FINAL

CONCEPTUAL REMEDIAL INVESTIGATION SCOPING DOCUMENT

POPLAR POINT
SOUTHEAST, WASHINGTON, D.C.

Presented to:

OFFICE OF THE DEPUTY MAYOR FOR PLANNING AND ECONOMIC DEVELOPMENT
1350 Pennsylvania Avenue, NW
Suite 317
Washington, D.C. 20004

Prepared by:

AMEC ENVIRONMENT & INFRASTRUCTURE, INC.
14424 Albemarle Point Place, Suite 115
Chantilly, Virginia 20151

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Prepared by:

AMEC ENVIRONMENT & INFRASTRUCTURE, INC.
14424 ALBEMARLE POINT PLACE, SUITE 115
CHANTILLY, VIRGINIA 20151
PHONE: (571) 215-9265

MAY 2013

AMEC Project Manager: ____________________
Signature

JOHN MITTAUER 5/10/2013
Printed Name/Date

District Department of the Environment (DDOE)
Project Manager Approval: ____________________
Signature

Raymond Montero
Printed Name/Date

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1.0 INTRODUCTION

The Poplar Point Remedial Investigation (RI) Scoping Document has been prepared as an initial step in the Remedial Investigation/Feasibility Study (RI/FS) to identify objectives and provide scoping for data collection and planning during the Poplar Point RI.

This document includes the following for the Poplar Point Site (the Site):

- Site Background, including history and Site description
- Physical Characteristics, including geology, hydrogeology and hydrology
- Summary of previous environmental investigations and evaluation of existing analytical data
- Conceptual Site Model, including contaminant source history and nature and extent of contamination
- Evaluation of potential human and ecological receptors and exposure pathways
- Identification of preliminary environmental laws and other requirements that may be applicable and relevant to the RI process
- Preliminary Remedial Action Alternatives
- RI/FS data needs including data gaps
- Presentation of data quality objectives to support decision-making

The RI Scoping Document serves as the foundation for the Remedial Investigation Work Plan, which will provide a detailed approach to data gathering and evaluation during the RI. Sections 1.0 through 7.0 of this document will be incorporated into the RI Work Plan to provide a comprehensive planning document for the RI.

A list of acronyms used in this document is provided as Appendix A.

1.1 SITE DESCRIPTION

The Site is located in Anacostia Park in S.E. Washington, D.C., along the east side of the Anacostia River, between the South Capitol Street Bridge, 11th Street Bridges, Anacostia Freeway (Interstate 295), and the Anacostia River, approximately one mile upstream from the confluence of the Anacostia and Potomac Rivers. Anacostia Park is a unit of the National Park Service (NPS) within National Capital Parks-East (NACE).

More specifically, the Site is bordered to the north by the Anacostia River and includes approximately 3,200 feet of embankment along the river channel seawall. Roadways, ramps and medians for the 11th Street Bridge form the northeast border of the Site while roadways and medians for the South Capitol Street Bridge form the northwest edge of the Site. An unnamed paved access road along the western edge of the DCL portion of the Site terminating at Anacostia Drive forms the western boundary of the Site. The Site is bordered to the south by Howard Road (including the NPS-managed lands adjacent to and incorporating the former Green Fuel Oil parcel), but excluding those parcels that were never under NPS management such as the Metro Green Line Station/parking structure, and the inside (i.e., northwestern) edge of the I-295 right-of-way.

The Site was created in part by the filling of tidal marshes along the Anacostia River between 1882 and 1927. The Poplar Point area has undergone a variety of uses since that time. The southwestern portion of the approximately 110-acre Site has historically been divided into two parcels, both of which supported nurseries and greenhouse operations from the mid-1920s until 1993. One of those parcels was used by the Architect of the Capitol (AOC), and the other by the District of Columbia's Lanham Tree Nursery (DCL). The central and eastern portions of the Site were occupied by the Naval Receiving Station (NRS) from the 1940s through the 1960s. Between 1959 and 1980, the Navy either demolished or transferred the remaining buildings located at the NRS to NPS.

In 2006, Congress enacted legislation (Public Law 109-396 commonly referred to as the DC Lands Act) directing the United States to transfer the Site to the District of Columbia (District), but the transfer has not yet occurred. Currently, the NPS Headquarters for NACE, the U.S. Park Police Anacostia Operations Facility (AOF), and the U.S. Park Police Aviation Unit facilities occupy the portion of the Site formerly occupied by the NRS. The District's METRO Green line runs underground through the western end of the former NRS area. The former greenhouse and nursery areas are unused and vegetation has been allowed to grow naturally there. The Site also includes various storage buildings, wetlands, and managed meadows. The existing wetlands, meadows, scrub-shrub areas, and willow thickets at the Site provide important habitat for a diversity of plants and animal life, including some species of special concern.

For the purpose of the Remedial Investigation/Feasibility Study (RI/FS), the terrestrial portions of the approximately 96-acre Site can be generally divided into four separate areas or parcels defined as:

- An approximately 20-acre parcel previously occupied by the DC Lanham (DCL) Tree Nursery
- An approximately 13-acre parcel previously occupied by the AOC

- An approximately 46-acre parcel previously occupied by the Naval Receiving Station (NRS), currently occupied in part by National Park Service (NPS) and US Park Police (USPP)

- Approximately 17 acres of additional Perimeter Properties primarily along the north side of Anacostia Drive adjacent to the Anacostia River and the former Green Fuel Oil property (located at the northeast corner of the intersection of Howard Road and South Capitol Street)

The terrestrial boundaries of the Site are intended to be inclusive of those parcels where historic activities may have resulted, or are known to have resulted, in the release of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances, pollutants or contaminants of concern. A recent (2008) aerial photograph illustrating the approximate boundaries for these four areas of the Site, existing structures, and adjacent properties is included as Figure 1-1. Additional details for former and existing structures and areas of interest are shown on Figure 1-2. As indicated on Figures 1-1 and 1-2, the Washington Metropolitan Area Transit Authority METRO Anacostia Station and Parking Garage, various private residential, educational and commercial properties located along Howard Road (such as P&P Auto and Howard Road Academy) and transportation rights-of-way for the 11th Street Bridge, South Capitol Street Bridge, and Anacostia Freeway (Interstate 295) are not included within the limits of the Site.

1.2 PURPOSE AND OBJECTIVES

The purpose of this document is to facilitate development of the RI/FS Work Plan and to identify data needs for the Poplar Point Site Remedial Investigation. A number of environmental investigations already have been conducted at various times on different portions of the Site. As such, it is possible to present a fairly thorough description and visualization of the Site in the form of a detailed conceptual Site model (CSM), which will provide a common basis for understanding existing Site conditions to enable discussions regarding future investigations, remedial alternatives, Site receptors, and future land uses. Specifically, the objectives are to:

- Present the existing physical conditions and contaminant distributions at the Site, to the extent currently known, particularly as they relate to contaminant fate and transport mechanisms;

- Identify the primary contaminant transport pathways that require investigation;

- Summarize the potential future land uses as a basis for identifying the primary risk pathways that require investigation;

- Develop initial Site remedial objectives;
- Evaluate the quality and usability of existing Site data;
- Identify data gaps that need to be filled to fully characterize the nature and extent of contamination; and
- Develop a general list of investigation methods proposed to fill the identified data gaps.

2.0 SITE BACKGROUND

2.1 SITE HISTORY

A Composite Plat for the Site prepared by Patton, Harris, Rust & Associates, dated April 4, 2008, summarizes current land title records for the various properties that the Site comprises (Figure 2-1). Figure 2-1 includes specific data for each property (lot number, owner name, and square footage) and illustrates the location of each lot within the limits of the Site. Chain of title records were not available to establish a detailed ownership history for each specific lot or parcel at the Site. Historical aerial photographs illustrating previous Site conditions during 1970 and 1957 are included as Figures 2-2 and 2-3, respectively. These two figures illustrate general Site conditions, land use, buildings, and infrastructure historically present during those periods, including proximal off-Site development. A 2008 aerial photograph is included as Figure 1-1 to provide a comparison of current conditions to historical conditions in 1957 and 1970. Table 2-1 provides a general description and historical use for significant buildings, structures, and areas of interest at Poplar Point, while their locations are shown on Figure 1-2. Historical uses specifically for the former NRS buildings are summarized in Table 2-2, and the former NRS building locations are shown on Figure 2-4.

The physical characteristics of the northern and central portions of the Site are similar, because they were historically low-lying mudflats that were filled with dredge spoils from approximately 1882 to 1927. Figure 2-5 overlays the 1882 Nautical Map with current Site features, and illustrates the submerged, tidally influenced mudflats and the historic Anacostia riverbank that was filled with dredge spoils. The filling was performed by the U.S Army Corps of Engineers to control mosquito breeding and to create a vehicle-accessible park for the east side of the Anacostia River. Less than two decades after the filling was complete, the federal government began transferring the park land for other uses. Since that time, the Site has been used primarily for federal (U.S. Navy, AOC, NPS, and USPP) and District facilities. Potential environmental concerns at each of the four parcels based on historical uses and previous environmental sampling are described in more detail in Tables 2-1 and 2-2.

