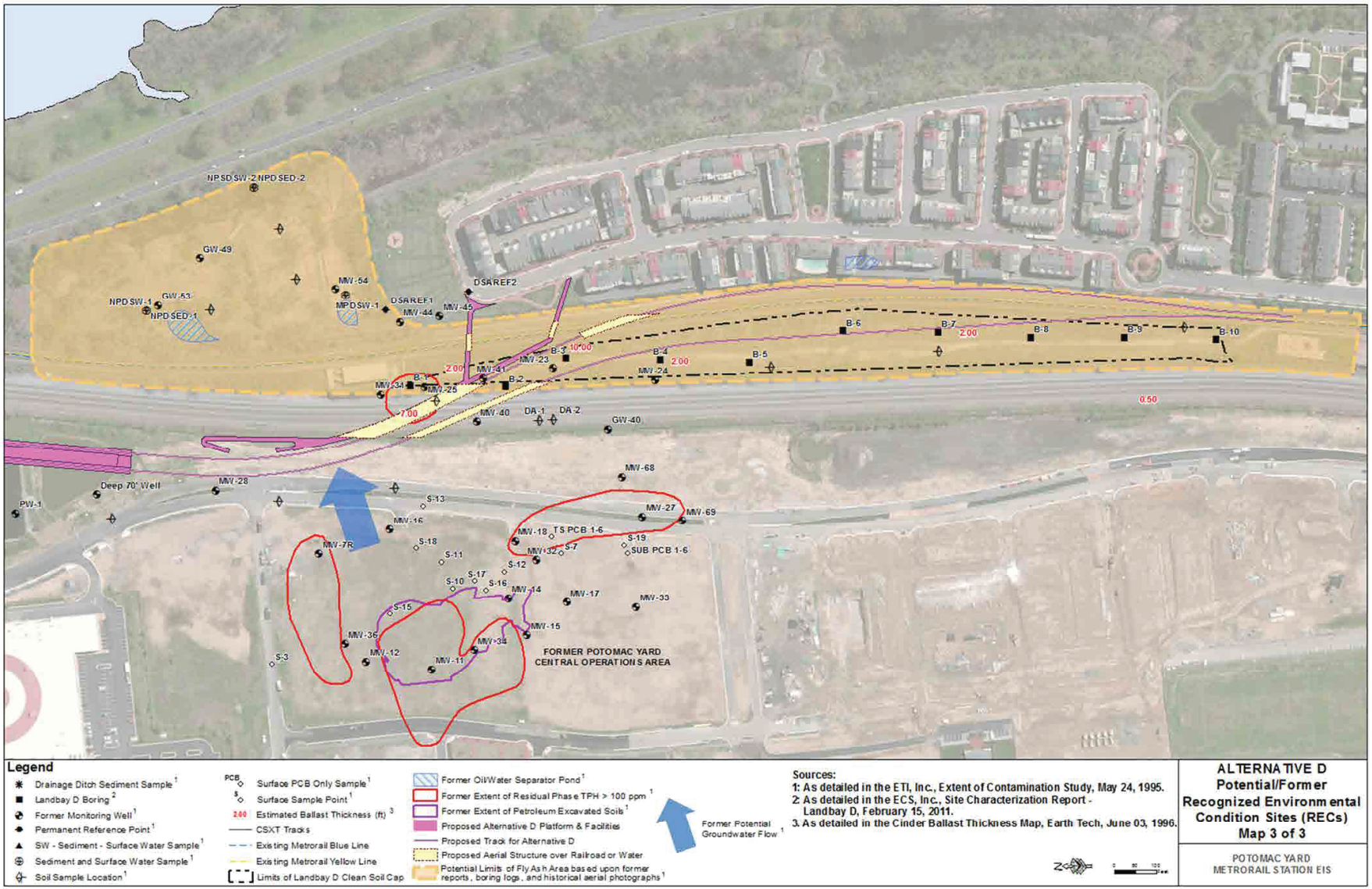


Figure 7-5: Build Alternative D Potential/Former Recognized Environmental Condition Sites (RECs) – South



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7.2 Temporary Construction Effects

RECs are most likely to be encountered during construction activities associated with the Build Alternatives. Temporary impacts from RECs may result from the following types of construction activities:

- Grading for the tracks;
- Clearing, grubbing, and grading for the station facilities and pedestrian bridges;
- Construction of new embankments for track;
- Construction of piers or bents for aerial sections of track and platforms;
- Drilling shafts and driving piles for structural foundations, and
- Fill activities.

Two of the construction effects, contaminated soil excavation and disposal, and contaminated groundwater dewatering during construction, are further discussed below.

7.2.1 Contaminated Soil Excavation and Disposal

RECs in subsurface soil consisting of fly ash, TPH and petroleum-impacted soils, and ballast material, have been identified within the limits of disturbance or construction for Build Alternative A, Build Alternative B, and to a lesser extent at Build Alternative D. Residual oil may also be present in subsurface soil at the former Oil/Water separator Ponds at Alternative B. If subsurface soil containing RECs is excavated, waste characterization sampling must be performed as discussed below.

Waste characterization sampling of excavated contaminated materials for disposal purposes will need to be performed including a toxicity characteristic leachate procedure (TCLP) to determine if the materials would be considered hazardous. All waste characterization sampling must be completed prior to any off-site shipment of material and meet the requirements of the intended licensed disposal facility. All excavated soil containing RECs must be managed on-site, sampled, manifested, and transported and disposed according to Virginia solid waste management regulations as detailed in site work plans or equivalent site plans.

7.2.2 7.2.3 Contaminated Groundwater Dewatering

Based on previous CERCLA, VDEQ, and Landbay environmental assessment reports at Potomac Yard, the shallow groundwater encountered during construction is likely contaminated with residual levels of TPH, VOCs, SVOCs and metals. The groundwater depth should be evaluated during the project design phase to identify the necessity of dewatering, groundwater control requirements if dewatering is required, and disposal requirements of contaminated groundwater. The groundwater will need to be retained and will require sampling, waste characterization, pretreatment and a temporary permit for on-site discharge or discharge to the local sanitary sewer system depending upon the volume or concentrations of contaminants.

8.0 POTENTIAL MITIGATION AND REMEDIAL OPTIONS

8.1 Proposed Designs and Construction Techniques

No large-scale below-grade structures are proposed, and significant volumes of soil from excavation are not anticipated for any of the build alternatives. The majority of each of the station structures would be constructed upon drilled shafts or driven piles. The majority of the subsurface features are anticipated to be contained to underground utilities, vaults, and other shallow excavations needed to facilitate the installation of piles, piers or bents.

Soil disturbance would be further lessened at the potential RECs by use of driven piles, shafts, or sheeting that can be used rather than drilled shafts to accommodate any excavations. These best management practices and construction mitigation methods are intended to lessen impacts from contaminated materials wherever possible.

8.2 Best Management Practices and Mitigation

This section describes Best Management Practices (BMP) and remedial options that could be used to mitigate risks posed by potential residual contamination at RECs if encountered during construction of the project.

These BMP and mitigation strategies and techniques are typically compiled into a Site Management Work Plan or equivalent document prior to construction. Elements of the Site Management Work Plan typically include:

- Soil Management Plan
- Construction Worker Health and Safety Plan
- Plans for clean capping of impacted soil
- Construction dewatering plans
- Plans for over excavation of utilities in impacted soils, and
- Vapor mitigation evaluation

8.2.1 Site Management Work Plan

A Site Management Work Plan (or equivalent site plans) describes temporary measures to mitigate potential risks from contaminants to construction workers and the environment. The Plan is developed prior to construction and may include the following elements based on other Site Management Work Plans developed for adjacent landbays:

- Construction worker health and safety – The RA approved by the USEPA in 1995 concluded that development activities would not pose elevated risks to human health. However, potential exposure to chemical constituents (i.e., arsenic and lead) in soil materials may occur through direct contact with soils at RECs or inhalation of dust particles (Weinberg Consulting Group, 1995). Therefore, construction worker protective measures may be required to ensure compliance with Occupational Safety and Health Administration (OSHA) regulations during construction activities.

- Contaminated soil excavation and disposal – As defined in the Site Management Work Plan or equivalent, the site engineer will monitor excavation of site soils during excavations in RECs and segregate and properly manifest soils indicative of ballast, fly ash, and petroleum contamination.

- Dust control measures – Dust inhalation exposure will not be likely to occur after final development and the cessation of earthmoving activities. Construction workers' exposure to dust may occur during excavation and earthmoving activities. The 1995 RA does not predict adverse health effects from dust. However, engineering controls and work practices may be implemented to minimize potential exposure of construction workers to particulate emissions. A limited dust monitoring program may be used during a portion of earthwork activities to confirm the 1995 RA conclusion of no adverse effect.

- Construction dewatering – Prior to discharging water from the site, contaminant reduction may be instituted, if necessary, based on site conditions and permit requirements. All appropriate discharge permits should be obtained prior to dewatering or discharge from the site.

- Clean capping of contaminants left in place – To mitigate risk to users of the developed property, a final grade may include a two-foot clean soil cap or an impervious hardscape cover to encapsulate contaminated material left in place, if necessary, after excavation is complete.

- Vapor barrier or mitigation measures evaluation – Previous environmental analysis has indicated that VOC contaminants in soil and groundwater resulting in potential indoor air issues are not elevated or widespread. However, during previous Landbay development plans at Potomac Yard, the City of Alexandria has requested that each building structure require vapor barrier and sub-grade ventilation unless the need for these measures is evaluated and determined to be unnecessary by a professional engineer (ECC, 2011).

- Over excavation of subsurface utilities in impacted soils – To mitigate potential future exposure to utility construction workers, planned utility corridors in contaminated soil at landbays in Potomac Yard have been planned to be over-excavated two feet beyond the extent of a typical excavation for the type and size of utility to be installed (ECC, 2011).

- Land use restrictions – To mitigate risk of groundwater ingestion, contact, or use of contaminated groundwater, previous Landbay development at Potomac Yard has included plans for a deed restriction precluding use of groundwater from the site for potable purposes.

8.2.2 Voluntary Remediation Program

The VDEQ Voluntary Remediation Program (VRP) is an alternative and voluntary remedial option program to document mitigation measures. The VRP is a streamlined mechanism for site owners or developers to voluntarily address contamination at sites with concurrence from the VDEQ. When the mitigation measures are satisfactorily completed, VDEQ issues a "certification of satisfactory completion of remediation". This certification provides assurance that the remediated site would not later become the subject of a VDEQ enforcement action unless new issues are discovered. Potential regulatory requirements and coordination is discussed in Section 9.

8.2.3 Other

Other BMPs would be used on the construction site, such as pollution control devices, development of spill prevention programs, installation and maintenance of runoff diversion and secondary containment structures. The BMPs and sediment and erosion control plans would be prepared and submitted with site plans to the City of Alexandria and Arlington County.

The potential chemicals of concern, construction impacts, best management practices (BMPs) and potential mitigation measures for Build Alternatives A, B and D are summarized in **Table 8-1, Table 8-2** and **Table 8-3** respectively.

Table 8-1: Alternative A Impact, Best Management Practice and Mitigation Summary

Potential/ Former REC	Potential Chemicals of Concern	Potential Construction Impacts	Potential BMP or Mitigation
Residual Fly Ash Area	Elevated concentrations of metals were detected in previous fly ash analysis immediately north of the Potomac Greens (ETI, 1995). Arsenic detected at an average concentration of 106 mg/kg, lead at 34 mg/kg, and copper at 70 mg/kg. Soil samples obtained as part of the adjacent Landbay D Site Characterization in 2011 (ECS, 2011) indicate TPH-DRO greater than 50 mg/kg, silver, and lead above VDEQ Tier II Risk based screening level (RBSL) for industrial/commercial property re-use. One soil sample from Landbay D (B-8) had a Lead TCLP analysis result of 5.4 mg/L, slightly above the USEPA's hazardous soil designation.	Potential to encounter fly ash at the proposed station platform, tracks, and to a lesser extent at the pedestrian footbridge primarily with the advancement of piles, footers, and utilities. However, significant amount of fill or soil excavation is not anticipated to be required, as the Metrorail tracks would follow their existing alignment and the platforms would be built at-grade. Drilled shafts or driven piles would be used as foundations for the station and pedestrian bridge structures.	A Site Management Work Plan to avoid and minimize risks from potential contaminants to construction workers and the environment may be developed to document and maintain no significant risk status during construction. Site Management Work Plan or equivalent site plan components may include an Environmental Health and Safety Plan, Soil Excavation and Disposal, Utility Clean Corridor Preparation, Dust Control, Construction Dewatering, Clean Fill and Surface Soil Cap, Vapor barrier or mitigation measures, subsurface use and ventilation, groundwater use restrictions, and post remedial actions.1
Former Potomac Yard Central Operations Sub-Area Former TPH and Free Product	Levels of up to 11 feet of free product were formerly located at the former Potomac Yard Central Operations Sub-Area, along with elevated levels of TPH. Given the former potential groundwater flow direction, any residual contaminants that remain in this area had the potential to migrate eastward towards the project area. Recent Landbay G (former Central Operations Area) SCR reports indicate elevated TPH and metals remain in soils and groundwater at this adjacent property.	Potential to encounter migrated/residual contamination from the former Central Operations Area at or near the northernmost pedestrian footbridge "head house" and to a lesser extent the northern portion of the Station Platform. However, significant amounts of fill or soil excavation is not anticipated	
Former Cinder Ballast	Cinder ballast ranging up to 10 feet thick may sporadically remain near Build Alternative A. Cinder ballast analytical results commonly contained elevated levels of metals, including lead and arsenic.	Advancement of piles, footers, and utilities along the ROW and for the pedestrian overpass into former ballast is possible. However, much of the near ground surface ballast has been removed at the site with only sporadic pockets of ballast in previously undisturbed areas remaining.	
Groundwater	Potential for residual low level of TPH, VOCs, SVOCs and metals in the groundwater.	Little to no dewatering of construction excavations is anticipated. Dewatering activities will be dependent upon the depth and amount of subsurface work. Major excavation is not anticipated to be required for the construction of Build Alternative A. Existing fill present on west side of ROW may also limit volumes of generated groundwater as groundwater is at deeper depth.	Should temporary dewatering of construction excavations be necessary, a National Pollution Discharge Elimination System (NPDES) or Publicly-owned Treatment Works (POTW) Permit may be required, if applicable. The dewatering design and permitting activities, if necessary, will be evaluated in the project design phase.2

[1] A Site Management Plan is considered to be a BMP unless it is required as a mitigation measure because of contaminants found during the Phase II ESA.
[2] Because the groundwater is anticipated to be contaminated from past industrial use, dewatering of construction excavations would be a mitigation measure required by regulatory authorities.

Table 8-2: Alternative B Impact, Best Management Practice and Mitigation Summary

Potential/ Former REC	Potential Chemicals of Concern	Potential Construction Impacts	Potential BMP or Mitigation
Residual Fly Ash Area	Elevated metals were detected in previous fly ash analysis immediately north of the Potomac Greens (ETI, 1995). Arsenic was detected at an average concentration of 106 mg/kg, lead at 34 mg/kg, and copper at 70 mg/kg.	Residual fly ash areas, potential residual contaminants from the former oil/water separator ponds, and potential residual or migrated contaminants from the former Central Operations Area may be encountered during clearing, grubbing activities, and potential soil excavation. Drilled shafts or driven piles would be required as foundations for the Metrorail station, pedestrian bridge and retaining wall structures. The vertical depth of fill required to accommodate the realigned track ranges from 1 to 15 feet. No below-grade structures are proposed for Build Alternative B at this time. Subsurface features would be contained to underground utilities, vaults, or shallow excavations needed to facilitate the installation of piles. For the most part, these features would be contained within the clean fill needed to accommodate the station platform and required track.	Soil disturbance may be lessened if driven piles, shafts, or sheeting can be used rather than drilled shafts or excavations to accommodate a mechanically stabilized engineered (MSE) wall. All soil and fill material required to be excavated at the site will be properly disposed off-site and replaced with clean fill.[1] A Site Management Work Plan to avoid and minimize potential risks from contaminants to construction workers and the environment may be developed to document mitigation measures and maintain no significant risk status at the property during construction.[2] The Site Management Work Plan or equivalent may include an Environmental Health and Safety Plan, Soil Excavation and Disposal, Utility Clean Corridor Preparation, Dust Control, Construction Dewatering, Clean Fill and Surface Soil Cap, Vapor barrier or mitigation measures, subsurface use and ventilation, groundwater use restrictions, and post remedial actions.
Former Oil/Water Separator Ponds	Potential for residual TPH, PCBs or other residual contaminants in soils. In 1973, the three oil/water retention ponds were relocated to clear a path for the Metrorail Yellow Line. The old ponds were filled with ash and soil. In 1993, the retention ponds were removed. The ponds were dewatered, and the sludge/sediment disposed off-site.		
Former Potomac Yard Central Operations Sub-Area Former TPH and Operations Sub-Area Former TPH and Free Product	Up to 11 feet of petroleum free product were formerly located in soils at the adjacent and up-gradient Former Central Operations Area, along with elevated levels of TPH, VOCs, SVOCs, and metals. Given the former potential groundwater flow direction, any residual contaminants that remain in this area had the potential to migrate eastward towards the project area.		
Former Cinder Ballast	Historic cinder ballast analytical results commonly contained elevated levels of lead and arsenic.		
Groundwater	Potential for residual low level of TPH, VOCs, SVOCs and metals in the groundwater.	Although little to no dewatering of construction excavations is anticipated, there is a potential for temporary dewatering of construction excavations of footers, utilities, etc. that intercept the shallow perched groundwater at the Site.	The dewatering requirement, design and permitting activities will be evaluated in the project design phase. An NPDES or POTW Permitting may be required, if dewatering is applicable.[3]

[1] Excavation and disposal of soil and fill material is considered to be a BMP unless it is required as a mitigation measure because of contaminants found during the Phase II ESA.
[2] A Site Management Plan is considered to be a BMP unless it is required as a mitigation measure because of contaminants found during the Phase II ESA.
[3] Because the groundwater is anticipated to be contaminated from past industrial use, dewatering of construction excavations would be a mitigation measure required by regulatory authorities.

Table 8-3: Alternative D Impact, Best Management Practice and Mitigation Summary

Potential/ Former REC	Potential Chemicals of Concern	Potential Construction Impacts	Potential BMP or Mitigation
Residual Fly Ash Area	Metals were detected in previous fly ash analysis immediately north of the Potomac Greens (ETI, 1995). Arsenic detected at an average concentration of 106 mg/kg, lead at 34 mg/kg, and copper at 70 mg/kg. Soil samples completed as part of Landbay D Site Characterization in 2011 (ECS, 2011) indicate TPH-DRO greater than 50 mg/kg, silver, and lead above the VDEQ Tier II Risk based screening level (RBSL) for industrial/commercial property re-use. A soil sample from Landbay D had a Lead TCLP analysis result of 5.4 mg/L, above the USEPA's hazardous soil designation.	Residual fly ash areas could be encountered at depth for tracks/pile and pier work south of the proposed station. Potential residual/migrated contaminants from the former Central Operations Sub-Area has the potential to be encountered for tracks, pile and pier work immediately south of the proposed station. Former cinder ballast can occur sporadically throughout project area. The main platform area appears to be located away from the main RECs. No significant below-grade structures are proposed and major excavation is not required for Build Alternative D which would be built upon aerial structures. Piers or bents that would be constructed for Build Alternative D would be built upon piles. Subsurface features would be contained to underground utilities, vaults, or shallow excavations needed to facilitate the installation of piles and piers. Soil disturbance can be lessened at the potential RECs if driven piles, or shafts, or sheeting can be used rather than drilled shafts to accommodate any excavations.	A Site Management Work Plan to avoid and minimize risks from potential contaminants to construction workers and the environment may be developed to document mitigation measures and maintain no significant risk status at the property during construction. The Site Management Work Plan or equivalent may include an Environmental Health and Safety Plan, Soil Excavation and Disposal, Utility Clean Corridor Preparation, Dust Control, Construction Dewatering, Clean Fill and Surface Soil Cap, Vapor barrier or mitigation measures, subsurface use and ventilation, groundwater use restrictions, and post remedial actions.[1]
Former Potomac Yard Central Operations Sub-Area Former TPH and Operations Sub Area Former TPH and Free Product	Levels of up to 11 feet of free product were formerly located at the former Potomac Yard Central Operations Sub-Area, along with elevated levels of TPH VOCs, SVOCs, and metals. Given the former potential groundwater flow direction, any residual contaminants that remain in this area had the potential to migrate eastward towards the project area.		
Former Cinder Ballast	Historic cinder ballast analytical results commonly contained elevated levels of lead and arsenic.		
Groundwater	Potential for residual low level of TPH, VOCs, SVOCs and metals in the groundwater.	Little to no dewatering is anticipated for the proposed Build Alternative D. Temporary dewatering activities may be required, dependent upon the depth and amount of subsurface work. Dewatering activities could be associated with footers, utilities, etc.	NPDES or POTW Permitting may be required, if applicable. May be included with a Materials Management Plan, as part of the Site Management Work Plan.[2]

[1] A Site Management Plan is considered to be a BMP unless it is required as a mitigation measure because of contaminants found during the Phase II ESA.
[2] Because the groundwater is anticipated to be contaminated from past industrial use, dewatering of construction excavations would be a mitigation measure required by regulatory authorities.