A more detailed description of historical Site uses for each parcel is included in Sections 2.1.1 through 2.1.4 below.

2.1.1 D.C. Lanham (DCL) Parcel

The DCL parcel is a 20-acre tract that is bounded on the east by the AOC parcel and to the north by open, undeveloped land south of Anacostia Drive SE, and the Anacostia River (see Figure 1-1). The western and southern borders are formed by South Capitol Street SE, and property along the northern side of Howard Road SE, respectively. The DCL parcel was originally tidal marshland which was in-filled with dredge material from the Anacostia River between 1882 and 1927. Although land uses from 1917 to 1927 are unknown, after filling operations were completed the Site was developed and used as a tree nursery by the District from approximately 1927 to 1993. Site uses at this time reportedly included planting and maintaining trees, flowers, and other vegetation in greenhouses and other nursery areas and likely included the storage, use, and application of pesticides and herbicides. The estimated dates of construction of former structures (including greenhouses) and areas of interest are summarized in Table 2-1 and are shown on Figure 1-2. This information is based on a review of historical reports, aerial photographs, topographic maps, and Sanborn Fire Insurance maps. The property has been vacant since 1993 and is currently unoccupied, with no existing buildings or significant structures present.

2.1.2 Architect of the Capitol (AOC) Parcel

The AOC greenhouse and nursery property is a 13-acre parcel sandwiched between the DCL parcel to the west and the former NRS to the east (see Figure 1-1). The northern border is formed by Anacostia Drive SE. The southern boundary includes properties located along Howard Road. The AOC parcel shares much of its history with DCL. The property was originally tidal marshland which was subsequently in-filled with dredge spoils from the Anacostia River between 1882 and 1927. Land uses from 1917 to 1927 are unknown. This parcel was used to grow tropical and subtropical plants in the greenhouse facilities between 1927 and 1993. Site uses during this period reportedly included planting and maintaining trees, flowers, and other vegetation, and likely included the storage, use, and application of pesticides and herbicides. An area on the north end of this parcel was used by the Capitol Police K-9 unit as a training facility (Environ, 2002). The estimated dates of construction for former or existing buildings, structures, and areas of interest are summarized in Table 2-1 and are shown on Figure 1-2. The property has been vacant since 1993, and the greenhouses, related nursery buildings, and trailers are unoccupied, abandoned, dilapidated, and unfit for occupancy.

2.1.3 Naval Receiving Station (NRS) Parcel

The U.S. Navy NRS previously occupied the approximately 64-acre (currently approximately 46-acre) middle and eastern portions of Poplar Point from the 1940s through the 1960s (see Figure 1-1). Most of this area was originally tidal marshland which was subsequently in-filled with dredging material from the Anacostia River between 1882 and 1927. Site uses from 1917 to the early 1940s are not well established. However, during the spring and summer of 1932, the NRS parcel was occupied by a large assemblage of protestors, identified as the Bonus Army. The Bonus Army established an encampment on the NRS parcel constructed of tents and salvageable materials from nearby sources. The protestors were driven from the parcel by District police in July 1932 and the encampment was burned to the ground.

Construction of the NRS facility began in 1942 and most of the buildings were completed by 1944. The Site was used by the Navy for various activities, primarily as a training and intelligence center. Several former NRS structures and buildings were designated as Experimental Buildings for the Naval Ordnance Laboratory.

In 1959, the Navy began to relocate the NRS. This was partially necessitated by construction of the adjacent Anacostia Freeway to the south, which cut through the southern portion of the Site and reduced the NRS parcel acreage from approximately 64 acres to approximately 46 acres. From 1959 through 1980, the Navy either demolished or transferred all buildings on the NRS to the NPS. Table 2-2 summarizes the former NRS building numbers, years listed on historic Navy maps, reported uses for the buildings, year demolished (if applicable), and potential environmental concerns. The locations of existing renovated NRS buildings and the former NRS buildings/structures which were demolished at the Site (excluding those buildings formerly located to the south in the current Metro Parking Garage and Anacostia Freeway right-of-way) are shown on Figure 2-4.

Existing buildings at the NRS parcel are described in the following paragraphs. The NRS parcel currently contains the NPS Headquarters for NACE, the USPP AOF, USPP Aviation Hangar, various storage buildings, and open, undeveloped grassy or recreational use areas. The USPP AOF main building is a two-story structure at 1901 Anacostia Drive SE. The original NRS building constructed in 1942 at this location was designated as T-1 (Recreation Building), but this building was renovated in 2000 to 2001 and is currently occupied by USPP. A USPP motorcycle storage/dog kennel building is next to the northwest corner of the AOF building (in the same location as NRS Garage Building T-31). This building was constructed in 1942, with some renovations for the dog kennels. The dog kennels are no longer used, though motorcycle maintenance is still performed at the storage-garage building. Three gasoline underground storage tanks (USTs) and an associated fuel dispenser island for the USPP were west of and next to the motorcycle storage building. The most recent 10,000-gallon gasoline UST was installed in 1992 and removed in 2008. The installation dates for the two other former USTs are unknown, although the USTs were removed in 1990 and in 1996. Two existing small munitions storage buildings (dates of construction unknown) are also north of the motorcycle storage building.

The USPP Aviation Hangar and adjacent 10,000-gallon JP-8 fuel above ground storage tank (AST) were reportedly constructed in 2004 and are used to house and service helicopters involved in search and rescue operations. NRS Building T-32 (Laundry Building) was formerly in this area, which was constructed in 1942 and demolished during the 1960s. The NPS National Capital Parks-East Headquarters building is a single-story structure with an address of 1900 Anacostia Drive SE. The original NRS building at this location was designated as T-4 (Dispensary), but this building has undergone several renovations since it was originally constructed in the early 1940s; the date the NPS assumed occupancy is unknown (likely sometime after the late 1960s).

The METRO Green Line tunnel located along the western border of the NRS parcel was constructed in the 1980s and completed in 1990. Relevant construction information known at present for the Green Line tunnel is provided in Section 2.2.3. Approximately 21 of the former NRS laboratory and classroom buildings were located along this western portion of the Site where extensive construction and earthwork activities occurred for the METRO Green Line construction (see Figure 2-4). The remainder of the NRS portion of the Site is primarily open land or recreational fields and undeveloped (aside from small support structures used for storage or dog training).

2.1.4 Additional Perimeter Properties

The Site includes approximately 17 acres of additional Perimeter Properties, generally categorized as the remaining Poplar Point property outside the AOC, DCL, or NRS portions of the Site (see Figure 1-1). These Perimeter Properties generally include a narrow strip of land between Anacostia Drive and the Anacostia River, a small triangular parcel north of DCL and south of Anacostia Drive, and the former Green Fuel Oil property at 632 Howard Road. Aside from Green Fuel Oil, these perimeter properties have remained open and undeveloped since the early 1900s. The Green Fuel Oil building was not observed on a 1957 aerial photograph, but was present on a 1960 Sanborn map, indicating it was constructed in the late 1950s. Historically, Green Fuel Oil was a petroleum distribution company but is not included on UST or leaking UST regulatory databases. Visual observations of this parcel made by RIDOLFI, Incorporated (RIDOLFI) during a 2002 Phase I Environmental Site Assessment indicated the presence of five petroleum ASTs, several drums, and fuel delivery trucks. The five ASTs consisted of two diesel fuel ASTs, one kerosene AST, one “Duralene” brand oil AST, and one gasoline AST (RIDOLFI, 2002). Staining was observed on the Duralene AST and on the ground surface beneath that AST at that time.

Tidal marshes along the Anacostia River and formerly located beneath most of the Perimeter Properties were filled beginning in 1882 and ending in 1927. Additional localized filling activities have occurred throughout the Site since the early 1900s to achieve the current grades.

2.2 DESCRIPTION OF CURRENT SITE CONDITIONS

The following sections provide a more detailed description of current conditions at each of the four Parcels (DCL, AOC, NRS, and Additional Perimeter Properties). Table 2-1 provides a more detailed description of significant buildings, structures, and areas of interest at Poplar Point; their locations are shown on Figure 1-2.

Topographically, the entire Site generally slopes from the south to the west-northwest towards the Anacostia River. Surface elevations range from approximately 0 foot on the District datum at the shore of the Anacostia River to approximately 20 feet on the southern edge of the Site. Surface drainage is primarily via sheet flow in paved or covered areas, although several low-lying swales or drainage features exist, such as the low area along the east side of Stickfoot Creek sewer and the wetlands on the DCL parcel. An east-west flood control wall is parallel to the southern shoulder of Anacostia Drive along most of the northern side of the NRS parcel, while an intersecting north-south earthen flood control berm is located along the western side of the NRS parcel, east of the Metro tunnel (Figure 1-2).

Vehicle access is limited at the DCL and AOC parcels because of trees, dense vegetation, and wetlands. Various paved and unpaved roads are located on the AOC parcel between the dilapidated buildings and overgrown nursery plots; however, these roads are only partially passable by vehicles because of vegetative overgrowth. A chain-link fence is located along the entire southern border of the Site, while the AOC/DCL parcels are partially enclosed by chain-link fencing. The remainder of the Site is generally accessible via paved roads such as Anacostia Drive or open, partially vegetated areas. Most of the NRS and Perimeter Property areas are accessible with either rubber-tire or all-terrain vehicles and equipment, aside from wetland areas or areas with dense trees/vegetation.

2.2.1 DCL Parcel Site Description

The DCL parcel is vacant and overgrown with dense vegetation and trees. A partially paved parking area and gravel/dirt roads are located along the southwest border, with access from Howard Road. The DCL parcel has low relief topography and several low-lying wetlands with variable vegetative cover and hydrologic regimes. Identified wetlands include the largest plot of palustrine forested scrub and emergent palustrine wetlands at Poplar Point. Vegetative cover on the DCL parcel varies with the soil saturation and elevation ranging from forested scrub with sycamores and silky dogwoods to palustrine emergent wetlands with common reeds, black willows and purple loosestrife. Existing wetland areas (designated as Wetlands 2, 3, and 7) for the DCL parcel are shown on Figure 2-6. No buildings exist on the DCL parcel; however, three former buildings (apparent greenhouses) along the southeast corner of the DCL Site near Howard Road were demolished at some time after the nursery was closed in 1993 (see Table 2-1 and Figure 1-2).

2.2.2 AOC Parcel Site Description

The AOC parcel is overgrown with trees and relatively thick vegetation, aside from various partially paved and unpaved access roads linking the greenhouses and nursery plots. The southern portion of the AOC parcel (Southern Greenhouses) contains eight collapsed and dilapidated greenhouse buildings, a boiler room building which formerly had a 10,000-gallon fuel oil AST, two chemical storage buildings, and a pump house building. These structures are abandoned, without power, and in various states of disrepair. The central portion of the AOC parcel (Northern-Central Greenhouses) contains an office building with six collapsed and dilapidated greenhouse buildings. A Garage Building, Lath House and two dilapidated, former K-9 training trailers are located along the northeast portion of the AOC parcel. These AOC buildings and the K-9 trailers are abandoned and unsafe for occupancy.

The Stickfoot Creek Sewer line runs parallel to the eastern border of the AOC parcel and discharges into the Anacostia River to the north (see Figure 1-1). Identified wetlands on the AOC parcel (designated as Wetland 6 as shown on Figure 2-6) are less extensive than those on the DCL parcel. Based on conversations with local NPS staff and field reconnaissance conducted by NPS and others in May 2012, Wetland 6 is partially or fully dependent on leakage from one or more water lines on the property. In early June 2012, representatives of DC Water turned off the water supply to the water lines that partially, or fully, sourced the wetlands on the AOC parcel. Vegetation on the AOC parcel ranges from open fields to palustrine emergent wetland vegetation including common reed and black willow.

Table 2-1 includes a more detailed description of current and historical buildings, structures, and areas of interest at AOC. Their locations are shown on Figure 1-2.

2.2.3 NRS Parcel Site Description

The NRS parcel currently contains the NPS Headquarters for NACE, the USPP AOF, USPP Aviation Hangar, various storage buildings, a motorcycle storage/dog kennel building, munitions storage buildings, and open undeveloped grassy or recreational use areas (see Table 2-1 and Figure 1-2). A more detailed description of the existing buildings at the NRS currently used by the NPS and USPP is included below:

U.S. Park Police Anacostia Operations Facility (AOF)

The USPP AOF main building is a two-story structure with a concrete slab-on-grade and a partial basement containing mechanical equipment. The current AOF building is approximately 68,000 square feet and primarily includes office and training rooms, law enforcement operations, holding cells, an auditorium, an indoor firing range, a forensic laboratory (which does not use chemicals), and associated exterior paved parking and grassy landscaped areas. The AOF area also has several office and storage trailers for office supplies, files, and dry goods located to the west-southwest (see Figure 1-2). In addition, a motorcycle storage/dog kennels building is located next to the northwest corner of the AOF building. Two small munitions storage buildings are also located north of the motorcycle storage building and an area that previously had a 10,000-gallon gasoline UST and fuel dispenser island.

U.S. Park Police Aviation Hangar

The USPP Aviation Hangar is a multi-level, warehouse-type building constructed on a concrete slab-on-grade and is used primarily to house helicopters involved in search and rescue operations. Supplies and equipment associated with maintenance of helicopters are stored within the Aviation Hangar. The areas to the north are paved with asphalt or concrete used for helicopter takeoffs and landings and are surrounded by a chain-link perimeter security fence. Northeast of the Aviation Hangar is a 10,000-gallon AST containing JP-8 fuel used to refuel helicopters. The AST is within a concrete secondary containment structure, has a leak detection system/alarm, and has a tertiary containment vault.

NPS National Capital Parks-East Headquarters

The NPS National Capital Parks-East Headquarters building is a single-story structure at 1900 Anacostia Drive SE. The building is constructed with a concrete slab-on-grade beneath some portions of the building and a low crawl space beneath other portions. The current building primarily includes office, storage, and training rooms for the NPS.

The western portion of the NRS includes a currently undeveloped rectangular-shaped parcel, located east of the AOC and west of the USPP Buildings, which is underlain by the WMATA METRO Green Line tunnel (see location on Figure 1-1). The METRO Green Line tunnel was constructed using a “cut-and-cover” method, which typically includes excavating a deep trench, installing the tunnel, and then backfilling the excavation. Excavated soils moved during tunneling were likely re-worked extensively in this area, and imported fill may have also been used as backfill. The portion of the tunnel closest to and under the Anacostia River was reportedly constructed using traditional tunneling techniques. Other data may be available from METRO that could influence our understanding of construction techniques and the potential impact on localized groundwater flow or contamination migration.

A concrete pad with locked metal hatches is located along the mid-northern border of this portion of the Site; it is a vent shaft for the underlying METRO Green Line tunnel. The bottom of the tunnel is at a depth of approximately 48 feet below the ground surface (bgs) at the shaft. The Green Line includes two parallel tunnels which are approximately 40 feet wide. The tops of the tunnels range in depth from approximately 30 feet bgs near the vent shaft to 5 feet bgs near the METRO Station. This portion of the NRS parcel also contains low-lying wet areas designated as Wetlands 4 and 5 on Figure 2-6. An east-west flood control berm is parallel to the southern shoulder of Anacostia Drive along most of the northern side of the NRS parcel, while an intersecting north-south earthen flood control wall is along the western side of the NRS parcel, east of the METRO tunnel (see Figure 1-2).

2.2.4 Additional Perimeter Properties Site Description

The Site includes Additional Perimeter Properties, generally categorized as the remaining Poplar Point property outside the AOC, DCL, or NRS portions of the Site (see Figure 1-1). These Perimeter Properties include a narrow strip of land between Anacostia Drive and the Anacostia River, a small triangular parcel north of DCL and south of Anacostia Drive, and the former Green Fuel Oil property at 632 Howard Road.

Based on property information included on Figure 2-1, the Green Fuel Oil parcel is under the jurisdiction of the District of Columbia, and includes a single-story building with a brick front or façade and a smaller, partially open, concrete block shed. This parcel is vacant, and the ASTs, drums, and fuel trucks have been removed although the buildings are still present.

Most of this parcel has a gravel surface with overgrown grass and vegetation to the north and access to the south from Howard Road. There are no wetlands or significant surface-water drainage features on this parcel. It is not known when business operations ceased at Green Fuel Oil, but it is believed to have operated until approximately 2005.

The Perimeter Properties along the northern side of the Site along Anacostia Drive are currently open, grassy, and include limited tree cover. The Anacostia Riverwalk Trail is on the north side of Anacostia Drive within the Perimeter Properties. The adjacent Anacostia River is tidally influenced and flows to the south. The entire river channel along the northern border of the Site has a stone bulkhead or seawall that physically separates the soil embankment from the river channel, with no connected or contiguous wetlands next to the main channel at the Site. This seawall is constructed of concrete, rock, and other materials. Various hardwood trees are located along the riverbank next to the seawall. Combined sewer outfalls 005 and 006 are located along the northeast border of the Site, discharging into the Anacostia River. No detailed information was available regarding the pipe sizes or associated flows within these outfalls, although their locations and estimated alignment (for outfall 005) are shown on Figure 1-2. Anacostia Drive runs parallel to the Anacostia River and has open and well-maintained grassy shoulders. Unnamed paved and gravel access roads provide access to existing NPS buildings at the former NRS portion of the Site, while most paved and gravel access roads at AOC and DCL are overgrown and in disrepair. Perimeter Property structures, transportation improvements, and related areas of interest are described in Table 2-1 and are shown on Figure 1-2.