9.0 POTENTIAL REGULATORY REQUIREMENTS AND COORDINATION

In addition to required NEPA regulations and guidance, the regulatory requirements and coordination relating to hazardous and contaminated materials that may be encountered during construction include the following federal, state and local laws, and guidance.

9.1 Federal

9.1.1 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA is a federal law designed to clean up sites contaminated with hazardous substances. The CERCLA law provides broad federal authority to clean up releases or threatened releases of hazardous substances that may endanger public health or the environment. The law authorized the USEPA to identify parties responsible for contamination of sites and compel the parties to clean up the sites.

In September 1992, USEPA and RF&P signed a CERCLA Administrative Order by Consent requiring RF&P to study and remediate contamination at the Potomac Rail Yard. USEPA declared the Potomac Yard CERCLA site closed in accordance with all applicable regulatory requirements in a letter dated October 20, 1999 (see **Appendix F**). As this site status is closed, CERCLA regulations are no longer applicable to this property.

9.1.2 Resource Conservation and Recovery Act (RCRA)

A hazardous waste is defined by the Resource Conservation and Recovery Act (RCRA) as a waste that poses substantial or potential threats to public health or the environment. The treatment, storage and disposal of hazardous waste are regulated under RCRA. A hazardous waste is defined under RCRA in 40 CFR 261 where they are divided into two major categories: characteristic wastes and listed wastes.

Characteristic hazardous wastes are materials that are known or tested to exhibit one or more of the following four hazardous traits: ignitability (i.e., flammable), reactivity, corrosively, and toxicity. Potentially excavated contaminated soil, fly ash, and ballast material generated at the site from RECs may need to be characterized to determine if the material is considered a hazardous waste. Such wastes will need to be labeled, transported, and disposed as hazardous waste at an appropriately permitted disposal facility.

9.1.3 Clean Water Act (CWA)

The Clean Water Act (33 U.S.C. 1251) - The Clean Water Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Construction dewatering discharge from this site may need to be pretreated and permitted.

9.1.4 USEPA All Appropriate Inquiries (AAI) - 40 CFR Part 312

All Appropriate Inquiries (AAI) is a process of evaluating a property's environmental conditions and assessing the likelihood of any contamination. The USEPA published a final rule setting federal standards for the conduct of all appropriate inquiries. The rule was published in the Federal Register on November 1, 2005. The All Appropriate Inquiries Final Rule provides that the ASTM E1527-05 standard is consistent with the requirements of the final rule and may be used to comply with the provisions of the rule.

9.1.5 Toxic Substances Control Act (TSCA)

The Toxic Substances Control Act (TSCA), passed by the United States Congress in 1976, regulates the introduction of new or already existing chemicals. The TSCA sections which could potentially be relevant to the Site define PCB concentrations that represent unreasonable risk to public health or the environment. The regulations implementing TSCA are found in Title 40 of the CFR, Chapter I, Subchapter R. The TSCA program is run by EPA and is not delegated to any state agency.

9.1.6 Hazardous Materials Transportation Act of 1975 (HMTA)

The Hazardous Materials Transportation Act of 1975 (HMTA) is a transportation-related statute to improve the regulatory and enforcement authority of the Secretary of Transportation to protect against risks to life and property which are inherent in the transportation of hazardous materials in commerce. The HMTA includes regulations which apply to any person who transports, or causes to be transported or shipped, a hazardous material. Hazardous materials regulations are subdivided by function into four basic areas:

- Procedures and/or Policies 49 CFR Parts 101, 106, and 107.
- Material Designations 49 CFR Part 172.

- Packaging Requirements 49 CFR Parts 173, 178, 179, and 180.
- Operational Rules 49 CFR Parts 171, 173, 174, 175, 176, and 177.

9.2 State

9.2.1 Virginia Hazardous Waste Management Regulations (VHWMR)

The Virginia Hazardous Waste Management Regulations (VHWMR) is applicable to the management and disposal of excavated soil at the site that may be potentially contaminated with hazardous materials. The VHWMR incorporates the federal RCRA Regulations 40 CFR Part 261, Subpart C, and Subpart D.

9.2.2 Virginia Solid Waste Management Regulations (9 VAC 20-80-10)

The Virginia Solid Waste Management Regulations (VSWMR) establish standards and procedures applicable to the management of solid wastes and design, construction, operation, maintenance, closure and post-closure care of solid waste management facilities in Virginia. The regulations establish facility standards for disposal of solid wastes generated during remediation activities. Solid waste generated at the site must be managed in accordance with VSWMR. Disposal facilities must meet VSWMR guidelines to accept the waste material.

9.2.3 Virginia Voluntary Remediation Program (VRP)

The Virginia VRP is a voluntary streamlined mechanism for site owners or operators to voluntarily address contamination at sites with concurrence from the VDEQ. When the remediation is satisfactorily completed, VDEQ issues a "certification of satisfactory completion of remediation." This certification provides assurance that the remediated site will not later become the subject of a VDEQ enforcement action unless new issues are discovered. The VRP program utilizes generic tiered risk based screening criteria based on proposed land use. The VRP risk based screening levels can be utilized to screen site data for potential soil, groundwater, and vapor intrusion chemicals of concern. The VRP could be considered by the project team management as an alternative remedial program to address residual site contamination.

9.2.4 Virginia Pollutant Discharge Elimination System (VPDES) (9 VAC 25-32-10 to 940)

The Virginia Pollutant Discharge Elimination System (VPDES) are standards for discharging pollutants into surface waters of the Commonwealth which are enforced by the City of Alexandria. A temporary discharge permit may be required from the City of Alexandria should discharge of groundwater from excavations be required at the potential Metrorail Station locations.

9.2.5 Virginia Erosion and Sediment Control Regulations (4 VAC 50-30-10 to 110)

Erosion and sediment control plans are to be submitted for land-disturbing activities, and must be in compliance with the locality and/or local soil and water conservation district. The City of Alexandria Erosion and Sediment Control Ordinance (Section 5-4-1 of the City Code) require that any construction project that disturbs at least 2,500 square feet have a City approved construction pollution prevention plan. Arlington County's related laws and regulations include Chapter 57, Erosion and Sediment Control, of the Arlington County Code and other related chapters.

9.3 Local

City of Alexandria Zoning Ordinance, Contaminated Land Requirements (Sec. 11-410(v)) – During Site Plan submittals, adequate provision shall be made to clean, control and otherwise alleviate contamination or environmental hazards on land when the site is in an area found by the Director of Transportation and Environmental Services to be contaminated by a toxic substance or otherwise to contain environmental hazards which are detrimental to the public health, safety and welfare. This local City Ordnance ensures that risk mitigation measures are conducted during construction as approved in site management work plans or equivalent site plans.

9.4 Land Acquisition

If the project involves any land acquisition using FTA funds, then the FTA Region III Real Estate Office and City of Alexandria Department of Transportation and Environmental Services must be contacted.

10.0 FINDINGS AND SUMMARY

RECs remaining within Potomac Yard have been either remediated or mitigated by risk management methods during previous USEPA, VDEQ, and City of Alexandria oversight of historical remedial activities or during more recent subsequent redevelopment activities. Additional measures, such as residual contaminant removal, construction worker health and safety plans, soil excavation and disposal plans, dust control, groundwater dewatering plans, clean capping of contaminants left in place, vapor barrier evaluation or mitigation measures, subsurface use and ventilation, and over excavation of subsurface utilities in impacted soils, are being implemented, as needed, during subsequent redevelopment within Potomac Yard to maintain a level of no significant risk to construction workers and future land users. The risk mitigation measures are outlined in Site Management Work Plans or equivalent site plans prior to construction, usually in the project design phase.

A Phase II ESA must be completed if a Build Alternative is selected as the preferred altnerative. The Phase II ESA would focus sampling locations on design features which may include areas requiring excavation in order to pre-characterize the soils and potential shallow groundwater. The Phase II results could be used to determine if site-specific risk mitigation measures are necessary and define soil and groundwater management and disposal requirements during construction.

11.0 QUALIFICATIONS – LIST OF PREPARERS

Lance E. Comas – Senior Environmental Scientist, AECOM, Inc.

BS – Geology – Richard Stockton College, 1989

Twenty-three (23) years experience in Phase I and Phase II investigations, remedial environmental assessments and analysis, completing Environmental Impact Statement preparation in accordance with Federal and State NEPA requirements for highways, rail, and other transportation projects throughout the Northeast and Mid-Atlantic regions. Mr. Comas has also completed and managed various remediation assessment projects regarding contaminated and hazardous materials for clients within the transportation, petrochemical, retail petroleum, pharmaceutical, energy generation, and governmental sectors throughout the Mid-Atlantic and the Northeastern United States, California, and Illinois.

Brendan McGuinness – Senior Environmental Scientist, AECOM, Inc.

BS – Geosciences – State University of New York, 1985

Professional Geologist, 1993, Tennessee, #TN3300

Twenty-five (25) years experience in petroleum and hazardous waste site studies, including site investigation, remedial investigation, and feasibility studies at numerous Department of Defense and commercial sites. Mr. McGuinness provides technical and regulatory support for RCRA, CERCLA, and brownfield projects and supports NEPA EIS and EA natural resources and hazardous materials studies.

Matthew Nilsen – Environmental Planner, AECOM, Inc.

MS - Environmental Science - Rutgers University/NJIT, 2004

BS – Environmental Science – Saint John's University, 2001

Eight (8) years experience in environmental and ecological assessments including conducting Phase I and Phase II investigations throughout the Northeast and Mid-Atlantic regions. In addition, Mr. Nilsen completed various remedial reports and investigations for submission to the NJDEP. Mr. Nilsen also conducted natural resource surveys; qualitative ecological field evaluations; threatened and endangered species investigations; prepared and filed environmental permit applications at the federal, state, and local level.

12.0 REFERENCES

Site Visits and Regulatory Meetings

AECOM. Potomac Yard Phase 1 Site Walk, April 23, 2012. Mr. Lance Comas, Mr. Brendan McGuinness.

City of Alexandria Department of Environmental Quality

Date: May 2, 2012

Contacts: Daniel Imig [Daniel.Imig@alexandriava.gov]

Subject: Brendan McGuinness (AECOM) regulatory meeting with City of Alexandria, Mr. Daniel Imig to review and collect environmental documents related to Potomac Yard.

Virginia Department of Environmental Quality

Date: April 23, 2012

Contacts: Mr. James Green (VA DEQ UST/Petroleum Program Manager), Richard Doucette (DEQ Waste Program Manager/Voluntary Remediation Program); June Erwin (VA DEQ FOIA Administrator).

Subject: MR. Lance Comas and Brendan McGuinness (AECOM) regulatory meeting with VA DEQ, Northern Regional Office, 13901 Crown Court, Woodbridge, VA. AECOM interviewed Mr. Green and Mr. Doucette regarding regulatory history and status of Potomac Yard site. AECOM conducted file review and obtained relevant environmental documents.

Communications (personal, e-mails, memos)

Buchanan, Tracey (VA DEQ), email message to Green, James (VA DEQ); Doucette, Richard (VA DEQ), March 29, 2012, Subject: FW: FOIA Request notification to VA DEQ staff for Potomac Yard, City of Alexandria, VA

Doucette, Richard (VA DEQ), email message to McGuinness, Brendan (AECOM), Green, James (DEQ), Erwin, June (DEQ); Comas, Lance (AECOM), April 04, 2012, Subject: RE: FOIA Request for Potomac Yard, City of Alexandria, VA DEQ staff is available on April 24.

Green, James (VA DEQ), email message to McGuinness, Brendan (AECOM), Doucette, Richard (DEQ); McMurray, Patricia (DEQ); Erwin, June (DEQ), March 30, 2012, Subject: RE: FOIA Request for Potomac Yard, City of Alexandria, VA

Imig, Daniel (City of Alexandria DEQ), email message to McGuinness, Brendan (AECOM), May 4, 2012. Subject: clean corridor code/ordnance reference. City's Zoning Ordinance (Article 11-410(V)) Adequate provision shall be made to clean, control and otherwise alleviate contamination or environmental hazards on land when the site is in an area found by the director of transportation and environmental services to be contaminated by a toxic substance or otherwise to contain environmental hazards which are detrimental to the public health, safety and welfare.

McGuinness, Brendan (AECOM), email message to Buchanan, Tracey (VA DEQ), March 29, 2012, Subject: FOIA Request submitted for Potomac Yard, City of Alexandria, VA

McGuinness, Brendan (AECOM), email message to Green, James (VA DEQ), Doucette, Richard (DEQ); McMurray, Patricia (DEQ); Erwin, June (DEQ); Comas, Lance (AECOM), April 04, 2012, Subject: RE: FOIA Request for Potomac Yard, City of Alexandria, VA. AECOM Request for interview and to collect documents on April 16 or 24, 2012

McGuinness, Brendan (AECOM), email message to Doucette, Richard (DEQ), Comas, Lance (AECOM), July 10, 2012, Subject: Request for Potomac Yard VRP documents related to Landbay G – VRP Site Number 00548.

McMurray, Patricia (VA DEQ), email message to Green, James (DEQ); McGuinness, Brendan (AECOM), Doucette, Richard (DEQ); Erwin, June (DEQ); Woodward, Jennifer (DEQ), March 30, 2012, Subject: RE: FOIA Request for Potomac Yard, City of Alexandria, VA. "Let us know if you need anything from Central Office".

Woodard, Henrietta (215.814.3164) USEPA Region III, FOIA Administrator, telephone call to McGuinness, Brendan (AECOM), April 07, 2012, Subject: AECOM Freedom of Information Act Request (FOIA) submitted electronically to USEPA Region III for Potomac Yard, Ms. Woodard (USEPA FOIA Administrator). Ms. Woodard states that Potomac Yard Files are archived in storage and difficult to access. Ms. Woodard confirmed that no other records are available for the site other than records available from the on-line USEPA Administrative Record for the Potomac Yard. The FOIA request from AECOM to USEPA for Potomac Yard files was closed on May 7, 2012.

Regulatory Guidance

City of Alexandria Zoning Ordinance, Contaminated Land Requirements - Sec. 11-410(v)

Clean Water Act (CWA) - 33 U.S.C. §1251

Resource Conservation and Recovery Act (RCRA) - 40 CFR Part 261

USEPA All Appropriate Inquiries (AAI) - 40 CFR Part 312

Virginia Solid Waste Management Regulations - 9 VAC 20-80-10

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Closure Report for Corrective Action Plan Implementation. Earth Tech, Inc. October 9, 2000.

Extent of Contamination Study, Potomac Yard, Alexandria, Virginia, Volume I. Environmental Technology of North America, Inc. May 24, 1995a.

Off-Site Sediment and Surface Water Sampling Plan. Roy F. Weston, Inc. April 24, 1998

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National Park Service, GIS data, 2010.

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POTOMAC YARD METRORAIL STATION
ENVIRONMENTAL IMPACT STATEMENT

DRAFT

Phase II Environmental Site Assessment

February 2016

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1.0 INTRODUCTION

The Federal Transit Administration (FTA), as the lead federal agency, and the City of Alexandria, as the project sponsor and joint lead agency, are preparing a Final Environmental Impact Statement (Final EIS) in accordance with the National Environmental Policy Act (NEPA) for the proposed Potomac Yard Metrorail Station (PYMS). The Final EIS is being prepared in cooperation with the Washington Metropolitan Area Transit Authority (WMATA) and the National Park Service (NPS).

This document is a Phase II Environmental Site Assessment (ESA) of Recognized Environmental Concerns (RECs) which were previously identified in a Phase I ESA to support findings in the Draft EIS. As described in the Phase I ESA, the potential impacts of the Preferred Alternative on RECs would occur during construction activities. Therefore, the Phase II ESA focused on the limits of soil disturbance predicted during construction of the Preferred Alternative and was primarily limited to the depth of likely associated soil disturbance. At the conclusion of construction for the Preferred Alternative, the site would be returned to its current condition or better, as discussed in Section 3.25 of the FEIS. All work has been completed pursuant to American Society of Testing and Materials (ASTM) *E1903 - 11 Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process*.

This Phase II ESA was conducted as part of the Final EIS to assess the nature of potential contamination at the RECs at the site of the Preferred Alternative. The Phase II ESA comprised installation of soil borings and collection of soil samples for laboratory analysis of potential contaminants of concern. A discussion of the Phase II ESA methodology, findings, and potential impacts to the construction of the Potomac Yard Metrorail Station project is provided.

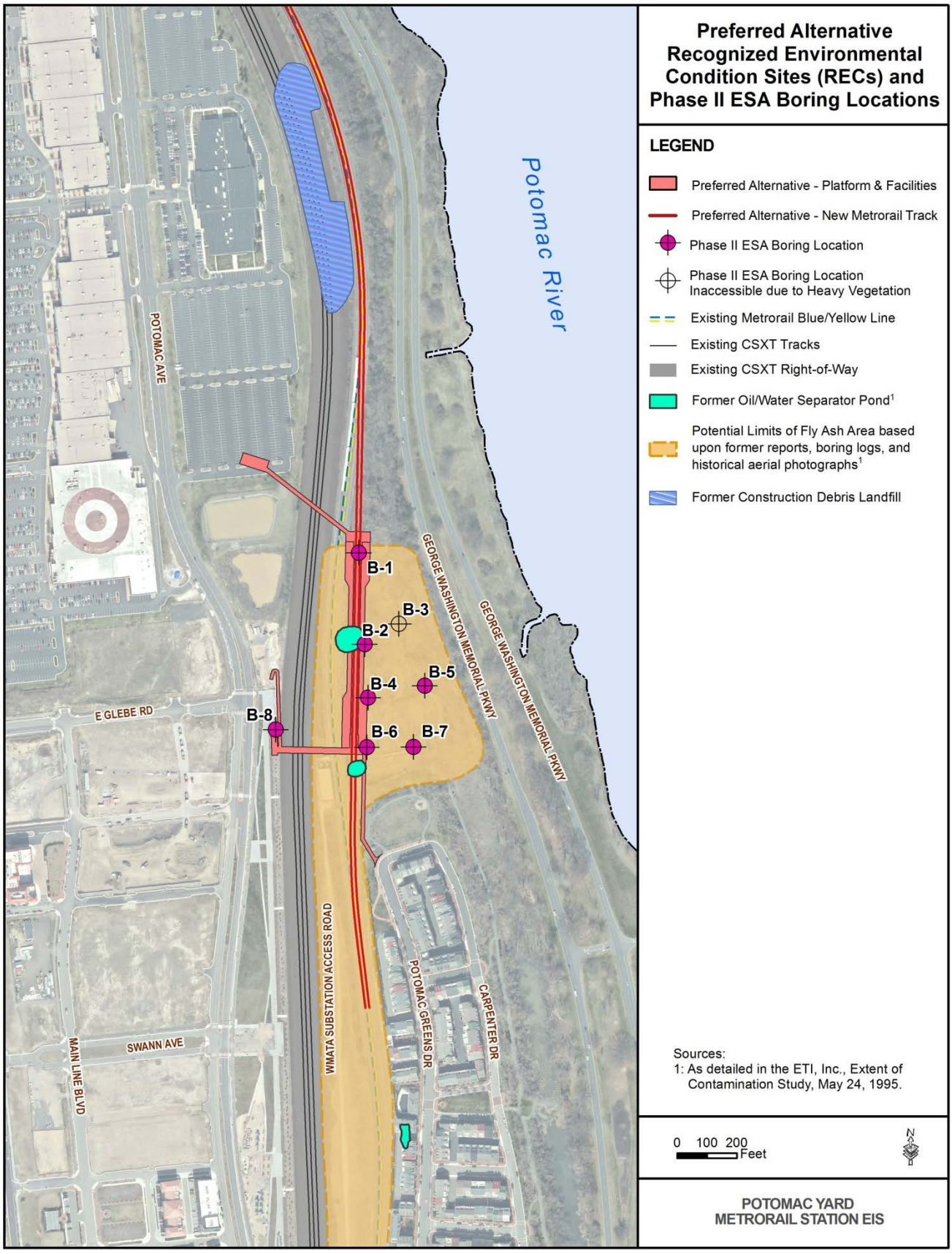
The Phase II ESA report is organized as follows:

- Section 1 provides a description of the Preferred Alternative and Phase II ESA study area;
- Section 2 summarizes the Phase I ESA findings and RECs at the Preferred Alternative site;
- Section 3 provides the findings of Phase II ESA at the Preferred Alternative site;
- Section 4 describes potential impacts of the Preferred Alternative based on Phase II ESA findings;
- Section 5 provides the qualifications of the authors;
- Section 6 lists preparers for the Phase II ESA; and
- Section 7 lists technical references.

1.1 Preferred Alternative Location and the Phase II ESA Study Area

The Preferred Alternative is located along and just east of the existing WMATA Metrorail Blue and Yellow Lines, west of the George Washington Memorial Parkway, and north of the Potomac Greens neighborhood in Potomac Greens Park within the City of Alexandria. **Figure 1-1** on the following page illustrates the Preferred Alternative and the Phase II ESA Study Area, which includes areas identified with RECs within and adjacent to the limits of disturbance and construction for the project. The figure also shows the boring locations where sampling was conducted.

Figure 1-1: Preferred Alternative Recognized Environmental Condition Sites (RECs) and Phase II Boring Locations



2.0 SITE SETTING

2.1 Surrounding Land Use

The surrounding land use to the west and south is a densely populated area, which continues to be developed for residential and commercial uses. A new plan for the redevelopment of the Potomac Yard Shopping Center (formerly within the Potomac Yard railroad yard) was adopted by the City of Alexandria in 2010. The new redevelopment is planned to contain 7.5 million square feet of office, retail, and residential development, as well as open space (http://alexandriava.gov/PotomacYard).

To the east and north of the project site are parkland and open space associated with the George Washington Memorial Parkway.

2.2 Surface Waters and Hydrology

Drainage patterns in the vicinity of the Preferred Alternative are controlled principally by topographic relief and urbanization. In urban settings, such as Potomac Yard, storm water is managed predominantly in subsurface pipes and drainage ponds. Drainage from the Potomac Yard area of the site west of the CSXT railroad tracks generally flows to Four Mile Run (to the north of the project site), which in turn discharges to the Potomac River, and drainage from the project site east of the CSXT railroad tracks generally flows directly to the Potomac River. The Potomac River flows south and discharges to the Chesapeake Bay.

Previous studies at the site have shown that shallow groundwater occurs at the former Potomac Yard rail yard site under an unconfined water table and perched water table conditions. The unconfined water table occurs at depths ranging from approximately 10 feet to 25 feet below ground surface (bgs). The perched water table is localized and may be seasonal in nature. The perched groundwater was encountered at depths of four to six feet bgs. The water table groundwater elevations in monitoring wells measured during the previous Extent of Contamination Study (ECS, 1995) generally ranged from about five feet to 33 feet mean sea level (msl)

2.3 Geology and Soils

The site is located near the western edge of the Coastal Plain physiographic province. The “Fall Line”, located less than 5 miles west of the study area, marks the boundary between the Coastal Plain and the Piedmont physiographic provinces. The Coastal Plain is an eastward-thickening wedge of sedimentary deposits overlying igneous and metamorphic bedrock. The bedrock dips eastward from the Piedmont at approximately 125 feet per mile. The Coastal Plain sediments consist of clays, silts, sands, and gravels deposited in river and marine environments.

The sedimentary deposits of the Coastal Plain in the vicinity of the study area are the Potomac Group of Cretaceous age. The Potomac Group is subdivided into three formations. In ascending order, these are the Patuxent Formation (Patuxent), the Arundel Clay Formation (Arundel), and the Patapsco Formation (Patapsco). Overlying the Potomac Group are river terrace and alluvial deposits of Quaternary age identified as the Shirley Formation and fill material.

The geology of the site was delineated from ground surface to the bedrock during previous environmental and geotechnical investigations. The stratigraphic sequence of the study area consists of six units. In descending order, these units include: fill material (ballast-cinder, fly-ash, silt and clay), Shirley Formation, Patapsco Formation, Arundel Clay Formation, Patuxent Formation, and bedrock.

3.0 SUMMARY OF PHASE I ESA FINDINGS OF RECS AT THE PREFERRED ALTERNATIVE

The Potomac Yard is a former rail yard, which was operated by the Richmond Fredericksburg and Potomac (RF&P) railroad from approximately 1906 to 1990. Historic operations at the Site were characterized in the Phase I ESA by reports obtained from the United States Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)Administrative Record, the Virginia Department of Environmental Quality (VDEQ), and the City of Alexandria Office of Environmental Quality.

The Preferred Alternative is located within the northern portion of the former Potomac Greens Sub-Area of the Potomac Yard rail yard. At the time of rail yard site operations, the former Potomac Greens Sub-Area consisted of approximately 38 acres located to the east of the Metrorail Blue/Yellow Line and west of the George Washington Memorial Parkway. At that time, the area occupied the lowest elevation of Potomac Yard. The area was not used for rail operations. However, former oil/water separator ponds, a fly ash deposition area, and dredge spoils were located in this area. These RECs within the Preferred Alternative site have been remediated or mitigated by risk management methods during previous EPA, VDEQ, and City of Alexandria oversight of historic remedial activities and during more recent redevelopment activities. Risk management methods of contaminants encountered during redevelopment and remedial activities have included measures such as removal of the oil/water separator ponds and dredge spoils and capping impacted soils in place.

The RECs described below were identified as having the potential for residual contamination at the Preferred Alternative site and were investigated during the Phase II ESA. **Figure 1-1** shows the locations of RECs and the location of the Phase II study area and soil borings..

3.1 Ballast

Based upon multiple environmental assessment reports completed for the former Potomac Yard rail yard site, much of the shallow fill used to level the rail yard appears to have been cinder ballast. The fill material adjacent to and underneath the existing track likely contains ballast. Much of the ballast material at the former Potomac Yard has been removed from areas no longer occupied by track. However, ballast can still be sporadically encountered in previously undisturbed areas or at undisturbed depths. Previous analysis at Potomac Yard indicates that ballast can contain significant concentrations of metals, including arsenic, lead, and copper.

3.2 Former Oil/Water Separator Ponds

Three oil/water separator ponds were located in the north, middle, and south portions of Potomac Greens and collected surface water containing grease and spilled fuel oil from refueling and maintenance operations in the Central Operations Area, North Yard, and South Yard Sub-Areas of the former rail yard. These ponds discharged into the Potomac River through drainage channels. During 1977 and 1978, the three oil/water separator ponds were moved from their original locations to clear a path for the Metrorail Yellow Line. The original oil/water separator ponds were then filled with soil and fly ash. On the downstream side of each pond, wooden baffles served to retain the floating oil and grease in the ponds while allowing water to discharge. Oil and grease were periodically removed and properly disposed off-site (ECS,1995).

After 1990, when locomotive servicing operations were discontinued at the rail yard, the three oil/water separator ponds collected only stormwater runoff from portions of the rail yard and from the City Of Alexandria system (across U.S. Route 1) to the west. During 1993, RF&P removed the three ponds from Potomac Greens. The area of the former southern most separator pond was also further redeveloped during the Potomac Greens construction. Prior to pond removal, RF&P estimated these ponds to be approximately 2,570 square feet (Middle Pond), 3,200 square feet (North Pond), and 3,370 square feet (South Pond) in area and five to eight feet deep.

The water was pumped from each pond and the sediments were solidified with kiln dust and disposed off-site. The soil beneath the ponds was excavated until the concentration of total petroleum hydrocarbons

(TPH) in the underlying soil was less than 100 milligrams per kilogram (mg/kg). The contaminated soil was then properly disposed of offsite. The areas once occupied by the ponds were subsequently refilled under the oversight of VDEQ (Roy F. Weston, 1996). Two of the former oil/water separator ponds are located on or in near proximity to the Preferred Alternative proposed station building location as shown on **Figure 1-1.** The area of the third oil/water separator pond was also subsequently redeveloped during construction of the Potomac Greens townhome development.

3.3 Former Dredge Spoils Area

Dredge spoils from the mouth of Four Mile Run were placed at the Potomac Greens Sub-Area by the U.S. Army Corps of Engineers (USACE) in 1983. USACE constructed a rectangular impoundment located in the south-central portion of Potomac Greens to contain the dredged material. The spoils were deposited within a 10 to 15 foot-high embankment and distributed in a layer that varied from one to 12 feet in thickness. The dredge spoils were removed from the site during the redevelopment of the Potomac Greens Sub-Area.

3.4 Former Fly Ash Deposition Areas

Geotechnical investigations within the Potomac Greens Sub-Area identified a widespread layer of fly ash, five to 20 feet thick, deposited throughout the Sub-Area. The source of this fly ash was reported to be Potomac Electric Power Company (PEPCO). Historical aerial photographs indicate most of this fill was deposited between the mid-1950s and 1963. The fly ash from the disposal area was removed and properly disposed during the redevelopment of the Potomac Greens Sub-Area (ETI, Inc., 1995). The approximate extent of the former fly ash disposal area within the Phase II ESA study area is shown on **Figure 1-1.**

Previous fly ash sample laboratory analysis conducted during site-wide environmental assessments indicate that most samples analyzed for metals had detectable concentrations. The metals arsenic, lead, and copper were detected most frequently. Arsenic was detected at an average concentration of 106 mg/kg, lead was detected at an average concentration of 34 mg/kg, and copper was detected at an average concentration of 70 mg/kg (ETI, Inc., 1995).

Previous risk management methods during site development at Potomac Yard have included risk assessment of arsenic concentrations in soil and fly ash to construction/utility workers during site development. These risk evaluations typically follow Virginia Voluntary Remediation Program (VRP) risk guidance. Previous risk calculations provided in the Preliminary Site-Development Risk Assessment for Potomac Greens (ECS, 2003) of arsenic in fly ash and soil to potential construction/utility workers at Potomac Yard did not indicate an unacceptable risk to these site workers.

3.5 Potential Construction Debris Landfill

The 1995 CERCLA Study identified a construction debris landfill in the area west of the Metrorail tracks near the current site of the movie theater. The construction debris landfill is noted to have been removed to an off-site landfill during redevelopment in 1977. Subsurface debris were encountered during construction of a sewer line for Landbay F (the Potomac Yard Shopping Center) in the former historic “stock pen” area, also located in this portion of the property.

3.6 Contaminated Groundwater

The CERCLA analyses detected contaminants in ground water. The groundwater analyses focused on the metals most commonly associated with ballast: arsenic, copper, and lead. The 1995 CERCLA analysis identified metals and residual petroleum hydrocarbons present in the groundwater at the property.

3.7 Contaminated Soil

The CERCLA analyses detected contaminants in soil. The 1995 CERCLA analysis identified metals and petroleum hydrocarbons present in the soil at the property.

4.0 SUMMARY OF THE PHASE II ESA FINDINGS

The previous Phase I ESA findings found that former RECs within the study area had either been remediated in accordance with USEPA or VDEQ approvals or had been mitigated by risk management methods during subsequent redevelopment. However, the potential for residual contamination at these RECs, especially in undeveloped areas of the study area, was present.

The level of mitigation and/or remediation which could be required in the study area for the Potomac Yard Metrorail Station project is dependent upon the degree of potential residual contamination and how it relates to the construction of the project. Therefore, a Phase II ESA was recommended.

4.1 Summary of Phase II ESA Methodology and Sampling

The Phase II ESA borings were located in or adjacent to RECs identified in the Phase I ESA and summarized above. Prior to Phase II ESA field work, a Right of Entry Agreement was negotiated with the City of Alexandria to conduct the soil borings and sampling at the property. The Right of Entry Agreement to conduct the Phase II ESA soil borings was signed in October 2015.

Prior to soil boring activity, utility clearance of all soil boring locations was conducted by Miss Utility of Virginia. Soil samples were collected via a “direct-push” technology drill rig. The soil samples were collected in 4-foot long acetate liners directly pushed into the ground by the drill rig. The soil samples were screened in the field for volatile organic compounds (VOCs) with a photoionization detector (PID) immediately upon opening the soil sample liners. The lithology and PID readings for each soil core were recorded in the field log book. Recorded information also included depth interval, moisture, odors (if present), the presence of groundwater, and depth that groundwater was encountered.

A total of seven borings (B-1 through B-8) were completed at the Preferred Alternative during October 15 and October 16, 2015. One scheduled boring (B-3) could not be completed due to thick woody vegetation limiting access to that area of the site. A total of ten soil samples were obtained from the soil borings. All the soil borings encountered fly ash within 2 feet of the ground surface. All soil borings encountered groundwater saturated fly ash at depths ranging from 4 to 6 feet below ground surface.

No significant VOC measurements above background were observed in borehole soils screened in the field for VOCs with a PID. No field indications of contaminated soil, such as discoloration or odors, were observed at any of the borehole locations with the exception of borehole location B-2. Soil boring B-2 is located in the former oil/water separator in the northern portion of the Preferred Alternative. A petroleum odor, dark staining, and ballast material were observed at the bottom of the fly ash fill at 7.5 to 8.0 feet below ground surface. A brown-grey mottled clay silt, which likely represents the original ground surface before emplacement of fly ash, was encountered at 8 feet below ground.

Due to shallow groundwater encountered at 4 to 6 feet below ground, soil samples were generally collected from 2 to 6 feet below ground, just above the depth to the groundwater.

- One soil sample was collected at each of boring sites B-1, B-4, B-5, B-6, and B-8.
- Due to impacted soils observed at 7.5 to 8.0 feet at boring B-2, soil samples were collected at 3 to 5 feet, 6 to 8 feet, and 10 to 12 feet below ground.
- Two soil samples were obtained at boring site B-7: a representative surface soil sample (B-7-0-2) as well as a soil sample at the depth of groundwater (B-7-3-5). The focus of the Phase II ESA soil sampling was subsurface fill (fly ash and ballast) and soil; however, a surface soil sample was taken at this location to provide a complete data set for analysis.

The laboratory analysis consisted of the following:

- All ten soil samples were analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbon-diesel range organics (TPH-DRO), and total metals concentrations.

- Based on locations of the former oil/water separator ponds and fly ash, six of the soil samples were analyzed for polychlorinated biphenols (PCBs).

- Based on field screening of samples and fly ash encountered, two of the soil samples were selected for the analysis of metals by the toxicity characteristics leaching procedure (TCLP), which determines if soils exhibit toxic characteristics which would require a hazardous waste listing to inform soil management and disposal requirements.

- Total metals soil results were also compared with toxicity regulatory criteria using what is referred to as the "20 times rule" for waste characterization. In accordance with Section 1.2 of the TCLP (Method 1311), the 20 times rule can be applied to soil samples by dividing the total metals analysis constituent concentration by 20 and then comparing the resulting concentration to the toxicity regulatory limit. If no theoretical concentration equals or exceeds the toxicity regulatory limit, the soil cannot exhibit toxicity characteristics.

4.2 Summary of Phase II ESA Findings

A summary of the analysis conducted for each soil sample, including the compounds and metals detected by the laboratory analysis, is provided in **Table 4-1**. The laboratory results are compared to EPA risk screening levels (RSLs) for commercial and industrial property use. The complete laboratory report with all laboratory analysis and sample chain of custody documentation is provided in **Appendix B**. Photographs of Phase II ESA field work, including select soil samples (referenced by the laboratory sample numbers used in Appendix B), are provided in **Appendix C**.

Three VOCs (acetone, 2-butanone, and carbon disulfide) were detected in the soil samples. Acetone was detected in eight out of ten samples, 2-butanone was detected in two samples, and carbon disulfide was detected in one sample. The concentrations of the VOCs in soil are below the EPA RSLs. These VOCs are also often considered to be common laboratory contaminants and not associated with samples.

The metals arsenic, barium, cadmium, chromium, lead, selenium, and mercury were detected in all soil samples. Additionally, silver was detected in one soil sample (B-2-10-12). Arsenic exceeded the EPA RSL of 3 mg/kg in all ten samples. No other metal exceeded the EPA RSL. Average concentrations of metals were; arsenic at 115 mg/kg, chromium at 28 mg/kg, lead at 78 mg/kg, selenium at 11 mg/kg, and mercury at 0.081 mg/kg. As noted above in the Phase I ESA findings, previous risk management methods during site development at Potomac Yard have included risk assessment of arsenic concentrations in soil and fly ash to construction/utility workers during site development. Previous risk calculations of arsenic in fly ash and soil to potential construction/utility workers at Potomac Yard did not indicate an unacceptable risk to these site workers (ECS, 2003). However, the average arsenic concentration detected in the Phase II ESA subset of samples is slightly higher than the previous average concentration.

TPH-DRO (total petroleum hydrocarbon-diesel range organics) was detected at 6,100 mg/kg in the soil sample submitted from soil and ballast material with a petroleum odor at the bottom of the fly ash fill at 7.5 to eight feet below ground at soil boring B-2. Soil samples taken at three to five feet and 10 to 12 feet below ground at this boring did not detect TPH-DRO. A TPH concentration in soil that is greater than 100 mg/kg is considered by VDEQ petroleum guidance to be indicative of a petroleum release. However, based on the site environmental remedial history and the Phase II ESA soil samples collected above and below this sample, this concentration is likely representative of an isolated residual petroleum contamination at the bottom of the former oil/water separator pond which was previously remediated at his location.

One PCB (arochlor-1260) was detected in two samples at levels not exceeding the RSL. The previous environmental assessment identified former transformers with PCBs in the former Potomac rail yard, which had been remediated under CERCLA and VDEQ oversight. Select PCB analysis was conducted during the Phase II analysis to document that residual PCBs were not present at the former oil/water separator ponds, fly ash, or soil which could potentially be excavated during redevelopment activities.