3.0 PHYSICAL CHARACTERISTICS OF THE POPLAR POINT SITE

The Poplar Point site is on the south bank of the Anacostia River, just upstream of the confluence with the Potomac River. This section describes the physical characteristics of the Site, with an emphasis on the geology, hydrogeology, and hydrology. These physical characteristics are described because they form the framework and provide the motive forces that influence contaminant migration through various media at the Site and impact the methods and scope of future remedial investigation activities.

3.1 GEOLOGY

An understanding of the geology at Poplar Point was developed by reviewing regional geologic information and integrating Site-specific subsurface data obtained from boring logs. A regional framework based on the work of Research Planning, Inc. (RPI, 2002) is provided first for context and is followed by a description of the geologic units that were encountered in geotechnical and environmental borings previously completed at the Site.

3.1.1 Regional Geological Framework

The Washington, D.C., area is located along the boundary of two physiographic provinces: the Atlantic Coastal Plain and Piedmont Plateau, which are separated by a feature called the “Fall Line” (Figure 3-1). The sedimentary strata of the Coastal Plain consist of Cretaceous to Quaternary age units that form a wedge that becomes progressively thicker eastward. The depositional origins of the sediments that make up the Coastal Plain stratigraphy range from fluvial to deltaic, estuarine, and marine (RPI, 2002). According to the surficial geology map shown on Figure 3-1, Poplar Point is located within Quaternary alluvium deposited by the Anacostia River and its tributaries. Underlying the alluvial cover of the Anacostia and outcropping in the hills southeast of the study area is the Cretaceous Age Potomac Group. The Potomac Group has three members: the Patapsco Formation, which consists of a lower maroon clay and an upper lighter clay with white sand lenses; the Arundel Clay, which is an iron-bearing clay that lies unconformably beneath the Patapsco; and the Patuxent Formation, which is the lowermost unit and consists of sands, gravels, and small lenses of clay (Froelich and Hack, 1975).

Superimposed on the natural geology is fill consisting of dredge spoils from the Anacostia River and other materials that were imported and placed in varying thicknesses across the Site. Placing the fill dramatically changed the landform as indicated on Figure 2-5, which shows previously existing marsh areas with numerous tidal channels in the late 1800s. The historic bathymetry data indicate that the Anacostia River channel proper averaged a depth of less than 20 feet and reached a maximum depth of about 30 feet near the Navy Yard and Poplar Point.

The stratigraphy of the Site was investigated in detail by RPI to understand the potential hydrological connectivity between various permeable geological units and the Anacostia River.

RPI reviewed and integrated boring logs drilled by WMATA for bridges and subway lines, and reviewed borings drilled by Thomas Brown and Environ as part of Site investigations at the DCL and AOC parcels. Because their interpretation is the most thorough and comprehensive, it will be used as a working hypothesis pending additional information that suggests updates to the conceptual Site model are appropriate.

RPI suggested that the Pleistocene and Holocene sediments near the Site were deposited in alluvial and fluvial settings associated with both the Anacostia River and small tributaries of the Anacostia River. The sediments that were deposited in various areas at specific times were controlled by sea level at the time of deposition (base level), which in turn controlled the energy of the river system, and thus the dominant grain size. Figure 3-2 is a generalized cross section to facilitate visualizing the geologic units at and around the Site extended from work completed by the U.S. Geological Survey (Tenbus, 2003).

In RPI’s interpretation, a Pleistocene aged unit (called the Middle Permeable Unit in this document) was deposited on the flanks of, and perhaps within, the present-day Anacostia River, unconformably on the underlying Cretaceous Clay Potomac Formation. This unit consists of gravelly, sandy, and eventually silty sediments deposited on terraces in deltaic fan or braided fluvial settings. During a subsequent drop in base level, much of this material was eroded, along with some underlying Cretaceous clay, resulting in terrace deposits flanking an incised channel following the Anacostia River alignment but approximately twice as wide as the present-day channel. Coarse sediments, gravelly sand, and sand (called the Lower Permeable Unit) were deposited in braided fluvial deposits within the incised channel. Note that although these sediments are deeper in the geological section, they are younger than the Middle Permeable Unit. The Middle and Lower Permeable Units are interpreted by RPI to be separated both laterally and vertically as controlled by the timing of the depositional and erosional events.

Next, as sea level rose during the Holocene, the energy level in the Anacostia decreased, and finer sediments, referenced herein as the Holocene Clay, were deposited. Discontinuous sandy units at the top of the Holocene clay interpreted by RPI as sand bars are referenced as the Upper Permeable Unit in this Planning Document. The depositional framework within the Anacostia channel is likely to reflect influences of urbanization over the last 200 years or so as the land was cleared for development. This would have initially released coarse sediment, followed by finer sediments. Finally, fill was placed in thicknesses varying from a few feet to more than 20 feet associated with land reclamation and other development activities beginning as early as the 1880s. At the Site, much of the fill was obtained by dredging the Anacostia River, further modifying and complicating the near-surface stratigraphy.

Soil descriptions and general observations from soil borings and hand auger borings, are described in a Site Characterization Report (RIDOLFI, 2007b) and shown on the soil boring logs (Appendix B). In addition, MACTEC Engineering and Consulting, Inc. (MACTEC) drilled three shallow monitoring wells on the NRS parcel in 2007 (MACTEC, 2008). Information from MACTEC's borings in Appendix B is consistent with more detailed information from the DCL and AOC parcels, but the deeper subsurface has not been characterized under the NRS with the exception of geotechnical borings, which were drilled by WMATA for transit-related purposes. Additional subsurface soil information was obtained by reviewing the following information:

- Soil boring logs completed by Brown in 1999
- Soil boring logs completed by Environ in 1999 (Environ, 2002)
- Soil boring information obtained from a subsurface investigation report completed for WMATA (DeLeuw et al., 1981)
- Anacostia River cores completed by the Academy of Natural Sciences in June 2003 (Velinsky, 2003a and 2003b)
- Anacostia River cores completed by Horne Engineering on behalf of the Louisiana State University (Horne, 2005)
- South Capitol Street Bridge Estimated Subsurface Profile for a Geotechnical Study completed by MACTEC in 2005 (MACTEC, 2005)
- National Park Police Anacostia Operations Facility geotechnical borings completed by Schnabel Engineering Associates in 1994 (Schnabel, 1994)

Additional subsurface information from the sources noted above is included in Appendix C. The locations of monitoring wells, piezometers, and soil borings that were used to evaluate the geology at the Site are shown on Figure 3-3. Cross sections depicting subsurface geologic conditions beneath the Site were prepared based on information from the above-mentioned sources. Because of the uneven distribution of boring data, the information for the NRS portion of the Site is more limited and the cross sections are more speculative in that area. The locations of the cross sections are shown on Figure 3-3. The cross sections include two in a west-east direction (A–A′ and B–B′, Figures 3-4 and 3-5) and two in a north-south direction (C–C′ and D– D′, Figures 3-6 and 3-7).

3.1.2 Fill Material

Surface materials at the Site consist of fill material and dredge spoils 0.5 foot to 20 feet thick. The fill material consists primarily of silt, clay, gravel, and sand with occasional brick, glass, wood, and concrete fragments. The fill material is generally thickest near the southwestern corner of the Site (up to 20 feet thick at TMW-56) and along the eastern side of the central north-south road that separates the DCL and AOC parcels (10 to 13 feet thick). The fill is relatively thin at soil borings completed within Wetland 3 (2 to 3.5 feet thick) and near the southern greenhouses (0.5 foot to 4 feet thick). Figure 3-8 is an isopach map of the fill unit showing the estimated fill material thickness in feet. The map uses a triangular, irregular network approach to interpolate between values measured at borings. Because the topographic data sets are inconsistent, as described below, a significant effort would be needed to integrate these data to facilitate computer-generated isopachs using more sophisticated interpolation methods.