Table 4-1: Phase II ESA Detected Analytes

Soil Sample / Contaminant Analyzed	EPA Commercial/ Industrial RSL	Borehole/Sample Location*									
		B-1	B-2			B-4	B-5	B-6	B-7		B-8
Sample Characteristics											
Sample ID #	-	B-1-2-4	B-2-3-5	B-2-6-8	B-2-10-12	B-4-3-5	B-5-2-4	B-6-3-5	B-7-0-2	B-7-3-5	B-8-2-4
Depth Interval (ft bgs)	-	2 - 4	3 - 5	6 - 8	10 - 12	3 - 5	2 - 4	3 - 5	0 - 2	3 - 5	2 - 4
Media	-	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
VOCs by SW-846 8260B (ug/kg)											
Acetone	670,000,000	52	5 J	160	7 J	N.D.	25 J	26	20 J	91	20 J
2-Butanone	190,000,000	N.D.	N.D.	20	N.D.	N.D.	N.D.	N.D.	N.D.	5 J	N.D.
Carbon Disulfide	3,500,000	N.D.	N.D.	4 J	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Metals by SW-846 6010B (mg/kg)											
Arsenic	3	**116**	**220**	**51.2**	**5.26**	**208**	**233**	**99.8**	**119**	**78.3**	**22.4**
Barium	220,000	681	1,180	169	67.3	1,110	1,710	1,000	1,060	1,610	103
Cadmium	9,300	0.588 J	0.723	0.572 J	0.893 J	0.492 J	1.11	0.664	0.891	0.615 J	0.526 J
Chromium	n.p.	22.6	30.1	20.6	25.3	33.1	45.8	26.1	30.0	20.1	30.6
Lead	800	25.2	31.4	480	17.5	32.3	56.6	29.5	36.2	18.9	53.5
Selenium	5,800	7.24	13.9	11.0	9.71	11.8	11.5	10.1	17.2	11.6	3.49
Silver	5,800	N.D.	N.D.	N.D.	5.13	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Mercury	40	0.070 J	0.083 J	0.264	0.012 J	0.095 J	0.085 J	0.046 J	0.070 J	0.037 J	0.046 J
PCBs by SW-846 8082 (ug/kg)											
PCB-1260	990	25	N.D.	N.D.	N.D.	n.a.	N.D.	15 J	n.a.	n.a.	n.a.
TPH-DRO by SW-846 8015B (mg/kg)											
TPH-DRO soil C10-C28	n.p.	N.D.	N.D.	**6,100**	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

* Borehole Location and Sampling Notes:
Proposed Phase II ESA borehole location B-3 was inaccessible due to heavy vegetation, and no sample was taken.
Due to impacted soils observed at boring B-2, soil samples were collected at multiple depths.
An additional soil sample was collected at B-7 to provide a representative surface level sample.

Key:
VOC = volatile organic compound
PCBs = polychlorinated biphenyls
TPH-DRO = total petroleum hydrocarbon-diesel range organics
SW-846 number references the EPA laboratory test method used.
(mg/kg) = milligrams per kilogram

(ug/kg) = micrograms per kilogram
Mercury analytical results have been rounded to three decimal places.
N.D. = non detect
n.a. = not analyzed
n.p. = not published
J = estimated value between the Method Detection Level (MDL) and Limits of Quantitation (LOQ)
RSLs = USEPA Commercial / Industrial Soil Regional Screening Levels (Revised June 2015)
Bold = Sample result greater than USEPA screening level, or greater than 100 mg/kg TPH-DRO in accordance with VDEQ Storage Tank Program Technical Manual, 2011.

Based on previous Potomac Yard environmental assessment and redevelopment reports, metals are noted to be a primary contaminant of concern in soil and fill. In some cases, metals exceeded the regulatory level that required the soil to be identified as hazardous waste in accordance with Federal Code of Regulations 40 CFR 261.24, Table 1. Hazardous waste characteristics include corrosivity, reactivity, ignitability, and other similar properties. Therefore, soil samples from the most impacted interval observed through field screening (B-2-6-8) and representative of fly ash (B-6-3-5) were submitted for toxicity characteristic leaching procedure (TCLP) for metals. The TCLP test method simulates typical solid waste landfill conditions and predicts whether toxic chemicals in the waste are likely to leach and eventually impact surface water or groundwater. The results of the TCLP metals analysis were below the regulatory criteria requiring a hazardous waste listing. **Table 4-2** lists the TCLP metals analysis results and toxicity regulatory criteria.

Table 4-2 also compares previous total metals soil results (Table 4-1) with toxicity regulatory criteria using what is referred to as the “20 times rule” for waste characterization. In accordance with Section 1.2 of the TCLP (Method 1311), the 20 times rule can be applied to soil samples by dividing the total metals analysis constituent concentration by 20 and then comparing the resulting concentration to the toxicity regulatory limit (Table 4-2). If no theoretical concentration equals or exceeds the toxicity regulatory limit, the soil cannot exhibit toxicity characteristics. No metal concentrations exceeded the regulatory limit for toxicity using the 20 times rule for waste characterization. Therefore, no hazardous waste listing for soil or fill is anticipated.

Additional hazardous waste characteristic analysis of excavated soil and fly ash (i.e., corrosivity, reactivity, ignitability, etc.,) may be required for disposal purposes during site development in accordance with 40 CFR 261.24 and Virginia solid waste management regulations. However, based on the Phase II ESA sample analysis and previous environmental assessment sampling conducted at the former Potomac Greens Sub-Area, the fly ash and soil at the Preferred Alternative site are anticipated to be non-hazardous for disposal purposes.

Table 4-2: Phase II ESA Metal Results Compared to the Toxicity Characteristic Regulatory Level

Soil Sample / Contaminant Analyzed	Toxicity Characteristic Regulatory Level (mg/L)	Borehole/Sample Location									
		B-1	B-2			B-4	B-5	B-6	B-7		B-8
Sample Characteristics											
Sample ID	-	B-1-2-4	B-2-3-5	B-2-6-8	B-2-10-12	B-4-3-5	B-5-2-4	B-6-3-5	B-7-0-2	B-7-3-5	B-8-2-4
Depth Interval (ft bgs)	-	2 - 4	3 - 5	6 - 8	10 - 12	3 - 5	2 - 4	3 - 5	0 - 2	3 - 5	2 - 4
Media	-	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Total Metals Analytical Results Using the 20 Times Rule of Waste Characterization (mg/kg)											
Arsenic	5	5.8	11	2.56	0.263	10.4	11.65	4.99	5.95	3.915	1.12
Barium	100	34.05	59	8.45	3.365	55.5	85.5	50	53	80.5	5.15
Cadmium	1	0.029 J	0.0362	0.029 J	0.045 J	0.025 J	0.056	0.033	0.045	0.031 J	0.026 J
Chromium	5	1.13	1.505	1.03	1.265	1.655	2.29	1.305	1.5	1.005	1.53
Lead	5	1.26	1.57	24	0.875	1.615	2.83	1.475	1.81	0.945	2.675
Selenium	1	0.362	0.695	0.55	0.486	0.59	0.575	0.505	0.86	0.58	0.175
Silver	5	N.D.	N.D.	N.D.	0.257	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Mercury	0.2	0.003 J	0.004 J	0.013	0.001 J	0.005 J	0.004 J	0.002 J	0.004 J	0.002 J	0.002 J
TCLP Metals Results SW-846/1311(mg/L)											
Arsenic	5	-	-	0.084	-	-	-	0.212	-	-	-
Barium	100	-	-	3.6	-	-	-	3.14	-	-	-
Cadmium	1	-	-	0.001 J	-	-	-	0.003 J	-	-	-
Chromium	5	-	-	0.009 J	-	-	-	0.008 J	-	-	-
Lead	5	-	-	N.D.	-	-	-	0.008 J	-	-	-
Selenium	1	-	-	0.021	-	-	-	0.081	-	-	-
Silver	5	-	-	N.D.	-	-	-	N.D.	-	-	-
Mercury	0.2	-	-	N.D.	-	-	-	N.D.	-	-	-

Key:
TCLP = Toxicity Characterization Leaching Procedure
SW-846 number references the EPA laboratory test method used.
(mg/kg) = milligrams per kilogram

(mg/L) = milligrams per litre
N.D. = non detect
J = estimated value
Toxicity Characteristic Regulatory Level taken from Table 1 of 40 CFR 261.24
Cadmium, selenium, and mercury analytical results have been rounded to three decimal places.

5.0 POTENTIAL IMPACTS TO THE PREFERRED PYMS BASED ON PHASE II ESA FINDINGS

The Preferred Alternative has the potential to excavate fill material consisting of ballast, fly ash, and soil with potentially elevated metals (arsenic). Residual petroleum may also be encountered in subsurface fill material near the location and depth of former oil/water separator ponds. However, the project would not result in long-term or permanent adverse effects due to mitigation of risks through engineering controls and other measures that would be used during construction.

5.1 Contaminated Fill Material and Soil Excavation and Disposal

Subsurface soil and fill material consisting primarily of fly ash, soil, and some ballast with elevated metals content (arsenic), and residual petroleum-impacted soils near the former oil/water separator ponds, have been identified within the limits of disturbance (LOD) for the Preferred Alternative. No soils exhibiting hazardous waste characteristics were identified. Appropriate management on site and disposal off-site of these impacted fill materials would be conducted in accordance with applicable Virginia solid waste management regulations.

5.2 Contaminated Groundwater Dewatering

Based on Phase II ESA analysis of soils and previous site-wide environmental assessment reports, shallow groundwater in the vicinity of the Preferred Alternative is likely contaminated with residual levels of petroleum hydrocarbons and metals. The groundwater depth should be evaluated at the project design phase to identify the necessity of dewatering, groundwater control requirements (if dewatering is required), and disposal or treatment requirements for contaminated groundwater.

The Virginia Pollutant Discharge Elimination System (VPDES) is a set of regulatory standards for discharge of pollutants into surface waters of the Commonwealth. The project would file a notice of intent for coverage under the VPDES construction general permit and related stormwater management program regulations. A site-specific stormwater pollution prevention plan (SWPPP) would be developed, outlining the steps that the contractor would take to comply with the permit, including water quality and quantity requirements, to reduce pollutants in the stormwater runoff from the construction site. The SWPPP also specifies all potential pollutant sources that could enter stormwater leaving the construction site and covers methods used to reduce pollutants in stormwater runoff during and after construction.

5.3 Mitigation of Potential Impacts

Temporary measures taken during construction, such as construction worker health and safety practices, management of excavated contaminated soil, and construction dewatering management and permitting would be implemented during construction to prevent exposure to potential contaminants at RECs. The construction contractor will be informed of site conditions and adequate provision shall be made to clean, control and otherwise alleviate contamination or environmental hazards during construction.

Soil disturbance can be lessened by use of driven piles, shafts, or sheeting, rather than drilled shafts to accommodate any excavations. In areas of the site where pile foundations may need to be installed by alternative methods due to geotechnical and/or vibration concerns, impacts from the generation of potentially contaminated fill, soil, and groundwater would be mitigated in accordance with Virginia Solid Waste Management Regulations (VSWMR) and Virginia Hazardous Waste Management Regulations (VHWMR).

As described in Section 5.2, a site-specific stormwater pollution prevention plan (SWPPP) would be developed, outlining the steps that the contractor would take to comply with the permit, including water quality and quantity requirements, to reduce pollutants in the stormwater runoff from the construction site.

The VSWMR, and the VHWMR, and other hazardous materials regulations described in Section 9 of the Phase I ESA will be followed and documented for on site management of wastes.

6.0 QUALIFICATIONS – LIST OF PREPARERS

6.1 Brendan McGuinness – Senior Environmental Scientist, AECOM, Inc.

BS – Geosciences – State University of New York, 1985
Professional Geologist, 1993, Tennessee, #TN3300

Twenty-five (25) years experience in petroleum and hazardous waste site studies, including site investigation, remedial investigation, and feasibility studies at numerous Department of Defense and commercial sites. Mr. McGuinness provides technical and regulatory support for RCRA, CERCLA, and brownfield projects and supports natural resources and hazardous materials studies under NEPA and other overall environmental review requirements.

7.0 REFERENCES

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APPENDIX A:

LIST OF ACRONYMS AND ABBREVIATIONS

APPENDIX A

List of Acronyms and Abbreviations

ASTM	American Society of Testing and Materials
bgs	Below Ground Surface
BMP	Best Management Practice
CSXT	CSX Transportation, Inc.,
DEIS	Draft Environmental Impact Statement
DPT	Direct Push Technology
DRO	Diesel Range Organics
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
FEIS	Final Environmental Impact Statement
ECS	Extent of Contamination Study
ESA	Environmental Site Assessment
FTA	Federal Transit Administration
msl	Mean Sea Level
LOQ	Limits of Quantitation
MDL	Method Detection Level
mg/l	Milligrams per Liter
mg/kg	Milligram per Kilogram
N.D.	Non-detect
n.p.	not-published
ug/l	Micrograms per Liter
NPS	National Park Service
NEPA	National Environmental Policy Act
PEPCO	Potomac Electric Power Company
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
PPB	Parts per Billion
PPM	Parts per Million
PYMS	Potomac Yard Metrorail Station
RECs	Recognized Environmental Conditions
RCRA	Resource Conservation and Recovery Act
RF&P	Richmond Fredericksburg and Potomac
RA	Risk Assessment
RSL	Risk Screening Level
TPH	Total Petroleum Hydrocarbons
TCLP	Toxicity Characterization Leaching Procedure
USACE	United States Army Corps of Engineers
USEPA	United states Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
VOC	Volatile Organic Compound
VRP	VDEQ Voluntary Remediation Program
WMATA	Washington Metropolitan Area Transit Authority

APPENDIX B:

LABORATORY ANALYSIS REPORT

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

November 16, 2015

Project: Potomac Yard Metro Station

Submittal Date: 10/16/2015
Group Number: 1601713
SDG: PYM01
PO Number: 60248359 TASK 0008
State of Sample Origin: VA

Client Sample Description	Lancaster Labs (LL) #
B-6-3-5 Grab Soil	8093379
B-6-3-5 Grab Soil	8093380
B-7-0-2 Grab Soil	8093381
B-7-3-5 Grab Soil	8093382
B-5-2-4 Grab Soil	8093383
B-4-3-5 Grab Soil	8093384
B-2-3-5 Grab Soil	8093385
B-2-6-8 Grab Soil	8093386
B-2-6-8 Grab Soil	8093387
B-2-10-12 Grab Soil	8093388
B-1-2-4 Grab Soil	8093389
B-8-2-4 Grab Soil	8093390

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

ELECTRONIC COPY TO AECOM Environment Attn: Brendan McGuinness

Respectfully Submitted,

Barbara A. Weyandt
Specialist

(717) 556-7264

Sample Description: B-6-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093379
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 10:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY635 SDG#: PYM01-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**	**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	26	6	17	0.74
10237	Benzene	71-43-2	N.D.	0.4	4	0.74
10237	Bromodichloromethane	75-27-4	N.D.	0.9	4	0.74
10237	Bromoform	75-25-2	N.D.	0.9	4	0.74
10237	Bromomethane	74-83-9	N.D.	2	4	0.74
10237	2-Butanone	78-93-3	N.D.	3	9	0.74
10237	Carbon Disulfide	75-15-0	N.D.	0.9	4	0.74
10237	Carbon Tetrachloride	56-23-5	N.D.	0.9	4	0.74
10237	Chlorobenzene	108-90-7	N.D.	0.9	4	0.74
10237	Chloroethane	75-00-3	N.D.	2	4	0.74
10237	Chloroform	67-66-3	N.D.	0.9	4	0.74
10237	Chloromethane	74-87-3	N.D.	2	4	0.74
10237	Cyclohexane	110-82-7	N.D.	0.9	4	0.74
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	2	4	0.74
10237	Dibromochloromethane	124-48-1	N.D.	0.9	4	0.74
10237	1,2-Dibromoethane	106-93-4	N.D.	0.9	4	0.74
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.9	4	0.74
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.9	4	0.74
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.9	4	0.74
10237	Dichlorodifluoromethane	75-71-8	N.D.	2	4	0.74
10237	1,1-Dichloroethane	75-34-3	N.D.	0.9	4	0.74
10237	1,2-Dichloroethane	107-06-2	N.D.	0.9	4	0.74
10237	1,1-Dichloroethene	75-35-4	N.D.	0.9	4	0.74
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.9	4	0.74
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.9	4	0.74
10237	1,2-Dichloropropane	78-87-5	N.D.	0.9	4	0.74
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.9	4	0.74
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.9	4	0.74
10237	Ethylbenzene	100-41-4	N.D.	0.9	4	0.74
10237	Freon 113	76-13-1	N.D.	2	9	0.74
10237	2-Hexanone	591-78-6	N.D.	3	9	0.74
10237	Isopropylbenzene	98-82-8	N.D.	0.9	4	0.74
10237	Methyl Acetate	79-20-9	N.D.	2	4	0.74
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.4	4	0.74
10237	4-Methyl-2-pentanone	108-10-1	N.D.	3	9	0.74
10237	Methylcyclohexane	108-87-2	N.D.	0.9	4	0.74
10237	Methylene Chloride	75-09-2	N.D.	2	4	0.74
10237	Styrene	100-42-5	N.D.	0.9	4	0.74
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.9	4	0.74
10237	Tetrachloroethene	127-18-4	N.D.	0.9	4	0.74
10237	Toluene	108-88-3	N.D.	0.9	4	0.74
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.9	4	0.74
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.9	4	0.74
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.9	4	0.74
10237	Trichloroethene	79-01-6	N.D.	0.9	4	0.74
10237	Trichlorofluoromethane	75-69-4	N.D.	2	4	0.74
10237	Vinyl Chloride	75-01-4	N.D.	0.9	4	0.74
10237	Xylene (Total)	1330-20-7	N.D.	0.9	4	0.74
Pesticides/PCBs	**SW-846 8082**		**ug/kg**	**ug/kg**	**ug/kg**	
10736	PCB-1016	12674-11-2	N.D.	4.2	20	1

*=This limit was used in the evaluation of the final result

Sample Description: B-6-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093379
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 10:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY635 SDG#: PYM01-01

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Pesticides/PCBs	**SW-846 8082**		**ug/kg**		**ug/kg**	**ug/kg**	
10736	PCB-1221	11104-28-2	N.D.		5.3	20	1
10736	PCB-1232	11141-16-5	N.D.		9.2	20	1
10736	PCB-1242	53469-21-9	N.D.		3.8	20	1
10736	PCB-1248	12672-29-6	N.D.		3.8	20	1
10736	PCB-1254	11097-69-1	N.D.		3.8	20	1
10736	PCB-1260	11096-82-5	15	J	5.7	20	1
GC Miscellaneous	**SW-846 8015B**		**mg/kg**		**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.		4.6	14	1
Metals	**SW-846 6010B**		**mg/kg**		**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	99.8		0.667	2.30	1
06946	Barium	7440-39-3	1,000		0.385	2.87	5
06949	Cadmium	7440-43-9	0.664		0.0494	0.575	1
06951	Chromium	7440-47-3	26.1		0.113	1.72	1
06955	Lead	7439-92-1	29.5		0.368	1.72	1
06936	Selenium	7782-49-2	10.1		0.954	2.30	1
06966	Silver	7440-22-4	N.D.		0.138	0.575	1
	SW-846 7471A		**mg/kg**		**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0459	J	0.0117	0.117	1
Wet Chemistry	**SM 2540 G-1997**		**%**		**%**	**%**	
00111	Moisture	n.a.	14.7		0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 15:09	Angela D Sneeringer	0.74
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 10:15	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 10:15	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 10:15	Client Supplied	1
10736	PCBs in Soil (microwave)	SW-846 8082	1	152950013A	10/27/2015 06:09	Jessica L Miller	1

*=This limit was used in the evaluation of the final result

Sample Description: B-6-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093379
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 10:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY635 SDG#: PYM01-01

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10497	PCB Microwave Soil Extraction	SW-846 3546	1	152950013A	10/23/2015 08:30	Jessica M Velez	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 18:19	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 01:57	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/23/2015 03:28	Tara L Snyder	5
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 01:57	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 01:57	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 01:57	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 01:57	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 01:57	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:00	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-6-3-5 Grab Soil
Potomac Yard Metro Station, VA TCLP NVE

LL Sample # TL 8093380
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 10:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PL635 SDG#: PYM01-02

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals		**SW-846 6010B**	**mg/l**	**mg/l**	**mg/l**	
07035	Arsenic	7440-38-2	0.212	0.0070	0.0200	1
07046	Barium	7440-39-3	3.14	0.00030	0.0050	1
07049	Cadmium	7440-43-9	0.0028 J	0.00030	0.0050	1
07051	Chromium	7440-47-3	0.0079 J	0.0015	0.0150	1
07055	Lead	7439-92-1	0.0078 J	0.0051	0.0150	1
07036	Selenium	7782-49-2	0.0806	0.0082	0.0200	1
07066	Silver	7440-22-4	N.D.	0.0014	0.0050	1
		SW-846 7470A	**mg/l**	**mg/l**	**mg/l**	
00259	Mercury	7439-97-6	N.D.	0.000050	0.00020	1

General Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
07035	Arsenic	SW-846 6010B	1	153145705001	11/11/2015 10:14	Eric L Eby	1
07046	Barium	SW-846 6010B	1	153145705001	11/11/2015 10:14	Eric L Eby	1
07049	Cadmium	SW-846 6010B	1	153145705001	11/11/2015 10:14	Eric L Eby	1
07051	Chromium	SW-846 6010B	1	153145705001	11/11/2015 10:14	Eric L Eby	1
07055	Lead	SW-846 6010B	1	153145705001	11/11/2015 10:14	Eric L Eby	1
07036	Selenium	SW-846 6010B	1	153145705001	11/11/2015 10:14	Eric L Eby	1
07066	Silver	SW-846 6010B	1	153145705001	11/11/2015 10:14	Eric L Eby	1
00259	Mercury	SW-846 7470A	1	153145713002	11/11/2015 09:47	Damary Valentin	1
05705	ICP-WW/TL, 3010A (tot) - U3	SW-846 3010A	1	153145705001	11/10/2015 23:00	Annamaria Kuhns	1
05713	WW SW846 Hg Digest	SW-846 7470A	1	153145713002	11/11/2015 01:00	Annamaria Kuhns	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	15313-2486-094 7A	11/09/2015 12:45	Christina A Huber	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: B-7-0-2 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093381
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 10:45 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY705 SDG#: PYM01-03

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	20	J	10	28	0.99
10237	Benzene	71-43-2	N.D.		0.7	7	0.99
10237	Bromodichloromethane	75-27-4	N.D.		1	7	0.99
10237	Bromoform	75-25-2	N.D.		1	7	0.99
10237	Bromomethane	74-83-9	N.D.		3	7	0.99
10237	2-Butanone	78-93-3	N.D.		6	14	0.99
10237	Carbon Disulfide	75-15-0	N.D.		1	7	0.99
10237	Carbon Tetrachloride	56-23-5	N.D.		1	7	0.99
10237	Chlorobenzene	108-90-7	N.D.		1	7	0.99
10237	Chloroethane	75-00-3	N.D.		3	7	0.99
10237	Chloroform	67-66-3	N.D.		1	7	0.99
10237	Chloromethane	74-87-3	N.D.		3	7	0.99
10237	Cyclohexane	110-82-7	N.D.		1	7	0.99
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		3	7	0.99
10237	Dibromochloromethane	124-48-1	N.D.		1	7	0.99
10237	1,2-Dibromoethane	106-93-4	N.D.		1	7	0.99
10237	1,2-Dichlorobenzene	95-50-1	N.D.		1	7	0.99
10237	1,3-Dichlorobenzene	541-73-1	N.D.		1	7	0.99
10237	1,4-Dichlorobenzene	106-46-7	N.D.		1	7	0.99
10237	Dichlorodifluoromethane	75-71-8	N.D.		3	7	0.99
10237	1,1-Dichloroethane	75-34-3	N.D.		1	7	0.99
10237	1,2-Dichloroethane	107-06-2	N.D.		1	7	0.99
10237	1,1-Dichloroethene	75-35-4	N.D.		1	7	0.99
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		1	7	0.99
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		1	7	0.99
10237	1,2-Dichloropropane	78-87-5	N.D.		1	7	0.99
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		1	7	0.99
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		1	7	0.99
10237	Ethylbenzene	100-41-4	N.D.		1	7	0.99
10237	Freon 113	76-13-1	N.D.		3	14	0.99
10237	2-Hexanone	591-78-6	N.D.		4	14	0.99
10237	Isopropylbenzene	98-82-8	N.D.		1	7	0.99
10237	Methyl Acetate	79-20-9	N.D.		3	7	0.99
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.7	7	0.99
10237	4-Methyl-2-pentanone	108-10-1	N.D.		4	14	0.99
10237	Methylcyclohexane	108-87-2	N.D.		1	7	0.99
10237	Methylene Chloride	75-09-2	N.D.		3	7	0.99
10237	Styrene	100-42-5	N.D.		1	7	0.99
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		1	7	0.99
10237	Tetrachloroethene	127-18-4	N.D.		1	7	0.99
10237	Toluene	108-88-3	N.D.		1	7	0.99
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		1	7	0.99
10237	1,1,1-Trichloroethane	71-55-6	N.D.		1	7	0.99
10237	1,1,2-Trichloroethane	79-00-5	N.D.		1	7	0.99
10237	Trichloroethene	79-01-6	N.D.		1	7	0.99
10237	Trichlorofluoromethane	75-69-4	N.D.		3	7	0.99
10237	Vinyl Chloride	75-01-4	N.D.		1	7	0.99
10237	Xylene (Total)	1330-20-7	N.D.		1	7	0.99
GC Miscellaneous	**SW-846 8015B**		**mg/kg**		**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.		5.7	17	1

*=This limit was used in the evaluation of the final result

Sample Description: B-7-0-2 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093381
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 10:45 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY705 SDG#: PYM01-03

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	119	0.832	2.87	1
06946	Barium	7440-39-3	1,060	0.481	3.59	5
06949	Cadmium	7440-43-9	0.891	0.0617	0.717	1
06951	Chromium	7440-47-3	30.0	0.141	2.15	1
06955	Lead	7439-92-1	36.2	0.459	2.15	1
06936	Selenium	7782-49-2	17.2	1.19	2.87	1
06966	Silver	7440-22-4	N.D.	0.172	0.717	1
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0701 J	0.0140	0.140	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	30.3	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 15:32	Angela D Sneeringer	0.99
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 10:45	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 10:45	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 10:45	Client Supplied	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 18:41	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:01	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/23/2015 03:31	Tara L Snyder	5
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:01	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:01	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:01	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:01	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 02:01	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:10	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1

*=This limit was used in the evaluation of the final result

Sample Description: B-7-0-2 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093381
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 10:45 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY705 SDG#: PYM01-03

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-7-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093382
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:00 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY735 SDG#: PYM01-04

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	91		7	20	0.71
10237	Benzene	71-43-2	N.D.		0.5	5	0.71
10237	Bromodichloromethane	75-27-4	N.D.		1	5	0.71
10237	Bromoform	75-25-2	N.D.		1	5	0.71
10237	Bromomethane	74-83-9	N.D.		2	5	0.71
10237	2-Butanone	78-93-3	5	J	4	10	0.71
10237	Carbon Disulfide	75-15-0	N.D.		1	5	0.71
10237	Carbon Tetrachloride	56-23-5	N.D.		1	5	0.71
10237	Chlorobenzene	108-90-7	N.D.		1	5	0.71
10237	Chloroethane	75-00-3	N.D.		2	5	0.71
10237	Chloroform	67-66-3	N.D.		1	5	0.71
10237	Chloromethane	74-87-3	N.D.		2	5	0.71
10237	Cyclohexane	110-82-7	N.D.		1	5	0.71
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		2	5	0.71
10237	Dibromochloromethane	124-48-1	N.D.		1	5	0.71
10237	1,2-Dibromoethane	106-93-4	N.D.		1	5	0.71
10237	1,2-Dichlorobenzene	95-50-1	N.D.		1	5	0.71
10237	1,3-Dichlorobenzene	541-73-1	N.D.		1	5	0.71
10237	1,4-Dichlorobenzene	106-46-7	N.D.		1	5	0.71
10237	Dichlorodifluoromethane	75-71-8	N.D.		2	5	0.71
10237	1,1-Dichloroethane	75-34-3	N.D.		1	5	0.71
10237	1,2-Dichloroethane	107-06-2	N.D.		1	5	0.71
10237	1,1-Dichloroethene	75-35-4	N.D.		1	5	0.71
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		1	5	0.71
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		1	5	0.71
10237	1,2-Dichloropropane	78-87-5	N.D.		1	5	0.71
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		1	5	0.71
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		1	5	0.71
10237	Ethylbenzene	100-41-4	N.D.		1	5	0.71
10237	Freon 113	76-13-1	N.D.		2	10	0.71
10237	2-Hexanone	591-78-6	N.D.		3	10	0.71
10237	Isopropylbenzene	98-82-8	N.D.		1	5	0.71
10237	Methyl Acetate	79-20-9	N.D.		2	5	0.71
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.5	5	0.71
10237	4-Methyl-2-pentanone	108-10-1	N.D.		3	10	0.71
10237	Methylcyclohexane	108-87-2	N.D.		1	5	0.71
10237	Methylene Chloride	75-09-2	N.D.		2	5	0.71
10237	Styrene	100-42-5	N.D.		1	5	0.71
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		1	5	0.71
10237	Tetrachloroethene	127-18-4	N.D.		1	5	0.71
10237	Toluene	108-88-3	N.D.		1	5	0.71
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		1	5	0.71
10237	1,1,1-Trichloroethane	71-55-6	N.D.		1	5	0.71
10237	1,1,2-Trichloroethane	79-00-5	N.D.		1	5	0.71
10237	Trichloroethene	79-01-6	N.D.		1	5	0.71
10237	Trichlorofluoromethane	75-69-4	N.D.		2	5	0.71
10237	Vinyl Chloride	75-01-4	N.D.		1	5	0.71
10237	Xylene (Total)	1330-20-7	N.D.		1	5	0.71
GC Miscellaneous	**SW-846 8015B**		**mg/kg**		**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.		5.5	17	1

*=This limit was used in the evaluation of the final result

Sample Description: B-7-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093382
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:00 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY735 SDG#: PYM01-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	78.3	0.781	2.69	1
06946	Barium	7440-39-3	1,610	0.451	3.37	5
06949	Cadmium	7440-43-9	0.615 J	0.0579	0.673	1
06951	Chromium	7440-47-3	20.1	0.132	2.02	1
06955	Lead	7439-92-1	18.9	0.431	2.02	1
06936	Selenium	7782-49-2	11.6	1.12	2.69	1
06966	Silver	7440-22-4	N.D.	0.808	3.37	5
	Reporting limits were raised due to interference from the sample matrix.					
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0365 J	0.0135	0.135	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	27.9	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 15:55	Angela D Sneeringer	0.71
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 11:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 11:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 11:00	Client Supplied	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 14:12	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:10	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/23/2015 03:34	Tara L Snyder	5
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:10	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:10	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:10	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:10	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/23/2015 06:23	Tara L Snyder	5
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:16	Damary Valentin	1

*=This limit was used in the evaluation of the final result

Sample Description: B-7-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093382
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:00 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY735 SDG#: PYM01-04

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-5-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093383
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY524 SDG#: PYM01-05

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	25	J	10	28	0.92
10237	Benzene	71-43-2	N.D.		0.7	7	0.92
10237	Bromodichloromethane	75-27-4	N.D.		1	7	0.92
10237	Bromoform	75-25-2	N.D.		1	7	0.92
10237	Bromomethane	74-83-9	N.D.		3	7	0.92
10237	2-Butanone	78-93-3	N.D.		6	14	0.92
10237	Carbon Disulfide	75-15-0	N.D.		1	7	0.92
10237	Carbon Tetrachloride	56-23-5	N.D.		1	7	0.92
10237	Chlorobenzene	108-90-7	N.D.		1	7	0.92
10237	Chloroethane	75-00-3	N.D.		3	7	0.92
10237	Chloroform	67-66-3	N.D.		1	7	0.92
10237	Chloromethane	74-87-3	N.D.		3	7	0.92
10237	Cyclohexane	110-82-7	N.D.		1	7	0.92
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		3	7	0.92
10237	Dibromochloromethane	124-48-1	N.D.		1	7	0.92
10237	1,2-Dibromoethane	106-93-4	N.D.		1	7	0.92
10237	1,2-Dichlorobenzene	95-50-1	N.D.		1	7	0.92
10237	1,3-Dichlorobenzene	541-73-1	N.D.		1	7	0.92
10237	1,4-Dichlorobenzene	106-46-7	N.D.		1	7	0.92
10237	Dichlorodifluoromethane	75-71-8	N.D.		3	7	0.92
10237	1,1-Dichloroethane	75-34-3	N.D.		1	7	0.92
10237	1,2-Dichloroethane	107-06-2	N.D.		1	7	0.92
10237	1,1-Dichloroethene	75-35-4	N.D.		1	7	0.92
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		1	7	0.92
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		1	7	0.92
10237	1,2-Dichloropropane	78-87-5	N.D.		1	7	0.92
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		1	7	0.92
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		1	7	0.92
10237	Ethylbenzene	100-41-4	N.D.		1	7	0.92
10237	Freon 113	76-13-1	N.D.		3	14	0.92
10237	2-Hexanone	591-78-6	N.D.		4	14	0.92
10237	Isopropylbenzene	98-82-8	N.D.		1	7	0.92
10237	Methyl Acetate	79-20-9	N.D.		3	7	0.92
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.7	7	0.92
10237	4-Methyl-2-pentanone	108-10-1	N.D.		4	14	0.92
10237	Methylcyclohexane	108-87-2	N.D.		1	7	0.92
10237	Methylene Chloride	75-09-2	N.D.		3	7	0.92
10237	Styrene	100-42-5	N.D.		1	7	0.92
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		1	7	0.92
10237	Tetrachloroethene	127-18-4	N.D.		1	7	0.92
10237	Toluene	108-88-3	N.D.		1	7	0.92
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		1	7	0.92
10237	1,1,1-Trichloroethane	71-55-6	N.D.		1	7	0.92
10237	1,1,2-Trichloroethane	79-00-5	N.D.		1	7	0.92
10237	Trichloroethene	79-01-6	N.D.		1	7	0.92
10237	Trichlorofluoromethane	75-69-4	N.D.		3	7	0.92
10237	Vinyl Chloride	75-01-4	N.D.		1	7	0.92
10237	Xylene (Total)	1330-20-7	N.D.		1	7	0.92
Pesticides/PCBs	**SW-846 8082**		**ug/kg**		**ug/kg**	**ug/kg**	
10736	PCB-1016	12674-11-2	N.D.		5.5	26	1

*=This limit was used in the evaluation of the final result

Sample Description: B-5-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093383
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY524 SDG#: PYM01-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Pesticides/PCBs	**SW-846 8082**		**ug/kg**	**ug/kg**	**ug/kg**	
10736	PCB-1221	11104-28-2	N.D.	7.0	26	1
10736	PCB-1232	11141-16-5	N.D.	12	26	1
10736	PCB-1242	53469-21-9	N.D.	5.0	26	1
10736	PCB-1248	12672-29-6	N.D.	5.0	26	1
10736	PCB-1254	11097-69-1	N.D.	5.0	26	1
10736	PCB-1260	11096-82-5	N.D.	7.4	26	1
GC Miscellaneous	**SW-846 8015B**		**mg/kg**	**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.	6.1	18	1
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	233	0.885	3.05	1
06946	Barium	7440-39-3	1,710	0.511	3.82	5
06949	Cadmium	7440-43-9	1.11	0.0656	0.763	1
06951	Chromium	7440-47-3	45.8	0.150	2.29	1
06955	Lead	7439-92-1	56.6	0.489	2.29	1
06936	Selenium	7782-49-2	11.5	1.27	3.05	1
06966	Silver	7440-22-4	N.D.	0.916	3.82	5
	Reporting limits were raised due to interference from the sample matrix.					
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0848 J	0.0149	0.149	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	34.5	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 16:18	Angela D Sneeringer	0.92
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 11:15	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 11:15	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 11:15	Client Supplied	1
10736	PCBs in Soil (microwave)	SW-846 8082	1	152950013A	10/27/2015 06:20	Jessica L Miller	1

*=This limit was used in the evaluation of the final result

Sample Description: B-5-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093383
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY524 SDG#: PYM01-05

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10497	PCB Microwave Soil Extraction	SW-846 3546	1	152950013A	10/23/2015 08:30	Jessica M Velez	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 14:34	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:13	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/23/2015 03:41	Tara L Snyder	5
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:13	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:13	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:13	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:13	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/23/2015 06:26	Tara L Snyder	5
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:18	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-4-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093384
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:30 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY435 SDG#: PYM01-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**	**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	N.D.	9	26	0.93
10237	Benzene	71-43-2	N.D.	0.6	6	0.93
10237	Bromodichloromethane	75-27-4	N.D.	1	6	0.93
10237	Bromoform	75-25-2	N.D.	1	6	0.93
10237	Bromomethane	74-83-9	N.D.	3	6	0.93
10237	2-Butanone	78-93-3	N.D.	5	13	0.93
10237	Carbon Disulfide	75-15-0	N.D.	1	6	0.93
10237	Carbon Tetrachloride	56-23-5	N.D.	1	6	0.93
10237	Chlorobenzene	108-90-7	N.D.	1	6	0.93
10237	Chloroethane	75-00-3	N.D.	3	6	0.93
10237	Chloroform	67-66-3	N.D.	1	6	0.93
10237	Chloromethane	74-87-3	N.D.	3	6	0.93
10237	Cyclohexane	110-82-7	N.D.	1	6	0.93
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	3	6	0.93
10237	Dibromochloromethane	124-48-1	N.D.	1	6	0.93
10237	1,2-Dibromoethane	106-93-4	N.D.	1	6	0.93
10237	1,2-Dichlorobenzene	95-50-1	N.D.	1	6	0.93
10237	1,3-Dichlorobenzene	541-73-1	N.D.	1	6	0.93
10237	1,4-Dichlorobenzene	106-46-7	N.D.	1	6	0.93
10237	Dichlorodifluoromethane	75-71-8	N.D.	3	6	0.93
10237	1,1-Dichloroethane	75-34-3	N.D.	1	6	0.93
10237	1,2-Dichloroethane	107-06-2	N.D.	1	6	0.93
10237	1,1-Dichloroethene	75-35-4	N.D.	1	6	0.93
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	1	6	0.93
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	1	6	0.93
10237	1,2-Dichloropropane	78-87-5	N.D.	1	6	0.93
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	1	6	0.93
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	1	6	0.93
10237	Ethylbenzene	100-41-4	N.D.	1	6	0.93
10237	Freon 113	76-13-1	N.D.	3	13	0.93
10237	2-Hexanone	591-78-6	N.D.	4	13	0.93
10237	Isopropylbenzene	98-82-8	N.D.	1	6	0.93
10237	Methyl Acetate	79-20-9	N.D.	3	6	0.93
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.6	6	0.93
10237	4-Methyl-2-pentanone	108-10-1	N.D.	4	13	0.93
10237	Methylcyclohexane	108-87-2	N.D.	1	6	0.93
10237	Methylene Chloride	75-09-2	N.D.	3	6	0.93
10237	Styrene	100-42-5	N.D.	1	6	0.93
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	1	6	0.93
10237	Tetrachloroethene	127-18-4	N.D.	1	6	0.93
10237	Toluene	108-88-3	N.D.	1	6	0.93
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	1	6	0.93
10237	1,1,1-Trichloroethane	71-55-6	N.D.	1	6	0.93
10237	1,1,2-Trichloroethane	79-00-5	N.D.	1	6	0.93
10237	Trichloroethene	79-01-6	N.D.	1	6	0.93
10237	Trichlorofluoromethane	75-69-4	N.D.	3	6	0.93
10237	Vinyl Chloride	75-01-4	N.D.	1	6	0.93
10237	Xylene (Total)	1330-20-7	N.D.	1	6	0.93
GC Miscellaneous	**SW-846 8015B**		**mg/kg**	**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.	5.5	16	1