Because the Site consisted of tidally influenced mudflats before fill material was placed between approximately 1910 and 1927, it is presumed that the current topography was shaped in part by the filling and subsequent Site grading. The pattern of fill thickness roughly corresponds with Site topography (Figure 3-9). Note that the topography was combined or spliced together from three distinct data sets that are not consistent; therefore, surface topography shown is relative or an approximation. Ground-surface elevations are high (approximately 9 to 13 feet above mean sea level [msl]) near the southwestern corner of the DCL parcel, where fill thicknesses are greater (4 to 20 feet), and low (approximately 1 foot to 5 feet above msl) within Wetland 3, where fill thicknesses are lesser (2 to 3.5 feet). Ground-surface elevations along the eastern side of the central north-south road that separates the DCL and AOC parcels range between approximately 5 and 12 feet above msl and the fill is 10 to 13 feet thick. The ground surface near the southern greenhouses is approximately 6 feet above msl and the fill is 0.5 foot to 4 feet thick. The fill thickness outside the Site is not well documented in reports reviewed for this Planning Document, although it is likely that the fill thins southward as the topography rises.

3.1.3 Holocene Clay

Throughout most of the Site, the surficial fill material is underlain by soft gray silty clay with occasional organics and pockets of peat. This gray clay has been interpreted as a Holocene deposit (RPI, 2002). This interpretation is reasonable to accept because the unit has a typical transgressive character (mostly fine-grained sediments, an aggradational pattern) that is characteristic of a major rise in base level, which occurred in the Holocene. For the purpose of this Planning Document, the soft gray clay is referenced as the “Holocene Clay.” This is an important unit because, where present, it is likely to restrict the vertical and reduce the horizontal contaminant migration.

The Holocene Clay was encountered in most of the soil borings completed through the fill material, with the exception of soil borings completed in the southwestern portion of the Site. The borings that did not encounter the Holocene Clay include RIDOLFI’s borings DCMW006-02 and DCMW007-02, and Brown’s soil borings MW07, MW23A, MW-23B, SB-4 through SB-7, and SB-43. At these borings, a sandy gravel unit was observed directly below the fill material.

This sandy gravel unit, which is described in more detail in the subsequent section, is referred to as the “middle permeable unit.” The southwestern extent of the Holocene clay likely represents the former (pre-dredging, pre-filling) extent of the tidally influenced Anacostia River. The estimated extent of the Holocene Clay is shown on Figure 3-3 as taken from boring logs interpreted by RPI and supplemented by data collected after RPI performed their study, by RIDOLFI and others.

Where present in borings, the Holocene clay ranges between approximately 15 feet thick (near the 11th Street Bridge) and 25 to 40 feet thick in borings at the DCL, AOC, and NRS parcels, with the exception of an area at the south end of the AOC parcel where the Holocene clay is between 5 and 10 feet thick before it pinches out against a remnant terrace.

3.1.4 Upper Permeable Unit

At some soil borings, a coarse to fine-grained wet sand unit is present beneath the fill material and above the upper level of the Holocene Clay. This material is referred to as the “Upper Permeable Unit” (UPU), which RPI interprets as deltaic fan deposits or sand bars. Where present, the UPU is between 2 and 5 feet thick. Soils grouped as UPU in this document differ from materials identified as fill, in that the UPU core samples did not contain artificial materials (i.e., brick, concrete, and glass) and pockets of mottled clay. Consequently, it can be difficult to positively identify this unit on historical soil boring logs, making it difficult to map. The UPU was encountered by RIDOLFI when installing piezometers PZ-4 through PZ-7, in the northern portion of Wetland 3, and was interpreted by RPI to be present in several patches on the both the DCL and AOC parcels.

3.1.5 Middle Permeable Unit

At soil borings completed on top of the former terrace, a wet, brown, fine sand and sandy rounded gravel were encountered directly below the Holocene Clay. This unit is referred to as the “Middle Permeable Unit” (MPU). Only one soil boring drilled at the Site as part of the environmental investigations, MW07, was completed through the MPU, which was approximately 15 feet thick at that location. Several WMATA borings reviewed by RPI penetrated through the MPU, and it was reported to be 15 to 20 feet thick (RPI, 2002). Further east, at geotechnical borings drilled parallel to the 11th Street bridge alignment, the MPU is approximately 40 feet thick. The MPU is situated on top of the former terrace. The edge of the former terrace is evidenced by the termination of the MPU between SB08 and SB101 (Figure 3-5); between DCMW015-02 and MW02 (Figure 3-6), and between DCMW013-02 and SB-101 (Figure 3-7).

3.1.6 Lower Permeable Unit

North of the northern edge of the former terrace, a wet, brown, fine sand and sandy rounded gravel unit underlies the Holocene Clay. This unit, referred to as the "Lower Permeable Unit" (LPU) was encountered at soil borings MW02, MW10, DCMW008-02, and DCMW009-02. This unit was also encountered at soil borings FPS-54U and FPS-56U, which were completed north of the Site in the Anacostia River as part of the subsurface investigation performed for WMATA (RPI, 2002). Through the center of the Site, from south to north, this unit appears to extend from the area near soil boring DCMW008-02 to beneath the Anacostia River, at FPS-54U (Figure 3-7).

RPI's interpretation of the depositional and erosional history suggests that there is an incision separating the Middle and Lower Permeable Units. Soil boring SB-101 is interpreted to have been drilled through the incision because neither the MPU nor LPU were encountered. This is difficult to verify based on soil boring data alone; however, the cross sections included with this document are used as a guiding principle until new or additional data suggests that an alternative explanation is warranted. The LPU is between 5 and 15 feet thick where penetrated by soil borings.

3.1.7 Underlying Cretaceous Clay

The lowermost unit encountered at the Site is a hard, silty, and orange and gray mottled clay with sand and gravel. This clay was interpreted as a member of the Cretaceous Potomac Formation by DeLeuw et al. (1981), and is referred to in this document as the Cretaceous clay. The Cretaceous clay is generally encountered below and in direct contact with the Middle and Lower permeable units. At one soil boring location, SB-101, the Cretaceous clay is below and in direct contact with the Holocene clay. Cross sections prepared by RPI and regional geological maps indicate that the Cretaceous clay extends beneath and across the Anacostia River to the north and outcrops in the hills south and east of the Site. This unit has not been fully penetrated by soil borings reviewed for this document but is at least 50 feet thick on several deep geotechnical borings under the Anacostia River (RPI, 2002).

3.1.8 Geological Data Gaps

There are numerous data gaps in the geologic understanding of the Site:

- RPI indicates that the Holocene UPU is discontinuous, and there are areas of the Site where well and boring data are sparse. The extent of this unit should be better defined because in many places it is the shallowest permeable unit and may influence groundwater movement and contaminant transport.

- There are relatively few borings that bound the incision separating the MPU and LPU, and additional detail is needed about this feature. If the Upper, Middle, or Lower units are in contact across the incision, it would provide a potential conduit for groundwater and associated contaminants. This issue can be evaluated in concert with the hydrogeology and contaminant distribution that are described in sections 3.2 and 4.0, respectively.

3.2 HYDROGEOLOGY

This section describes the hydrogeology of the Site based on available data. The hydrogeology is complicated and relatively difficult to interpret for the following reasons:

- Most of the wells are screened in the fill or UPU so data are limited regarding the deeper aquifer units.

- The existence and contact of one geologic unit relative to another varies throughout the Site, and possibly varies relative to the migration pathway of a specific contaminant. For example, the MPU may be in contact with the LPU at only one location, then in contact with the fill in one area while separated from the fill by the Holocene Clay in another area, and not exist in other areas.

- Monitoring wells are not isolated within specific hydrogeologic units, which introduce ambiguity when comparing water levels to wells that have shorter screens. For example, MW-7 has more than 20 feet of screen, and DCMW011-02 has a 5-foot screen; both are in the MPU.

- The top of casing elevations for monitoring wells drilled by Thomas Brown were not documented (the ground surface elevations were reported instead) making the groundwater elevation measurements collected by them, and subsequently by ENVIRON and RPI, suspect.

- Top of casing elevations were not surveyed for the three shallow NRS parcel monitoring wells installed by MACTEC.

- The current groundwater monitoring system does not effectively isolate each geologic unit—including the Holocene Clay—for measurement or vertical and horizontal interconnectedness. Additional pathways may exist, but remain unidentified.

- Site-wide (across the larger Poplar Point Site) synoptic groundwater elevations have not been measured.

- No pump (aquifer) or laboratory tests have been conducted or, if they have, the results of the tests are not available so that hydraulic conductivities and related parameters that control groundwater movement and contaminant transport are uncertain.

- Some portions of some water bearing units may be hydraulically connected to the Anacostia River, which is tidally influenced. Until the extent of connection is better understood, water-level measurements collected at different times of day may be impacted by tidal influences.

These factors will be used to develop data gaps at the end of this section, but a description of water level observations made in 2002 is presented first because they were made synoptically, after top of casing measurements were recorded during a single survey.