*=This limit was used in the evaluation of the final result

Sample Description: B-4-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093384
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:30 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY435 SDG#: PYM01-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	208	0.809	2.79	1
06946	Barium	7440-39-3	1,110	0.467	3.49	5
06949	Cadmium	7440-43-9	0.492 J	0.0600	0.697	1
06951	Chromium	7440-47-3	33.1	0.137	2.09	1
06955	Lead	7439-92-1	32.3	0.446	2.09	1
06936	Selenium	7782-49-2	11.8	1.16	2.79	1
06966	Silver	7440-22-4	N.D.	0.167	0.697	1
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0949 J	0.0131	0.131	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	28.3	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 16:40	Angela D Sneeringer	0.93
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 11:30	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 11:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 11:30	Client Supplied	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 16:49	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:17	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/23/2015 03:48	Tara L Snyder	5
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:17	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:17	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:17	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:17	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 02:17	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:20	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1

*=This limit was used in the evaluation of the final result

Sample Description: B-4-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093384
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:30 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY435 SDG#: PYM01-06

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093385
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:45 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY235 SDG#: PYM01-07

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	5	J	4	10	0.37
10237	Benzene	71-43-2	N.D.		0.3	3	0.37
10237	Bromodichloromethane	75-27-4	N.D.		0.5	3	0.37
10237	Bromoform	75-25-2	N.D.		0.5	3	0.37
10237	Bromomethane	74-83-9	N.D.		1	3	0.37
10237	2-Butanone	78-93-3	N.D.		2	5	0.37
10237	Carbon Disulfide	75-15-0	N.D.		0.5	3	0.37
10237	Carbon Tetrachloride	56-23-5	N.D.		0.5	3	0.37
10237	Chlorobenzene	108-90-7	N.D.		0.5	3	0.37
10237	Chloroethane	75-00-3	N.D.		1	3	0.37
10237	Chloroform	67-66-3	N.D.		0.5	3	0.37
10237	Chloromethane	74-87-3	N.D.		1	3	0.37
10237	Cyclohexane	110-82-7	N.D.		0.5	3	0.37
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		1	3	0.37
10237	Dibromochloromethane	124-48-1	N.D.		0.5	3	0.37
10237	1,2-Dibromoethane	106-93-4	N.D.		0.5	3	0.37
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.5	3	0.37
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.5	3	0.37
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.5	3	0.37
10237	Dichlorodifluoromethane	75-71-8	N.D.		1	3	0.37
10237	1,1-Dichloroethane	75-34-3	N.D.		0.5	3	0.37
10237	1,2-Dichloroethane	107-06-2	N.D.		0.5	3	0.37
10237	1,1-Dichloroethene	75-35-4	N.D.		0.5	3	0.37
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.5	3	0.37
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.5	3	0.37
10237	1,2-Dichloropropane	78-87-5	N.D.		0.5	3	0.37
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.5	3	0.37
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.5	3	0.37
10237	Ethylbenzene	100-41-4	N.D.		0.5	3	0.37
10237	Freon 113	76-13-1	N.D.		1	5	0.37
10237	2-Hexanone	591-78-6	N.D.		2	5	0.37
10237	Isopropylbenzene	98-82-8	N.D.		0.5	3	0.37
10237	Methyl Acetate	79-20-9	N.D.		1	3	0.37
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.3	3	0.37
10237	4-Methyl-2-pentanone	108-10-1	N.D.		2	5	0.37
10237	Methylcyclohexane	108-87-2	N.D.		0.5	3	0.37
10237	Methylene Chloride	75-09-2	N.D.		1	3	0.37
10237	Styrene	100-42-5	N.D.		0.5	3	0.37
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.5	3	0.37
10237	Tetrachloroethene	127-18-4	N.D.		0.5	3	0.37
10237	Toluene	108-88-3	N.D.		0.5	3	0.37
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.5	3	0.37
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.5	3	0.37
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.5	3	0.37
10237	Trichloroethene	79-01-6	N.D.		0.5	3	0.37
10237	Trichlorofluoromethane	75-69-4	N.D.		1	3	0.37
10237	Vinyl Chloride	75-01-4	N.D.		0.5	3	0.37
10237	Xylene (Total)	1330-20-7	N.D.		0.5	3	0.37
Pesticides/PCBs	**SW-846 8082**		**ug/kg**		**ug/kg**	**ug/kg**	
10736	PCB-1016	12674-11-2	N.D.		5.0	23	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093385
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:45 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY235 SDG#: PYM01-07

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Pesticides/PCBs	**SW-846 8082**		**ug/kg**	**ug/kg**	**ug/kg**	
10736	PCB-1221	11104-28-2	N.D.	6.3	23	1
10736	PCB-1232	11141-16-5	N.D.	11	23	1
10736	PCB-1242	53469-21-9	N.D.	4.5	23	1
10736	PCB-1248	12672-29-6	N.D.	4.5	23	1
10736	PCB-1254	11097-69-1	N.D.	4.5	23	1
10736	PCB-1260	11096-82-5	N.D.	6.8	23	1
GC Miscellaneous	**SW-846 8015B**		**mg/kg**	**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.	5.5	16	1
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	220	0.802	2.77	1
06946	Barium	7440-39-3	1,180	0.463	3.46	5
06949	Cadmium	7440-43-9	0.723	0.0595	0.692	1
06951	Chromium	7440-47-3	30.1	0.136	2.07	1
06955	Lead	7439-92-1	31.4	0.443	2.07	1
06936	Selenium	7782-49-2	13.9	1.15	2.77	1
06966	Silver	7440-22-4	N.D.	0.166	0.692	1
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0830 J	0.0129	0.129	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	27.7	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152942AA	10/21/2015 22:28	Kathrine K Muramatsu	0.37
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 11:45	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 11:45	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 11:45	Client Supplied	1
10736	PCBs in Soil (microwave)	SW-846 8082	1	152950013A	10/27/2015 06:32	Jessica L Miller	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-3-5 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093385
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 11:45 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY235 SDG#: PYM01-07

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10497	PCB Microwave Soil Extraction	SW-846 3546	1	152950013A	10/23/2015 08:30	Jessica M Velez	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 14:57	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:20	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/23/2015 03:51	Tara L Snyder	5
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:20	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:20	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:20	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:20	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 02:20	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:23	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-6-8 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093386
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 12:00 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY268 SDG#: PYM01-08

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/kg		ug/kg	ug/kg	
10237	Acetone	67-64-1	160		13	36	1.15
10237	Benzene	71-43-2	N.D.		0.9	9	1.15
10237	Bromodichloromethane	75-27-4	N.D.		2	9	1.15
10237	Bromoform	75-25-2	N.D.		2	9	1.15
10237	Bromomethane	74-83-9	N.D.		4	9	1.15
10237	2-Butanone	78-93-3	20		7	18	1.15
10237	Carbon Disulfide	75-15-0	4	J	2	9	1.15
10237	Carbon Tetrachloride	56-23-5	N.D.		2	9	1.15
10237	Chlorobenzene	108-90-7	N.D.		2	9	1.15
10237	Chloroethane	75-00-3	N.D.		4	9	1.15
10237	Chloroform	67-66-3	N.D.		2	9	1.15
10237	Chloromethane	74-87-3	N.D.		4	9	1.15
10237	Cyclohexane	110-82-7	N.D.		2	9	1.15
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		4	9	1.15
10237	Dibromochloromethane	124-48-1	N.D.		2	9	1.15
10237	1,2-Dibromoethane	106-93-4	N.D.		2	9	1.15
10237	1,2-Dichlorobenzene	95-50-1	N.D.		2	9	1.15
10237	1,3-Dichlorobenzene	541-73-1	N.D.		2	9	1.15
10237	1,4-Dichlorobenzene	106-46-7	N.D.		2	9	1.15
10237	Dichlorodifluoromethane	75-71-8	N.D.		4	9	1.15
10237	1,1-Dichloroethane	75-34-3	N.D.		2	9	1.15
10237	1,2-Dichloroethane	107-06-2	N.D.		2	9	1.15
10237	1,1-Dichloroethene	75-35-4	N.D.		2	9	1.15
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		2	9	1.15
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		2	9	1.15
10237	1,2-Dichloropropane	78-87-5	N.D.		2	9	1.15
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		2	9	1.15
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		2	9	1.15
10237	Ethylbenzene	100-41-4	N.D.		2	9	1.15
10237	Freon 113	76-13-1	N.D.		4	18	1.15
10237	2-Hexanone	591-78-6	N.D.		5	18	1.15
10237	Isopropylbenzene	98-82-8	N.D.		2	9	1.15
10237	Methyl Acetate	79-20-9	N.D.		4	9	1.15
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.9	9	1.15
10237	4-Methyl-2-pentanone	108-10-1	N.D.		5	18	1.15
10237	Methylcyclohexane	108-87-2	N.D.		2	9	1.15
10237	Methylene Chloride	75-09-2	N.D.		4	9	1.15
10237	Styrene	100-42-5	N.D.		2	9	1.15
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		2	9	1.15
10237	Tetrachloroethene	127-18-4	N.D.		2	9	1.15
10237	Toluene	108-88-3	N.D.		2	9	1.15
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		2	9	1.15
10237	1,1,1-Trichloroethane	71-55-6	N.D.		2	9	1.15
10237	1,1,2-Trichloroethane	79-00-5	N.D.		2	9	1.15
10237	Trichloroethene	79-01-6	N.D.		2	9	1.15
10237	Trichlorofluoromethane	75-69-4	N.D.		4	9	1.15
10237	Vinyl Chloride	75-01-4	N.D.		2	9	1.15
10237	Xylene (Total)	1330-20-7	N.D.		2	9	1.15

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: The sample was re-analyzed and the QC is again outside of the

*=This limit was used in the evaluation of the final result

Sample Description: B-2-6-8 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093386
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 12:00 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY268 SDG#: PYM01-08

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	acceptance limits, indicating a matrix effect. The data is reported from the initial trial.						
Pesticides/PCBs	**SW-846 8082**		**ug/kg**		**ug/kg**	**ug/kg**	
10736	PCB-1016	12674-11-2	N.D.		28	130	5
10736	PCB-1221	11104-28-2	N.D.		35	130	5
10736	PCB-1232	11141-16-5	N.D.		61	130	5
10736	PCB-1242	53469-21-9	N.D.		25	130	5
10736	PCB-1248	12672-29-6	N.D.		25	130	5
10736	PCB-1254	11097-69-1	N.D.		25	130	5
10736	PCB-1260	11096-82-5	N.D.		38	130	5
	Reporting limits were raised due to interference from the sample matrix.						
GC Miscellaneous	**SW-846 8015B**		**mg/kg**		**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	6,100		150	460	25
Metals	**SW-846 6010B**		**mg/kg**		**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	51.2		0.876	3.02	1
06946	Barium	7440-39-3	169		0.101	0.755	1
06949	Cadmium	7440-43-9	0.572	J	0.0649	0.755	1
06951	Chromium	7440-47-3	20.6		0.148	2.26	1
06955	Lead	7439-92-1	480		0.483	2.26	1
06936	Selenium	7782-49-2	11.0		1.25	3.02	1
06966	Silver	7440-22-4	N.D.		0.181	0.755	1
	SW-846 7471A		**mg/kg**		**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.264		0.0152	0.152	1
Wet Chemistry	**SM 2540 G-1997**		**%**		**%**	**%**	
00111	Moisture	n.a.	35.7		0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.						

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 18:35	Angela D Sneeringer	1.15
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 12:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 12:00	Client Supplied	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-6-8 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093386
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 12:00 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY268 SDG#: PYM01-08

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 12:00	Client Supplied	1
10736	PCBs in Soil (microwave)	SW-846 8082	1	152950013A	10/27/2015 21:15	Jessica L Miller	5
10497	PCB Microwave Soil Extraction	SW-846 3546	1	152950013A	10/23/2015 08:30	Jessica M Velez	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/27/2015 16:34	Thomas C Wildermuth	25
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:23	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/22/2015 02:23	Tara L Snyder	1
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:23	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:23	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:23	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:23	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 02:23	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:25	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-6-8 Grab Soil
Potomac Yard Metro Station, VA TCLP NVE

LL Sample # TL 8093387
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/15/2015 12:00 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PL268 SDG#: PYM01-09

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals		**SW-846 6010B**	**mg/l**	**mg/l**	**mg/l**	
07035	Arsenic	7440-38-2	0.0842	0.0070	0.0200	1
07046	Barium	7440-39-3	3.60	0.00030	0.0050	1
07049	Cadmium	7440-43-9	0.0013 J	0.00030	0.0050	1
07051	Chromium	7440-47-3	0.0091 J	0.0015	0.0150	1
07055	Lead	7439-92-1	N.D.	0.0051	0.0150	1
07036	Selenium	7782-49-2	0.0208	0.0082	0.0200	1
07066	Silver	7440-22-4	N.D.	0.0014	0.0050	1
		SW-846 7470A	**mg/l**	**mg/l**	**mg/l**	
00259	Mercury	7439-97-6	N.D.	0.000050	0.00020	1

General Sample Comments

If the analysis is for determination of Hazardous Waste Characteristics, see Table 1 in EPA Code of Federal Regulations 40 CFR 261.24.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
07035	Arsenic	SW-846 6010B	1	153145705001	11/11/2015 10:18	Eric L Eby	1
07046	Barium	SW-846 6010B	1	153145705001	11/11/2015 10:18	Eric L Eby	1
07049	Cadmium	SW-846 6010B	1	153145705001	11/11/2015 10:18	Eric L Eby	1
07051	Chromium	SW-846 6010B	1	153145705001	11/11/2015 10:18	Eric L Eby	1
07055	Lead	SW-846 6010B	1	153145705001	11/11/2015 10:18	Eric L Eby	1
07036	Selenium	SW-846 6010B	1	153145705001	11/11/2015 10:18	Eric L Eby	1
07066	Silver	SW-846 6010B	1	153145705001	11/11/2015 10:18	Eric L Eby	1
00259	Mercury	SW-846 7470A	1	153145713002	11/11/2015 09:49	Damary Valentin	1
05705	ICP-WW/TL, 3010A (tot) - U3	SW-846 3010A	1	153145705001	11/10/2015 23:00	Annamaria Kuhns	1
05713	WW SW846 Hg Digest	SW-846 7470A	1	153145713002	11/11/2015 01:00	Annamaria Kuhns	1
00947	TCLP Non-volatile Extraction	SW-846 1311	1	15313-2486-094 7A	11/09/2015 12:45	Christina A Huber	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: B-2-10-12 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093388
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/13/2015 12:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY210 SDG#: PYM01-10

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	7	J	6	18	0.72
10237	Benzene	71-43-2	N.D.		0.4	4	0.72
10237	Bromodichloromethane	75-27-4	N.D.		0.9	4	0.72
10237	Bromoform	75-25-2	N.D.		0.9	4	0.72
10237	Bromomethane	74-83-9	N.D.		2	4	0.72
10237	2-Butanone	78-93-3	N.D.		4	9	0.72
10237	Carbon Disulfide	75-15-0	N.D.		0.9	4	0.72
10237	Carbon Tetrachloride	56-23-5	N.D.		0.9	4	0.72
10237	Chlorobenzene	108-90-7	N.D.		0.9	4	0.72
10237	Chloroethane	75-00-3	N.D.		2	4	0.72
10237	Chloroform	67-66-3	N.D.		0.9	4	0.72
10237	Chloromethane	74-87-3	N.D.		2	4	0.72
10237	Cyclohexane	110-82-7	N.D.		0.9	4	0.72
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		2	4	0.72
10237	Dibromochloromethane	124-48-1	N.D.		0.9	4	0.72
10237	1,2-Dibromoethane	106-93-4	N.D.		0.9	4	0.72
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.9	4	0.72
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.9	4	0.72
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.9	4	0.72
10237	Dichlorodifluoromethane	75-71-8	N.D.		2	4	0.72
10237	1,1-Dichloroethane	75-34-3	N.D.		0.9	4	0.72
10237	1,2-Dichloroethane	107-06-2	N.D.		0.9	4	0.72
10237	1,1-Dichloroethene	75-35-4	N.D.		0.9	4	0.72
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.9	4	0.72
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.9	4	0.72
10237	1,2-Dichloropropane	78-87-5	N.D.		0.9	4	0.72
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.9	4	0.72
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.9	4	0.72
10237	Ethylbenzene	100-41-4	N.D.		0.9	4	0.72
10237	Freon 113	76-13-1	N.D.		2	9	0.72
10237	2-Hexanone	591-78-6	N.D.		3	9	0.72
10237	Isopropylbenzene	98-82-8	N.D.		0.9	4	0.72
10237	Methyl Acetate	79-20-9	N.D.		2	4	0.72
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.4	4	0.72
10237	4-Methyl-2-pentanone	108-10-1	N.D.		3	9	0.72
10237	Methylcyclohexane	108-87-2	N.D.		0.9	4	0.72
10237	Methylene Chloride	75-09-2	N.D.		2	4	0.72
10237	Styrene	100-42-5	N.D.		0.9	4	0.72
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.9	4	0.72
10237	Tetrachloroethene	127-18-4	N.D.		0.9	4	0.72
10237	Toluene	108-88-3	N.D.		0.9	4	0.72
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.9	4	0.72
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.9	4	0.72
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.9	4	0.72
10237	Trichloroethene	79-01-6	N.D.		0.9	4	0.72
10237	Trichlorofluoromethane	75-69-4	N.D.		2	4	0.72
10237	Vinyl Chloride	75-01-4	N.D.		0.9	4	0.72
10237	Xylene (Total)	1330-20-7	N.D.		0.9	4	0.72
Pesticides/PCBs	**SW-846 8082**		**ug/kg**		**ug/kg**	**ug/kg**	
10736	PCB-1016	12674-11-2	N.D.		4.4	21	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-10-12 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093388
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/13/2015 12:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY210 SDG#: PYM01-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Pesticides/PCBs	**SW-846 8082**		**ug/kg**	**ug/kg**	**ug/kg**	
10736	PCB-1221	11104-28-2	N.D.	5.6	21	1
10736	PCB-1232	11141-16-5	N.D.	9.8	21	1
10736	PCB-1242	53469-21-9	N.D.	4.0	21	1
10736	PCB-1248	12672-29-6	N.D.	4.0	21	1
10736	PCB-1254	11097-69-1	N.D.	4.0	21	1
10736	PCB-1260	11096-82-5	N.D.	6.0	21	1
GC Miscellaneous	**SW-846 8015B**		**mg/kg**	**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.	4.9	15	1
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	5.26	0.700	2.41	1
06946	Barium	7440-39-3	67.3	0.0809	0.604	1
06949	Cadmium	7440-43-9	0.893 J	0.260	3.02	5
	Reporting limits were raised due to interference from the sample matrix.					
06951	Chromium	7440-47-3	25.3	0.118	1.81	1
06955	Lead	7439-92-1	17.5	0.386	1.81	1
06936	Selenium	7782-49-2	9.71	1.00	2.41	1
06966	Silver	7440-22-4	5.13	0.145	0.604	1
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0123 J	0.0121	0.121	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	18.8	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 17:26	Angela D Sneeringer	0.72
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/15/2015 12:15	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/15/2015 12:15	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/15/2015 12:15	Client Supplied	1
10736	PCBs in Soil (microwave)	SW-846 8082	1	152950013A	10/27/2015 07:17	Jessica L Miller	1