The current conceptual Site model includes four units with the potential to bear water: the fill unit, the UPU, the MPU, and the LPU. Water level observations for each unit are described below. The Holocene Clay lies beneath the fill unit and, because of its physical characteristics, it is likely to restrict the vertical flow of groundwater. However, in the southwest corner of the DCL parcel, the fill is directly next to the MPU as controlled by erosional and depositional processes, and in these areas a connection between the water table aquifer in the fill and deeper units is more likely.

Groundwater elevations observed in December 2002 by RIDOLFI were used in this document to estimate the groundwater flow directions. Groundwater elevations reported by Brown during previous investigations were not used, because it appeared that the measuring point elevations on the monitoring wells were not surveyed as determined by reviewing Brown’s reports.

Table 3-1 summarizes the units in which monitoring wells and piezometers are screened. Some of Brown’s wells are screened across more than one unit, which makes them of limited value for assessing the hydraulic head relationships of individual units. In addition, some of Brown’s wells are screened at differing intervals within individual units, which also makes the wells of limited value for assessing hydraulic head relationships of individual units. As shown in Table 3-1, wells were grouped according to the water-bearing unit in which they are screened.

3.2.1 Fill Material / Upper Permeable Unit

The hydraulic properties of the fill material are likely to vary considerably from boring to boring because the nature of the material is inconsistent. In contrast, the UPU is relatively consistent sand. As mentioned above, these units are in contact with one another so they likely behave as a single hydrogeologic unit.

Twenty-two wells or piezometers are screened in either the fill material or the UPU, 19 of which provide usable groundwater elevation data. The locations of these wells and piezometers are not uniformly distributed across the Site. There is a cluster of wells near the garage building on the AOC parcel, two wells on the AOC parcel near the boundary between the DCL and AOC parcels, and ten locations on the eastern half of the DCL parcel. Figure 3-10 shows the groundwater elevations in the fill / UPU measured on December 21, 2002.

The groundwater elevations observed near the garage on the AOC parcel range from 5.29 feet above msl in MW20 to 7.26 feet above msl in MW03, despite their proximity. The pattern of hydraulic head relationships indicates that the shallow groundwater flows radially outward from MW03. The high level of groundwater in MW03 may be attributable to direct surface water recharge, because the well was installed in fill material that was placed into the excavation of the former UST pit. The flow direction from the garage is toward the west based on the wells MW05 and DCMW012-12, and potentially in other directions, although there are insufficient wells except those directly next to the garage to document this clearly. On the DCL parcel, the gradient is flat, water levels range from 3.19 feet to 3.68 feet, and there is no dominant flow direction. This is consistent with the observation that Wetland 3 was full of standing water in December 2002, when the groundwater and surface water elevations were essentially the same.

MACTEC installed three shallow monitoring wells (NRS-1, NRS-2, and NRS-3) at the NRS parcel in 2008 that are screened in the fill. Static groundwater levels in these wells were gauged twice in January 2008, relative to the well top of casing. The top of casing elevations of these wells were estimated with a handheld geographic positioning system unit and have not yet been surveyed to establish an accurate reference point for measuring groundwater elevations. In addition, these wells were installed six years after the previously described event and did not provide comparable results. Available data for the MACTEC wells are included in Table 3-1.

3.2.2 Middle Permeable Unit

Ten monitoring wells are screened in this unit forming a slender triangle, which makes estimation of the groundwater flow direction interpretative. Three of these wells (MW07, MW23A, and MW23B) are not useful for assessing the hydraulic head relationship of wells screened in this unit, because these wells are not screened at consistent intervals. The water level in DCMW013-02 (3.13 feet) was anomalously higher than other wells and was not used for contouring. In the remaining wells, the water levels are within a fairly small range, 1.02 to 1.87 feet.

Figure 3-11 was prepared using December 21, 2002, data from the groundwater elevations observed at select wells screened in the MPU (MW01, DCMW006-02, DCMW007-02, DCMW011-02, DCMW013-02, DCMW014-02, and DCMW015-02). The groundwater elevations were high near DCMW014-02 and DCMW015-02 (1.87 and 1.84 feet above msl, respectively) and low near DCMW006-02 (1.02 feet above msl). These hydraulic head relationships generally indicate that the direction of groundwater flow is toward the southwest, though local anomalies may exist or result from anthropogenic sources.

3.2.3 Lower Permeable Unit

Four monitoring wells are screened in this unit, all at intervals that appear to be useful for assessing hydraulic head relationships. However, three wells are on a nearly linear alignment, which makes the flow direction quite sensitive to small variations in measured water levels.

A contour diagram of the LPU groundwater elevation (Figure 3-12) was prepared using the December 21, 2002, groundwater elevation measurements. The groundwater elevations were high near MW10 (1.80 feet above msl) and low near MW02 (1.20 feet above msl). These hydraulic head relationships indicate that the direction of groundwater flow is toward the west.

Groundwater levels at wells in the LPU were similar to the levels observed at wells in the MPU. Water levels in the LPU ranged from 1.20 to 1.60 feet above msl, and water levels in the MPU ranged from 1.02 to 1.87 feet above msl (excluding the wells mentioned in the previous section).

3.2.4 Vertical Hydraulic Gradients

Two pairs of wells are drilled directly next to each other and a third pair of wells that are relatively close to each other can be used to evaluate vertical hydraulic gradients. Table 3-2 presents the results of that evaluation. In each case, the comparison is between wells screened in the fill or UPU and wells screened in the LPU. The direction of the hydraulic gradient is downward in each case, ranging from 0.06 foot per foot (hydraulic gradient [ft/ft]) to 0.10 ft/ft. No well pairs are where the fill and MPU are in proximity; therefore, the vertical hydraulic gradient between these units is unknown.

3.2.5 Hydrogeologic Data Gaps

There are numerous data gaps in the hydrogeologic understanding of the Site.

- While groundwater flow is generally thought to be towards the river, the local details of groundwater flow direction have not been resolved.

- Intra-unit flow directions for the permeable units and the interconnectedness of these units are not well defined. This is particularly important for all the permeable and fill units in the southwest corner of the DCL parcel where the Holocene Clay is absent. Here, if the aquifers are connected, a conduit for contamination from surface releases into the deeper subsurface is a possibility.

- Seasonal variation in groundwater flow has not been characterized.
- The hydraulic conductivity and porosity of the water bearing units have not been characterized, and are important for understanding flow velocities and contaminant transport.
- Hydraulic conductivity of the Holocene Clay has also not been determined, though it is assumed to be an aquitard. The topographic surface and full extent of the Holocene Clay and its influence on horizontal groundwater and contaminant migration have not been determined.
- Tidal influences in the various units, which would help clarify which units might be connected to the river, are not available.
- There are large spatial data gaps on the NRS parcel, especially in the deeper units.
- The influence, if any, the Green Line subway tunnel, Stickfoot Creek sewer system, and other anthropogenic features have on Site groundwater and contaminant movement is unclear.

3.3 SURFACE WATER/WETLANDS HYDROLOGY

This section describes the surface water hydrology as it relates to the Site. The hydrology is driven in part by precipitation, which is summarized in Table 3-3. The monthly precipitation is relatively consistent. Another important factor is the Anacostia River, which forms the northern boundary of the Site and affects the hydrology of the Site. As with previous sections, there is more information available for the DCL and AOC parcels than for the NRS parcel because those areas were subject to numerous previous investigations.

3.3.1 Anacostia River

The Site is next to the Anacostia River, which flows to the south. Table 3-4 summarizes hydrologic characteristics of the Anacostia River (Anacostia Watershed Restoration Partnership, 2010). The Anacostia River has relatively low flow rates compared to the Potomac River, with a mean annual flow rate of 139 cubic feet/second (DOH, 2003) as measured at upstream flow gages. Near the Site, the Anacostia River is tidally influenced, with approximately 3.5 feet of tidal variation per day (National Oceanic and Atmospheric Administration [NOAA], 2010). Figure 3-13 shows data from a tide gage approximately 1.5 miles downstream from Poplar Point at the confluence of the Anacostia and Potomac Rivers. During the two-day period shown on the figure, the tide ranged from -0.5 foot to +3.5 feet.

The south bank of the Anacostia consists of a hardened “seawall” constructed from concrete, rock, and other materials. Along the northern boundary of the Site, the seawall physically separates the soil embankment from the river channel. Consequently, there is little if any direct flow from the Site to the river.

The entire shoreline of the Anacostia River at the Site falls within the 100-year floodplain. An approximately 1,500-foot-long, east-west flood control wall is parallel to the southern shoulder of Anacostia Drive along most of the northern side of the NRS parcel. An intersecting earthen flood control berm approximately 1,000 feet long and oriented north-south is located along the western side of the NRS parcel, east of the Metro Green Line tunnel. These structures are designed to keep floodwaters from the Anacostia River from impacting developed portions on the NRS parcel.

3.3.2 Stickfoot Sewer/Creek and On-Site Wetlands

The Stickfoot Sewer/Creek flows into and under the Site, generally on an alignment between the AOC and NRS parcels. It is contained within a rectangular concrete culvert that is roughly 10 feet wide by 10 feet deep, which discharges to the Anacostia River through a wooden flap gate forming a delta at the discharge point. A manhole is in the culvert near the pump house toward the southern portion of the DCL parcel through which flow can be observed. On several occasions in 2002, Stickfoot Creek was observed by peering down the manhole. At the time, the weather was relatively dry and water was seen flowing over a sand and gravel substrate with an observed water depth on the order of 6 inches (no measurements were taken). A surveyor established the elevation of the invert in the manhole as -0.3 feet, the elevation at the point of discharge in the Anacostia River as -1.8 feet, and the distance between these points as 1,250 feet. During a Site visit in early May 2012, when weather conditions were relatively dry, observations down the same manhole identified flowing water through the Stickfoot Sewer. The murkiness of the water prevented direct observation of the substrate. No measurements of depth to water were taken.

It is unknown whether the culvert has breaches such that groundwater could flow into the structure or surface water could flow out of the structure. The source of the water is also unclear other than it appears to come from the south. The historical map of the Site (Figure 2-5) shows a meandering line that may represent the former Stickfoot Creek connecting to the Anacostia River along a northwesterly alignment. However, it is unclear where the headwaters of Stickfoot Creek are or were, and the flow may represent municipal stormwater or leaks from a water supply system. Prior attempts to resolve this uncertainty were unsuccessful.

When the DCL and AOC nurseries were active, a ditch system collected stormwater, which was pumped into the Stickfoot Creek system for conveyance into the river. The pumps are now inactive and stormwater collects in low areas (remnants of the ditch system) on the Site forming seasonally ponded areas, and infiltrates or leaves the Site via evapotranspiration. During the late fall and winter, several feet of standing water accumulates in low areas of the Site, which have taken on seasonal (Wetland 3) characteristics since the stormwater management system stopped operating. The following section describes observations in the largest wetland area in the context of trying to understand the relationship between surface water and groundwater.

In 2002, staff gages were installed near three piezometers in Wetland 3 to compare surface water elevations to local groundwater elevations. The locations of the staff gages are shown on Figure 3-14. On July 22 and 23, 2002, the surface water level at SG-1 (2.67 feet above msl) was higher than the groundwater level at PZ-2 (1.04 feet above msl). This indicates a downward flux of surface water to groundwater. Surface water was not present at SG-2, SG-3, and SG-4 during the July 2002 measurements.

During water level measurements on November 15, November 21, and December 21, 2002, the surface water levels were similar to corresponding groundwater levels (near 3 feet above msl). The measurements indicate that the surficial material in Wetland 1 was completely saturated from the top of the Holocene Clay to the ground surface during this period, likely because of the significant precipitation and snowmelt that occurred during late fall and early winter.

In general, other than the Stickfoot Sewer, the surface water on the DCL and AOC parcels seems to be self-contained. When the nurseries were operational, pumps were used to remove water that fell on the Site. Now, the water seeks topographic low spots, such as the wetland areas and ditches that had formerly been used to convey surface water to pumps. These areas are underlain by Holocene Clay, so it seems likely that this water leaves the Site via evapotranspiration, or infiltrating to groundwater over the summer.

There were anecdotal reports that standing water at the AOC and southwestern portion of the NRS parcel is sourced at least in part by leaks from water mains. One of the authors of this section noted that water was flowing in a concrete structure surrounding the southern greenhouses during a Site visit in 2002. At that time, the water seemed to be limited to the area around the greenhouses, but the dense vegetation made it difficult to establish either the source or disposition of this water.

During a Site visit in May 2012, the anecdotal information was largely confirmed, because several, interconnected, large areas of standing water were observed near the southern greenhouses. Though these observations were made during a relatively dry time of year; flowing water was observed in several shallow pools and into the concrete structure next to the southern greenhouses. A steady flow of water was observed from a broken water line identified next to one of the greenhouses. In addition, water was observed seeping from the ground at the periphery of a shallow pool next to the concrete structure.

Following the May 2012 Site visit, NPS representatives contacted DC Water with a request to investigate the flow of water from the pipe on the AOC parcel. In June 2012, DC Water representatives shut off the public water supply to the AOC parcel. NPS representatives subsequently confirmed that flowing water from the broken water line and seepage area had stopped.

In addition, during scouting of an area on the east side of the embankment next to Stickfoot Creek, an apparent sinkhole was discovered in the soil which appeared to have been created by water flowing at a substantial rate, possibly from a broken water main. Water discharging from this feature would likely have flowed toward Wetland 4, a topographic low spot west of the Green Line tunnel alignment (Wagoner, 2010). Substantial quantities of standing water have been reported in the same general vicinity that may have been associated with the same or another leak. As-built diagrams indicating the location of water mains have not been located to date.

A storm sewer system in the developed portion of the NRS, perimeter parcels, and along roads and other transportation corridors collects runoff and conveys it to the Anacostia River, but the details of the system were not documented for this planning effort. Culverts under the north-south road at the western boundary of the AOC parcel may allow surface water to flow into the DCL parcel, and into Wetland 3, if the pipes are not clogged (the system has not been maintained for over a decade). Surface runoff is directed by surface topography and drainage swales to the north but there are no known direct connections to the Anacostia River, although there may have been a drain structure historically. The general surface water flow directions based on topography are shown on Figure 3-9.

The Stickfoot Creek storm sewer generally bisects the Poplar Point area, crossing from upland near the Anacostia Freeway to the Anacostia River. The degree of anthropogenic modification to the headwater area of Stickfoot Creek makes the Creek's source somewhat uncertain. There is a distinct delta in the Anacostia River at the terminus of Stickfoot, indicating that sediment is transported through the structure. However, Stickfoot is entirely enclosed through the Site, which suggests that sediment in the delta originates upstream (south) of the Site. The condition of this structure where it flows under the Site is not known, so it is unclear whether groundwater leaks into or out of the culvert.

3.3.3 Surface Water Data Gaps

There are numerous data gaps in the surface water understanding of the Site.

- Surface water runoff behavior and magnitude have not been well characterized, nor have groundwater recharge rates from surface water. The surface water runoff patterns for the NRS parcel have not been documented.

- There are no obvious wetlands on the developed portion of the NRS parcel and a flood control wall and berm prevent surface water from leaving the Site to the north. There is a stormwater collection and conveyance system for the active NPS and Capitol Police facilities that presumably discharges directly to the Anacostia River but documentation of such a system remains a data gap.

- The location and condition of water mains are not well established, and leaky mains may be or have been a source of surface water at the Site.

- The hydrology of Stickfoot Creek has not been quantified and the magnitude of the likely groundwater interaction with the Stickfoot Creek Sewer is at this time unknown.

- The tidal influence of the Anacostia River on Site groundwater is not well understood.

3.4 POTENTIAL TRANSPORT MECHANISMS

This section summarizes the physical transport pathways in a CSM of the Site. In a later section, the CSM will be considered with the existing Site chemical data to identify potential data gaps, refine the understanding of contaminant transport pathways, and develop a plan for collecting additional data needed to evaluate potential remedial alternatives.

Across the Site, shallow groundwater transport pathways may be highly variable locally because of the presence of multiple interbedded permeable and impermeable units with uncharacterized lateral and vertical continuity, which is typical of the natural geologic variability associated with fluvial systems. The shallow groundwater transport pathways are also influenced by the elongated shape of the 96-acre Site, proximity to the Anacostia River, and possibly anthropogenic structures such as the Stickfoot Creek Sewer and the Green Line tunnel. Deep groundwater transport pathways may also be highly variable locally as a result of the natural geologic variability associated with fluvial systems, all of which are likely influenced near the Anacostia River by tidal fluctuations, and across the Site by seasonal variabilities that are not yet characterized.

Figure 3-9 shows the surface topography at the Site and illustrates predicted surface water flow directions inferred from ground-surface elevations. The surface of the water table often mimics the overlying topography so that Figure 3-9 may indicate shallow groundwater flow directions in the fill and UPU. These transport pathways may be influenced locally by anthropogenic conduits or obstructions, such as storm sewers, drainage swales, seawall, floodwalls, the Stickfoot Creek storm sewer, and the Green Line Metro tunnel. Shallow groundwater may also discharge into topographic lows, which is likely the case in wetlands at the Site.

Considering that most of the surficial soils on the Site are dredge fill consisting of a mixture of organic and inorganic materials with relatively low permeability, surface water infiltration and shallow groundwater flow are likely limited in near-surface soils relative to more permeable units. The Holocene Clay underlying the dredge fill across most of the Site likely restricts shallow groundwater from flowing to deeper units. Topographic low areas and the underlying Holocene Clay explain the seasonal occurrence of wetland areas on portions of the Site where anthropogenic drainage systems (e.g., storm sewers) are not installed or may not be functioning effectively.