*=This limit was used in the evaluation of the final result

Sample Description: B-2-10-12 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093388
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/13/2015 12:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY210 SDG#: PYM01-10

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10497	PCB Microwave Soil Extraction	SW-846 3546	1	152950013A	10/23/2015 08:30	Jessica M Velez	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 15:19	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:26	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/22/2015 02:26	Tara L Snyder	1
06949	Cadmium	SW-846 6010B	1	152925708002	10/23/2015 03:54	Tara L Snyder	5
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:26	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:26	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:26	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 02:26	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:27	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-1-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093389
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/16/2015 10:30 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY124 SDG#: PYM01-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**	**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	52	9	27	1.04
10237	Benzene	71-43-2	N.D.	0.7	7	1.04
10237	Bromodichloromethane	75-27-4	N.D.	1	7	1.04
10237	Bromoform	75-25-2	N.D.	1	7	1.04
10237	Bromomethane	74-83-9	N.D.	3	7	1.04
10237	2-Butanone	78-93-3	N.D.	5	13	1.04
10237	Carbon Disulfide	75-15-0	N.D.	1	7	1.04
10237	Carbon Tetrachloride	56-23-5	N.D.	1	7	1.04
10237	Chlorobenzene	108-90-7	N.D.	1	7	1.04
10237	Chloroethane	75-00-3	N.D.	3	7	1.04
10237	Chloroform	67-66-3	N.D.	1	7	1.04
10237	Chloromethane	74-87-3	N.D.	3	7	1.04
10237	Cyclohexane	110-82-7	N.D.	1	7	1.04
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	3	7	1.04
10237	Dibromochloromethane	124-48-1	N.D.	1	7	1.04
10237	1,2-Dibromoethane	106-93-4	N.D.	1	7	1.04
10237	1,2-Dichlorobenzene	95-50-1	N.D.	1	7	1.04
10237	1,3-Dichlorobenzene	541-73-1	N.D.	1	7	1.04
10237	1,4-Dichlorobenzene	106-46-7	N.D.	1	7	1.04
10237	Dichlorodifluoromethane	75-71-8	N.D.	3	7	1.04
10237	1,1-Dichloroethane	75-34-3	N.D.	1	7	1.04
10237	1,2-Dichloroethane	107-06-2	N.D.	1	7	1.04
10237	1,1-Dichloroethene	75-35-4	N.D.	1	7	1.04
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	1	7	1.04
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	1	7	1.04
10237	1,2-Dichloropropane	78-87-5	N.D.	1	7	1.04
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	1	7	1.04
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	1	7	1.04
10237	Ethylbenzene	100-41-4	N.D.	1	7	1.04
10237	Freon 113	76-13-1	N.D.	3	13	1.04
10237	2-Hexanone	591-78-6	N.D.	4	13	1.04
10237	Isopropylbenzene	98-82-8	N.D.	1	7	1.04
10237	Methyl Acetate	79-20-9	N.D.	3	7	1.04
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.7	7	1.04
10237	4-Methyl-2-pentanone	108-10-1	N.D.	4	13	1.04
10237	Methylcyclohexane	108-87-2	N.D.	1	7	1.04
10237	Methylene Chloride	75-09-2	N.D.	3	7	1.04
10237	Styrene	100-42-5	N.D.	1	7	1.04
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	1	7	1.04
10237	Tetrachloroethene	127-18-4	N.D.	1	7	1.04
10237	Toluene	108-88-3	N.D.	1	7	1.04
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	1	7	1.04
10237	1,1,1-Trichloroethane	71-55-6	N.D.	1	7	1.04
10237	1,1,2-Trichloroethane	79-00-5	N.D.	1	7	1.04
10237	Trichloroethene	79-01-6	N.D.	1	7	1.04
10237	Trichlorofluoromethane	75-69-4	N.D.	3	7	1.04
10237	Vinyl Chloride	75-01-4	N.D.	1	7	1.04
10237	Xylene (Total)	1330-20-7	N.D.	1	7	1.04
Pesticides/PCBs	**SW-846 8082**		**ug/kg**	**ug/kg**	**ug/kg**	
10736	PCB-1016	12674-11-2	N.D.	4.6	22	1

*=This limit was used in the evaluation of the final result

Sample Description: B-1-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093389
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/16/2015 10:30 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY124 SDG#: PYM01-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Pesticides/PCBs	**SW-846 8082**		**ug/kg**	**ug/kg**	**ug/kg**	
10736	PCB-1221	11104-28-2	N.D.	5.8	22	1
10736	PCB-1232	11141-16-5	N.D.	10	22	1
10736	PCB-1242	53469-21-9	N.D.	4.2	22	1
10736	PCB-1248	12672-29-6	N.D.	4.2	22	1
10736	PCB-1254	11097-69-1	N.D.	4.2	22	1
10736	PCB-1260	11096-82-5	25	6.2	22	1
GC Miscellaneous	**SW-846 8015B**		**mg/kg**	**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.	5.1	15	1
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	116	0.716	2.47	1
06946	Barium	7440-39-3	681	0.413	3.09	5
06949	Cadmium	7440-43-9	0.588 J	0.0531	0.617	1
06951	Chromium	7440-47-3	22.6	0.121	1.85	1
06955	Lead	7439-92-1	25.2	0.395	1.85	1
06936	Selenium	7782-49-2	7.24	1.02	2.47	1
06966	Silver	7440-22-4	N.D.	0.148	0.617	1
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0696 J	0.0126	0.126	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	22.1	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 17:49	Angela D Sneeringer	1.04
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/16/2015 10:30	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/16/2015 10:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/16/2015 10:30	Client Supplied	1
10736	PCBs in Soil (microwave)	SW-846 8082	1	152950013A	10/27/2015 07:28	Jessica L Miller	1

*=This limit was used in the evaluation of the final result

Sample Description: B-1-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093389
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/16/2015 10:30 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY124 SDG#: PYM01-11

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10497	PCB Microwave Soil Extraction	SW-846 3546	1	152950013A	10/23/2015 08:30	Jessica M Velez	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 17:11	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:30	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/23/2015 04:03	Tara L Snyder	5
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:30	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:30	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:30	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:30	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 02:30	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:29	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: B-8-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093390
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/16/2015 11:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY824 SDG#: PYM01-12

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/kg**		**ug/kg**	**ug/kg**	
10237	Acetone	67-64-1	20	J	7	21	0.84
10237	Benzene	71-43-2	N.D.		0.5	5	0.84
10237	Bromodichloromethane	75-27-4	N.D.		1	5	0.84
10237	Bromoform	75-25-2	N.D.		1	5	0.84
10237	Bromomethane	74-83-9	N.D.		2	5	0.84
10237	2-Butanone	78-93-3	N.D.		4	11	0.84
10237	Carbon Disulfide	75-15-0	N.D.		1	5	0.84
10237	Carbon Tetrachloride	56-23-5	N.D.		1	5	0.84
10237	Chlorobenzene	108-90-7	N.D.		1	5	0.84
10237	Chloroethane	75-00-3	N.D.		2	5	0.84
10237	Chloroform	67-66-3	N.D.		1	5	0.84
10237	Chloromethane	74-87-3	N.D.		2	5	0.84
10237	Cyclohexane	110-82-7	N.D.		1	5	0.84
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		2	5	0.84
10237	Dibromochloromethane	124-48-1	N.D.		1	5	0.84
10237	1,2-Dibromoethane	106-93-4	N.D.		1	5	0.84
10237	1,2-Dichlorobenzene	95-50-1	N.D.		1	5	0.84
10237	1,3-Dichlorobenzene	541-73-1	N.D.		1	5	0.84
10237	1,4-Dichlorobenzene	106-46-7	N.D.		1	5	0.84
10237	Dichlorodifluoromethane	75-71-8	N.D.		2	5	0.84
10237	1,1-Dichloroethane	75-34-3	N.D.		1	5	0.84
10237	1,2-Dichloroethane	107-06-2	N.D.		1	5	0.84
10237	1,1-Dichloroethene	75-35-4	N.D.		1	5	0.84
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		1	5	0.84
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		1	5	0.84
10237	1,2-Dichloropropane	78-87-5	N.D.		1	5	0.84
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		1	5	0.84
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		1	5	0.84
10237	Ethylbenzene	100-41-4	N.D.		1	5	0.84
10237	Freon 113	76-13-1	N.D.		2	11	0.84
10237	2-Hexanone	591-78-6	N.D.		3	11	0.84
10237	Isopropylbenzene	98-82-8	N.D.		1	5	0.84
10237	Methyl Acetate	79-20-9	N.D.		2	5	0.84
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.5	5	0.84
10237	4-Methyl-2-pentanone	108-10-1	N.D.		3	11	0.84
10237	Methylcyclohexane	108-87-2	N.D.		1	5	0.84
10237	Methylene Chloride	75-09-2	N.D.		2	5	0.84
10237	Styrene	100-42-5	N.D.		1	5	0.84
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		1	5	0.84
10237	Tetrachloroethene	127-18-4	N.D.		1	5	0.84
10237	Toluene	108-88-3	N.D.		1	5	0.84
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		1	5	0.84
10237	1,1,1-Trichloroethane	71-55-6	N.D.		1	5	0.84
10237	1,1,2-Trichloroethane	79-00-5	N.D.		1	5	0.84
10237	Trichloroethene	79-01-6	N.D.		1	5	0.84
10237	Trichlorofluoromethane	75-69-4	N.D.		2	5	0.84
10237	Vinyl Chloride	75-01-4	N.D.		1	5	0.84
10237	Xylene (Total)	1330-20-7	N.D.		1	5	0.84
GC Miscellaneous	**SW-846 8015B**		**mg/kg**		**mg/kg**	**mg/kg**	
10941	TPH-DRO soil C10-C28 microwave	n.a.	N.D.		5.0	15	1

*=This limit was used in the evaluation of the final result

Sample Description: B-8-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093390
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/16/2015 11:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY824 SDG#: PYM01-12

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010B**		**mg/kg**	**mg/kg**	**mg/kg**	
06935	Arsenic	7440-38-2	22.4	0.725	2.50	1
06946	Barium	7440-39-3	103	0.0838	0.625	1
06949	Cadmium	7440-43-9	0.526 J	0.0538	0.625	1
06951	Chromium	7440-47-3	30.6	0.123	1.88	1
06955	Lead	7439-92-1	53.5	0.400	1.88	1
06936	Selenium	7782-49-2	3.49	1.04	2.50	1
06966	Silver	7440-22-4	N.D.	0.150	0.625	1
	SW-846 7471A		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.0460 J	0.0122	0.122	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	20.8	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	TCL VOCs 4.3 8260B	SW-846 8260B	1	X152931AA	10/20/2015 18:12	Angela D Sneeringer	0.84
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201529039141	10/16/2015 11:15	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201529039141	10/16/2015 11:15	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201529039141	10/16/2015 11:15	Client Supplied	1
10941	TPH-DRO soil C10-C28 microwave	SW-846 8015B	1	152960028A	10/26/2015 17:56	Thomas C Wildermuth	1
10942	Microwave Extraction-DRO soils	SW-846 3546	1	152960028A	10/24/2015 08:35	Olivia Arosemena	1
06935	Arsenic	SW-846 6010B	1	152925708002	10/22/2015 02:33	Tara L Snyder	1
06946	Barium	SW-846 6010B	1	152925708002	10/22/2015 02:33	Tara L Snyder	1
06949	Cadmium	SW-846 6010B	1	152925708002	10/22/2015 02:33	Tara L Snyder	1
06951	Chromium	SW-846 6010B	1	152925708002	10/22/2015 02:33	Tara L Snyder	1
06955	Lead	SW-846 6010B	1	152925708002	10/22/2015 02:33	Tara L Snyder	1
06936	Selenium	SW-846 6010B	1	152925708002	10/22/2015 02:33	Tara L Snyder	1
06966	Silver	SW-846 6010B	1	152925708002	10/22/2015 02:33	Tara L Snyder	1
00159	Mercury	SW-846 7471A	1	152945711004	10/23/2015 07:31	Damary Valentin	1
05708	ICP-ICPMS - SW, 3050B - U3	SW-846 3050B	1	152925708002	10/20/2015 09:26	Christopher M Klumpp	1

*=This limit was used in the evaluation of the final result

Sample Description: B-8-2-4 Grab Soil
Potomac Yard Metro Station, VA

LL Sample # SW 8093390
LL Group # 1601713
Account # 10303

Project Name: Potomac Yard Metro Station

Collected: 10/16/2015 11:15 by BM

Submitted: 10/16/2015 17:40
Reported: 11/16/2015 11:45

AECOM Environment
3101 Wilson Boulevard
Suite 900
Arlington VA

PY824 SDG#: PYM01-12

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
05711	Hg-SW, 7471A - U3	SW-846 7471A modified	1	152945711004	10/22/2015 13:50	Christopher M Klumpp	1
00111	Moisture	SM 2540 G-1997	1	15293820004B	10/20/2015 20:53	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: AECOM Environment Group Number: 1601713
Reported: 11/16/2015 11:45

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result		Blank MDL**	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: X152931AA	Sample number(s): 8093379,8093381-8093384,8093386,8093388-8093390									
Acetone	N.D.		7.	20	ug/kg	92	88	46-139	4	30
Benzene	N.D.		0.5	5	ug/kg	96	95	80-120	2	30
Bromodichloromethane	N.D.		1.	5	ug/kg	88	86	75-120	2	30
Bromoform	N.D.		1.	5	ug/kg	79	75	64-120	5	30
Bromomethane	N.D.		2.	5	ug/kg	70	70	21-192	0	30
2-Butanone	N.D.		4.	10	ug/kg	81	77	54-129	5	30
Carbon Disulfide	1	J	1.	5	ug/kg	111	105	60-120	5	30
Carbon Tetrachloride	N.D.		1.	5	ug/kg	85	82	69-130	4	30
Chlorobenzene	N.D.		1.	5	ug/kg	95	93	80-120	2	30
Chloroethane	N.D.		2.	5	ug/kg	78	77	21-185	1	30
Chloroform	N.D.		1.	5	ug/kg	94	92	80-120	2	30
Chloromethane	N.D.		2.	5	ug/kg	77	75	56-120	2	30
Cyclohexane	N.D.		1.	5	ug/kg	90	86	58-120	4	30
1,2-Dibromo-3-chloropropane	N.D.		2.	5	ug/kg	79	79	59-122	0	30
Dibromochloromethane	N.D.		1.	5	ug/kg	87	84	77-120	4	30
1,2-Dibromoethane	N.D.		1.	5	ug/kg	95	93	80-120	2	30
1,2-Dichlorobenzene	N.D.		1.	5	ug/kg	94	93	80-120	1	30
1,3-Dichlorobenzene	N.D.		1.	5	ug/kg	93	92	80-120	1	30
1,4-Dichlorobenzene	N.D.		1.	5	ug/kg	95	92	80-120	3	30
Dichlorodifluoromethane	N.D.		2.	5	ug/kg	73	68	28-131	7	30
1,1-Dichloroethane	N.D.		1.	5	ug/kg	90	89	77-120	1	30
1,2-Dichloroethane	N.D.		1.	5	ug/kg	89	89	77-130	0	30
1,1-Dichloroethene	N.D.		1.	5	ug/kg	97	94	73-129	3	30
cis-1,2-Dichloroethene	N.D.		1.	5	ug/kg	99	97	80-120	2	30
trans-1,2-Dichloroethene	N.D.		1.	5	ug/kg	100	100	79-122	1	30
1,2-Dichloropropane	N.D.		1.	5	ug/kg	94	93	76-120	0	30
cis-1,3-Dichloropropene	N.D.		1.	5	ug/kg	87	84	74-120	3	30
trans-1,3-Dichloropropene	N.D.		1.	5	ug/kg	85	83	76-120	3	30
Ethylbenzene	N.D.		1.	5	ug/kg	94	93	80-120	2	30
Freon 113	N.D.		2.	10	ug/kg	95	92	54-123	3	30
2-Hexanone	N.D.		3.	10	ug/kg	76	73	47-133	5	30
Isopropylbenzene	N.D.		1.	5	ug/kg	96	93	76-120	3	30
Methyl Acetate	N.D.		2.	5	ug/kg	86	83	61-144	3	30
Methyl Tertiary Butyl Ether	N.D.		0.5	5	ug/kg	93	91	72-120	2	30
4-Methyl-2-pentanone	N.D.		3.	10	ug/kg	78	75	57-123	4	30
Methylcyclohexane	N.D.		1.	5	ug/kg	90	88	59-120	2	30
Methylene Chloride	N.D.		2.	5	ug/kg	96	94	76-122	2	30
Styrene	N.D.		1.	5	ug/kg	91	88	76-120	2	30
1,1,2,2-Tetrachloroethane	N.D.		1.	5	ug/kg	93	91	67-121	3	30
Tetrachloroethene	N.D.		1.	5	ug/kg	94	89	78-120	5	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: AECOM Environment Group Number: 1601713
Reported: 11/16/2015 11:45

Analysis Name	Blank Result	Blank MDL**	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Toluene	N.D.	1.	5	ug/kg	98	95	80-120	3	30
1,2,4-Trichlorobenzene	N.D.	1.	5	ug/kg	87	86	60-120	1	30
1,1,1-Trichloroethane	N.D.	1.	5	ug/kg	89	87	59-136	3	30
1,1,2-Trichloroethane	N.D.	1.	5	ug/kg	95	92	80-120	3	30
Trichloroethene	N.D.	1.	5	ug/kg	98	95	80-120	3	30
Trichlorofluoromethane	N.D.	2.	5	ug/kg	78	76	58-133	3	30
Vinyl Chloride	N.D.	1.	5	ug/kg	81	80	59-120	1	30
Xylene (Total)	N.D.	1.	5	ug/kg	95	93	80-120	2	30
Batch number: X152942AA	Sample number(s): 8093385								
Acetone	N.D.	7.	20	ug/kg	90	89	46-139	2	30
Benzene	N.D.	0.5	5	ug/kg	100	101	80-120	0	30
Bromodichloromethane	N.D.	1.	5	ug/kg	91	91	75-120	1	30
Bromoform	N.D.	1.	5	ug/kg	81	82	64-120	1	30
Bromomethane	N.D.	2.	5	ug/kg	72	74	21-192	3	30
2-Butanone	N.D.	4.	10	ug/kg	82	82	54-129	0	30
Carbon Disulfide	N.D.	1.	5	ug/kg	115	115	60-120	0	30
Carbon Tetrachloride	N.D.	1.	5	ug/kg	95	95	69-130	1	30
Chlorobenzene	N.D.	1.	5	ug/kg	98	99	80-120	0	30
Chloroethane	N.D.	2.	5	ug/kg	84	86	21-185	2	30
Chloroform	N.D.	1.	5	ug/kg	99	100	80-120	1	30
Chloromethane	N.D.	2.	5	ug/kg	75	78	56-120	3	30
Cyclohexane	N.D.	1.	5	ug/kg	93	93	58-120	1	30
1,2-Dibromo-3-chloropropane	N.D.	2.	5	ug/kg	80	81	59-122	2	30
Dibromochloromethane	N.D.	1.	5	ug/kg	89	89	77-120	0	30
1,2-Dibromoethane	N.D.	1.	5	ug/kg	97	98	80-120	0	30
1,2-Dichlorobenzene	N.D.	1.	5	ug/kg	98	99	80-120	1	30
1,3-Dichlorobenzene	N.D.	1.	5	ug/kg	98	100	80-120	1	30
1,4-Dichlorobenzene	N.D.	1.	5	ug/kg	100	100	80-120	0	30
Dichlorodifluoromethane	N.D.	2.	5	ug/kg	73	73	28-131	1	30
1,1-Dichloroethane	N.D.	1.	5	ug/kg	95	95	77-120	0	30
1,2-Dichloroethane	N.D.	1.	5	ug/kg	93	95	77-130	1	30
1,1-Dichloroethene	N.D.	1.	5	ug/kg	106	106	73-129	0	30
cis-1,2-Dichloroethene	N.D.	1.	5	ug/kg	102	102	80-120	0	30
trans-1,2-Dichloroethene	N.D.	1.	5	ug/kg	107	106	79-122	1	30
1,2-Dichloropropane	N.D.	1.	5	ug/kg	95	96	76-120	1	30
cis-1,3-Dichloropropene	N.D.	1.	5	ug/kg	87	89	74-120	1	30
trans-1,3-Dichloropropene	N.D.	1.	5	ug/kg	86	87	76-120	1	30
Ethylbenzene	N.D.	1.	5	ug/kg	98	98	80-120	0	30
Freon 113	N.D.	2.	10	ug/kg	104	105	54-123	0	30
2-Hexanone	N.D.	3.	10	ug/kg	77	76	47-133	1	30
Isopropylbenzene	N.D.	1.	5	ug/kg	99	99	76-120	0	30
Methyl Acetate	N.D.	2.	5	ug/kg	89	87	61-144	2	30
Methyl Tertiary Butyl Ether	N.D.	0.5	5	ug/kg	95	95	72-120	0	30
4-Methyl-2-pentanone	N.D.	3.	10	ug/kg	78	78	57-123	0	30
Methylcyclohexane	N.D.	1.	5	ug/kg	95	95	59-120	0	30
Methylene Chloride	N.D.	2.	5	ug/kg	101	100	76-122	1	30
Styrene	N.D.	1.	5	ug/kg	91	92	76-120	1	30
1,1,2,2-Tetrachloroethane	N.D.	1.	5	ug/kg	94	94	67-121	0	30
Tetrachloroethene	N.D.	1.	5	ug/kg	100	99	78-120	0	30
Toluene	N.D.	1.	5	ug/kg	101	101	80-120	0	30
1,2,4-Trichlorobenzene	N.D.	1.	5	ug/kg	89	89	60-120	0	30
1,1,1-Trichloroethane	N.D.	1.	5	ug/kg	94	93	59-136	1	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: AECOM Environment Group Number: 1601713
Reported: 11/16/2015 11:45

Analysis Name	Blank Result	Blank MDL**	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,1,2-Trichloroethane	N.D.	1.	5	ug/kg	96	96	80-120	1	30
Trichloroethene	N.D.	1.	5	ug/kg	102	102	80-120	0	30
Trichlorofluoromethane	N.D.	2.	5	ug/kg	85	86	58-133	1	30
Vinyl Chloride	N.D.	1.	5	ug/kg	80	84	59-120	4	30
Xylene (Total)	N.D.	1.	5	ug/kg	98	98	80-120	0	30
Batch number: 152950013A	Sample number(s): 8093379,8093383,8093385-8093386,8093388-8093389								
PCB-1016	N.D.	3.6	17	ug/kg	102		76-121		
PCB-1221	N.D.	4.6	17	ug/kg					
PCB-1232	N.D.	8.0	17	ug/kg					
PCB-1242	N.D.	3.3	17	ug/kg					
PCB-1248	N.D.	3.3	17	ug/kg					
PCB-1254	N.D.	3.3	17	ug/kg					
PCB-1260	N.D.	4.9	17	ug/kg	108		79-130		
Batch number: 152960028A	Sample number(s): 8093379,8093381-8093386,8093388-8093390								
TPH-DRO soil C10-C28 microwave	N.D.	4.0	12	mg/kg	86		74-117		
Batch number: 152925708002	Sample number(s): 8093379,8093381-8093386,8093388-8093390								
Arsenic	N.D.	0.580	2.00	mg/kg	108		80-120		
Barium	N.D.	0.0670	0.500	mg/kg	109		80-120		
Cadmium	N.D.	0.0430	0.500	mg/kg	108		80-120		
Chromium	N.D.	0.0980	1.50	mg/kg	103		80-120		
Lead	N.D.	0.320	1.50	mg/kg	112		80-120		
Selenium	N.D.	0.830	2.00	mg/kg	108		80-120		
Silver	N.D.	0.120	0.500	mg/kg	105		80-120		
Batch number: 152945711004	Sample number(s): 8093379,8093381-8093386,8093388-8093390								
Mercury	N.D.	0.0100	0.100	mg/kg	96		80-120		
Batch number: 153145705001	Sample number(s): 8093380,8093387								
Arsenic	0.0073 J	0.0070	0.0200	mg/l	117		80-120		
Barium	0.00091 J	0.00030	0.0050	mg/l	98		80-120		
Cadmium	N.D.	0.00030	0.0050	mg/l	104		80-120		
Chromium	N.D.	0.0015	0.0150	mg/l	107		80-120		
Lead	N.D.	0.0051	0.0150	mg/l	99		80-120		
Selenium	N.D.	0.0082	0.0200	mg/l	120		80-120		
Silver	N.D.	0.0014	0.0050	mg/l	104		80-120		
Batch number: 153145713002	Sample number(s): 8093380,8093387								
Mercury	N.D.	0.00005 0	0.00020	mg/l	96		80-120		
Batch number: 15293820004B	Sample number(s): 8093379,8093381-8093386,8093388-8093390								
Moisture					100		99-101		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: AECOM Environment Group Number: 1601713
Reported: 11/16/2015 11:45

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 152950013A	Sample number(s): 8093379,8093383,8093385-8093386,8093388-8093389 UNSPK: P086793								
PCB-1016	93	99	76-121	6	50				
PCB-1260	80	83	79-130	4	50				
Batch number: 152960028A	Sample number(s): 8093379,8093381-8093386,8093388-8093390 UNSPK: P089996 BKG: P089996								
TPH-DRO soil C10-C28 microwave	88		74-117			94	76	22*	20
Batch number: 152925708002	Sample number(s): 8093379,8093381-8093386,8093388-8093390 UNSPK: P083789 BKG: P083789								
Arsenic	106	105	75-125	0	20	2.08	1.79 J	15 (1)	20
Barium	114	108	75-125	4	20	98.4	106	7	20
Cadmium	104	104	75-125	0	20	0.299 J	0.330 J	10 (1)	20
Chromium	119	114	75-125	3	20	6.69	7.89	16 (1)	20
Lead	116	112	75-125	2	20	14.7	14.7	0	20
Selenium	103	103	75-125	1	20	2.20	2.96	29* (1)	20
Silver	96	90	75-125	6	20	N.D.	N.D.	0 (1)	20
Batch number: 152945711004	Sample number(s): 8093379,8093381-8093386,8093388-8093390 UNSPK: 8093379 BKG: 8093379								
Mercury	103	95	80-120	4	20	0.0392 J	0.0451 J	14 (1)	20
Batch number: 153145705001	Sample number(s): 8093380,8093387 UNSPK: P107830 BKG: P107830								
Arsenic	106	105	75-125	1	20	0.0113 J	0.0127 J	11 (1)	20
Barium	92	92	75-125	0	20	0.752	0.754	0	20
Cadmium	93	92	75-125	1	20	0.0101	0.0101	0 (1)	20
Chromium	93	93	75-125	0	20	0.0051 J	0.0052 J	2 (1)	20
Lead	88	88	75-125	0	20	0.0117 J	0.0119 J	1 (1)	20
Selenium	112	111	75-125	1	20	N.D.	N.D.	0 (1)	20
Silver	47*	41*	75-125	14	20	N.D.	N.D.	0 (1)	20
Batch number: 153145713002	Sample number(s): 8093380,8093387 UNSPK: P107830 BKG: P107830								
Mercury	88	88	80-120	1	20	N.D.	N.D.	0 (1)	20
Batch number: 15293820004B	Sample number(s): 8093379,8093381-8093386,8093388-8093390 BKG: 8093388								
Moisture						18.8	17.8	6*	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TCL VOCs 4.3 8260B
Batch number: X152931AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
8093379	100	109	99	96
8093381	108	112	105	89
8093382	100	107	102	95
8093383	101	105	101	96

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: AECOM Environment Group Number: 1601713
Reported: 11/16/2015 11:45

Surrogate Quality Control

8093384	104	108	106	84
8093386	114	115	124	72
8093388	99	105	98	97
8093389	101	107	99	94
8093390	100	105	100	94
Blank	98	103	99	98
LCS	98	101	100	99
LCSD	98	101	99	99
Limits:	50-141	54-135	52-141	50-131

Analysis Name: TCL VOCs 4.3 8260B
Batch number: X152942AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
8093385	105	107	106	81
Blank	99	100	98	96
LCS	98	100	99	97
LCSD	98	100	98	97
Limits:	50-141	54-135	52-141	50-131

Analysis Name: PCBs in Soil (microwave)
Batch number: 152950013A

	Tetrachloro-m-xylene	Decachlorobiphenyl
8093379	101	87
8093383	102	91
8093385	86	90
8093386	61	64
8093388	110	76
8093389	96	77
Blank	108	100
LCS	109	101
MS	95	74
MSD	104	84
Limits:	53-140	45-143

Analysis Name: TPH-DRO soil C10-C28 microwave
Batch number: 152960028A

	Orthoterphenyl
8093379	87
8093381	68
8093382	67
8093383	61
8093384	80
8093385	66
8093386	29*
8093388	82
8093389	88
8093390	83
Blank	94
DUP	92
LCS	82
MS	84
Limits:	54-145

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: AECOM Environment Group Number: 1601713
Reported: 11/16/2015 11:45

Surrogate Quality Control

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

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Acct. # 11487 Group # 1601713 Sample # 8093379-90

COC # 389610

Client Information

Client: AECOM

Acct. #:

Project Name/#: Potomac Yard Metro Station

PWSID #:

Project Manager: Brendan McGuinness

P.O. #:

Sampler: Brendan McGuinness

Quote #:

State where samples were collected: VA

For Compliance: Yes ☐ No ☑

Matrix

Sediment ☐ Soil ☒ Water: Potable ☐ Ground ☐ NPDES ☐ Surface ☐ Other: ____

Total # of Containers

Analysis Requested

Preservation Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	TCLP (Metals only)	PCBs	RCRA Metals	TPH-PRO	VOCs
B-6-3-5	10-13-15	10:15	X		7	✓	✓	✓	✓	✓
B-7-0-2		10:45						✓	✓	✓
B-7-3-5		11:00						✓	✓	✓
B-5-2-4		11:15					✓	✓	✓	✓
B-4-3-5		11:30						✓	✓	✓
B-2-3-5		11:45					✓	✓	✓	✓
B-2-6-8	↓	12:00				✓	✓	✓	✓	✓
B-2-10-12	10-13-15	12:15					✓	✓	✓	✓

For Lab Use Only

FSC: ____

SCR#: 178602

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

RUSH TAT

Turnaround Time (TAT) Requested (please circle)

Standard (Rush)

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: 5 DAY TAT

E-mail address: brendan.mcguinness@aecom.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP)
Type VI (Raw Data Only)
Type III (Reduced non-CLP)
TX TRRP-13
NYSDEC Category A or B
MA MCP
CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Joe Helpert	10-6-15	13:26	Brendan McGuinness	10-13-15	11:00
Brendan McGuinness	10-16-15	1300			
				10/16/15	17:10

EDD Required? (Yes) No

If yes, format: excel

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ____ Other ____

Temperature upon receipt 0.7-1.3 °C

Environmental Analysis Request/Chain of Custody

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For Eurofins Lancaster Laboratories Environmental use only

Acct. # 11487 Group # 1601713 Sample # 8093379-90

COC # 389611

Client Information

Client: AECOM

Acct. #:

Project Name/#: Potomac Yard Metro Station

PWSID #:

Project Manager: Brendan McGuinness

P.O. #:

Sampler: Brendan McGuinness

Quote #:

State where samples were collected: VA

For Compliance: Yes ☐ No ☑

Matrix

Sediment ☐ Soil ☒ Water: Potable ☐ Ground ☐ NPDES ☐ Surface ☐ Other: ____

Analysis Requested

Preservation Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	RCRA Metals	TPH-DRO	VOCs	PCBs
B-1-2-4	10.16.15	1030	X		7	✓	✓	✓	✓
B-8-2-4	10.16.15	11:15	X		6	✓	✓	✓	

For Lab Use Only

FSC:

SCR#: 178602

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

RUSH
5 DAY TAT.

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: 5 DAY TAT

E-mail address: brendan.mcguinness@aecom.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP)
Type VI (Raw Data Only)
Type III (Reduced non-CLP)
TX TRRP-13
NYSDEC Category A or B
MA MCP
CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Brendan McGuinness	10.16.15	1300			
				10/16/15	1740

EDD Required? Yes No

If yes, format:

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ____ Other ____

Temperature upon receipt 0.7-1.3 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 115005

Group Number(s): 1601713

Client: AECOM

Delivery and Receipt Information

Delivery Method:	ELLE Courier	Arrival Timestamp:	10/16/2015 17:40
Number of Packages:	2	Number of Projects:	1
State/Province of Origin:	VA		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	Yes		

Unpacked by Jordan Woods (6698) at 21:37 on 10/16/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	1.3	DT	Wet	Y	Bagged	N
2	DT146	0.7	DT	Wet	Y	Bagged	N

Container Quantity Discrepancy Details

Sample ID on COC	Container Qty. Received	Container Qty. on COC	Comments
B-6 - 3-5	8	7	

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference…

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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APPENDIX C:

PHOTOGRAPHS OF FIELD WORK

Photo 1. Remote control DPT drill rig mobilizing to boring sites from Potomac Greens.

Photo 2. Very moist to saturated fly ash in sample liner at SB-6.

Photo 3. DPT drill rig located at SB-7.

Photo 4. DPT drill rig located at SB-4.

Photo 5. Fly ash in sample liner at 2 feet below ground at SB-4.

Photo 6. DPT drill rig at SB-2 at former oil/water separator pond.

Photo 7. View of DPT drill rig on SB-2 at former oil/water separator.

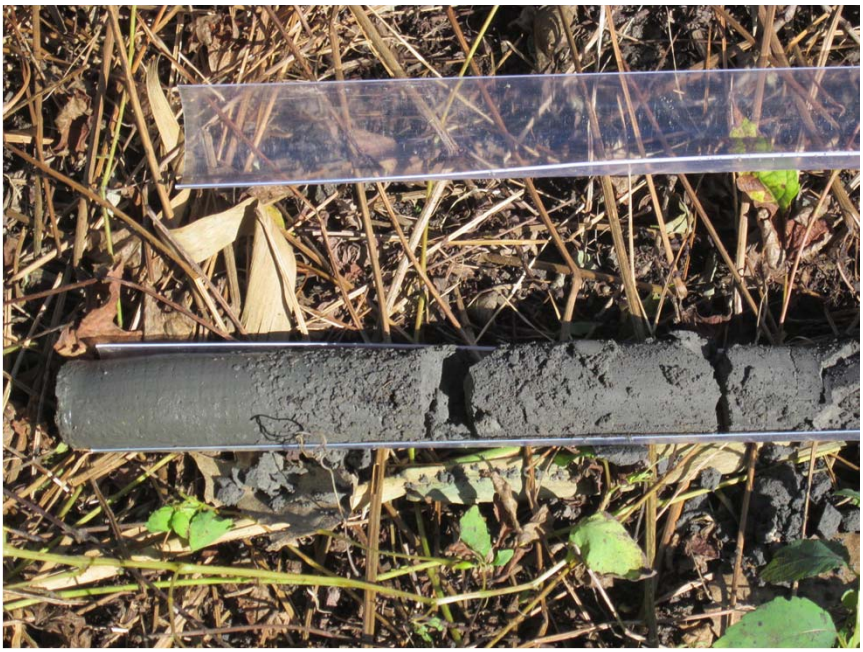

Photo 8. Close-up of fly ash fill at soil boring SB-2.

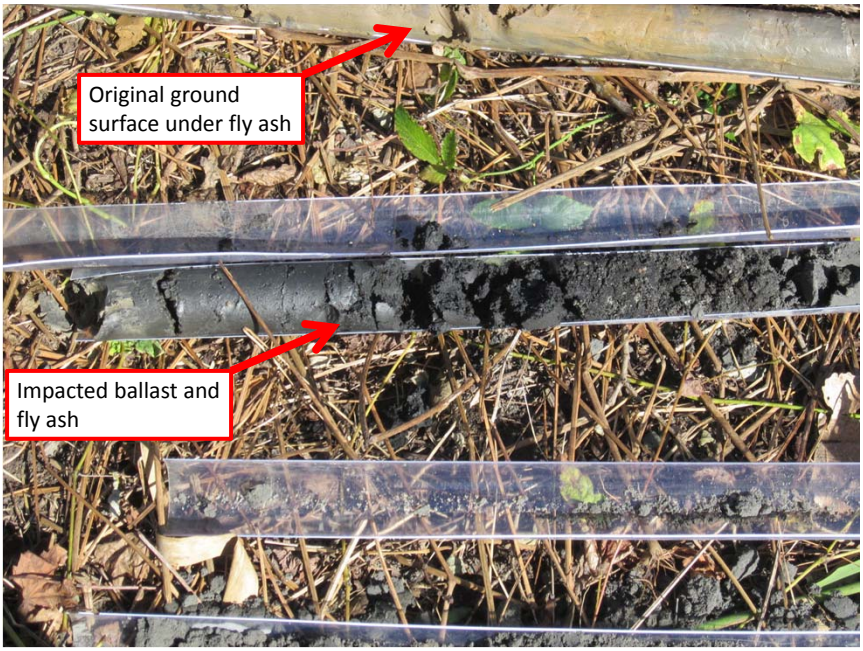

Photo 9. Close-up of petroleum impacted soil and ballast at 7.5 to 8 feet above original ground surface indicated by mottled clay in liner above.

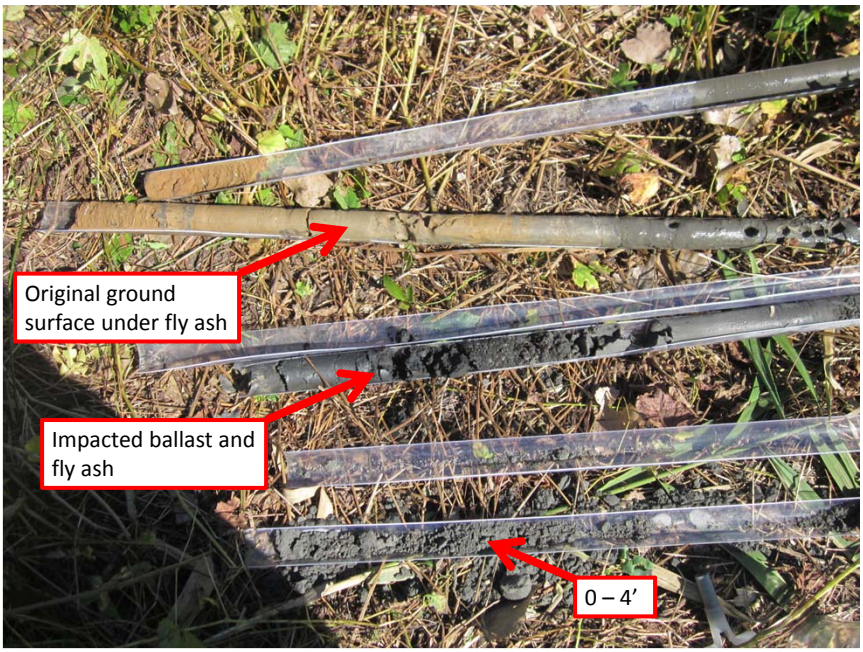

Photo 10. Grey fly ash with some ballast grades into brown mottled clay of original ground surface at 8 to 12 feet below ground at SB-2.