Figure 3-2 shows a generalized geologic cross section that simplifies the smaller-scale variability that may exist locally to present the larger-scale regional context. Locally, the MPU is exposed at the ground surface at some locations, and the MPU and LPU may be in contact with each other at other locations. In addition, sand and gravel deposits within the Holocene Clay may provide local preferential transport pathways between the permeable units shown in cross sections presented in Section 3.1. Consequently, it is difficult to confidently establish whether monitoring wells installed at similar elevations within what may be interpreted as the same hydrogeologic unit are actually monitoring that unit. Furthermore, even if the same unit is presumably monitored by a group of wells, the interpreted groundwater flow direction may be locally influenced by the orientation and the extent of that unit. For example, given that the MPU is exposed and near the ground surface in the southwest portion of the Site, it is reasonable to expect that the local groundwater flow direction within that portion of the MPU can be oriented toward the southwest (as shown on Figure 3-11), away from the expected regional groundwater flow direction.

Groundwater flow directions generally are expected to be oriented toward the Anacostia River (approximately perpendicular to the riverbank), which is generally north across most of the Site, except near the bend in the river at the western end of the Site. This relatively sharp bend in the river likely alters the regional groundwater flow direction toward the west and possibly southwest, similar to the surface water flow directions depicted on Figure 3-9. This presumed shift in the regional groundwater flow direction combined with local geologic variability, influences from anthropogenic features, and tidal effects penetrating inland (to an unknown distance depending on geologic permeability), can lead to potentiometric surface maps that appear different from the expected regional flow directions. A three-dimensional schematic illustrating some factors affecting groundwater flow directions is shown on Figure 3-15.

Absent physical contaminant characteristics that influence transport pathways, such as the presence of non-aqueous phase liquids (NAPL), contaminant transport pathways from surface or near surface spills will vary across the Site. These pathways will vary depending on the numerous local variations in geology and subsurface structures, the local groundwater flow direction at the spill location, potential wetland influences, seasonal effects on groundwater levels that may result in flow direction changes, and tidal effects closer to the river. Current potentiometric data are insufficient for accurate interpretation of the local and regional flow directions and potential transport pathways. For example, Figure 3-11 shows groundwater flow within the MPU toward the southwest, which is approximately upgradient topographically on the Site. More extensive monitoring may show the actual regional groundwater flow and resulting transport direction to be toward the Anacostia River to the west.

Despite the lack of water-level monitoring data locations and frequency and the difficulty of relating the current data to the extensive subsurface variability, the position of the Anacostia River as the likely primary groundwater discharge zone provides an advantage from which to evaluate transport pathways using knowledge of existing Site contaminant chemistry, history of source areas, and Site topography.

4.0 EXISTING ANALYTICAL DATA

4.1 PREVIOUS INVESTIGATIONS AND OFF-SITE DISPOSAL ACTIVITIES

Previous environmental investigations performed from 1981 to 2008 focused primarily on the DCL and AOC parcels, with limited assessment of the NRS and Perimeter Properties parcels. Table 2-1 summarizes previous investigations and removal actions completed at significant buildings/structures and areas of interest at the Site. Figure 4-1 shows the sample locations and type of sampling performed (soil, groundwater, or surface water) categorized by the consultant or contractor who performed the sampling. A chronology of previous investigations is summarized in the following paragraphs. Section 4.1.1 describes work at the DCL and AOC parcels; descriptions of the work at the NRS and Perimeter Properties parcels are presented in Sections 4.1.2 and 4.1.3, respectively.

4.1.1 Previous Investigations and Remedial Actions at the DCL and AOC Parcels

4.1.1.1 Department of Transportation Investigations – 1981

In 1981, the U.S. Department of Transportation (U.S. DOT) completed an Environmental Impact Statement (EIS) for construction of the Anacostia segment of the Metro Green Line (U.S. DOT, 1981). The locations of the Green Line tunnel alignment and associated Anacostia Station Parking Deck are shown on Figure 1-2. Geological data collected during construction were used to characterize stratigraphy and potential groundwater flow characteristics. The EIS primarily focused on the impact of the rail line and did not identify areas for environmental investigation (DeLeuw et al., 1981).

4.1.1.2 Phase I Environmental Site Assessment – 1995

In December 1995, Volkert Environmental Group, Inc. (Volkert, 1995) completed a Phase I Environmental Site Assessment (ESA) of the DCL and AOC parcels. Volkert's ESA identified a gasoline UST, a fuel oil AST, numerous 55-gallon drums, possible asbestos-containing materials (ACMs), possible polychlorinated biphenyls (PCBs), other chemicals, and historical activities that might have impacted the Site. Volkert recommended additional investigations near the waste pit, discarded 55-gallon drums, fuel oil AST, gasoline UST, and possible ACMs in the boiler room, offices, and greenhouses.

4.1.1.3 Emergency Response Activities – 1997

In March 1997, several federal and local agencies initiated emergency response activities at the DCL and AOC parcels because of the presence of drums, compressed gas cylinders, and other evidence of potential contamination. After further inspection, the DC Fire Department de-escalated the response action to nonemergency status. The emergency response activities prompted three phases of priority response, described below.

4.1.1.4 Priority Response, Phases I through III – 1997

In March 1997, a three-phase priority response plan was developed by Thomas L. Brown Associates (Brown, 1997a, 1997b, 1997c, 1997d, and 1997e). Phase I included staging and removing 11 gas cylinders. Phase I activities also included overpacking and appropriately storing laboratory kits containing ferrous oxide and potassium nitrate from the chemical storage building.

Phase II activities included overpacking 55-gallon and 25-gallon drums and excavating and stockpiling stained soils found beneath the drums. The overpacked drums and excavated soils were temporarily stockpiled on Site, pending appropriate disposal.

Phase III activities included locating and removing the source of an oil leak in the boiler room; removing five ASTs and one UST; planning the removal of drums on the DCL parcel; and repairing the surrounding fence. During the priority response activities, one 1,000-gallon UST was removed from the southern side of the garage building on the AOC Parcel. A small hole was noted in the bottom of the UST, but no soil was removed. Three soil samples collected for analysis contained fuel-related compounds.

Brown also completed an asbestos survey of the buildings on the AOC Parcel in 1997. This study analyzed 114 samples of floor tiles, roofing, ceiling tiles, pipe insulation, and other potential ACMs. Suspect material was observed in all but one building. Asbestos was found in floor tiles of the southern boiler room, office space of the northern nursery building, Transite board in tables in greenhouses (confirmed in two, suspected in all others), insulation in two of the northern greenhouses and the associated office building/boiler room, and material stored in trash bags in the southern boiler room (Brown, 1997b).

In March 1997, samples were collected from six drums, and two bags of soil were collected from the drum area for laboratory analyses (Brown, 1997c). The drum contents were described as kerosene and lubrication oil. The Phase II Priority Response Report provides data from sampling three tanks, two of which were reported as removed, plus some pails found near the garage (Brown, 1997d). A 300-gallon AST in a concrete vault near the southwest corner contained water. A yellow, 275-gallon diesel AST near the southern fence was drained and removed. Four pails containing liquids were removed from north of the garage.

4.1.1.5 Phase II Investigations – 1997 and 1999

Based on findings from the three-phase priority response, additional environmental investigations were conducted on the DCL and AOC Parcels. Phase II investigations included:

- Completing a subsurface investigation, including soil borings and monitoring well installations
- Collecting and analyzing surface and subsurface soil samples, wetland sediment samples, groundwater samples, and surface water samples
- Excavating test pits at various locations at the DCL parcel
- Locating, cataloging, sampling, and overpacking drums

4.1.1.6 Soil/Planting Medium and Sediment Investigations – 1998

In August 1998, Ecology and Environment, Inc. (E&E) was retained by the NPS to collect samples of soil/planting medium and sediment at the AOC parcel. Samples of soil/planting medium were collected from 8 of the 14 greenhouses. Three soil samples were collected at the dog training area, and one sediment sample was collected from the southeast drain sump. In addition, three soil samples were collected from unidentified test pit locations. The results are described in E&E’s 1999 report. The E&E report identified elevated pesticide concentrations in the samples collected from within the greenhouse and in the soil/planting medium. Soil samples collected from the dog training area, test pits and drain sump did not show elevated concentrations of pesticides.

4.1.1.7 Site Investigation Activities – 1999

In 1999, Environ Corporation (Environ) was retained by the AOC to complete an environmental investigation and prepare a comprehensive report regarding soil, sediment, groundwater, and surface water conditions on the AOC Parcel. According to their subsequent report (Environ, 2002), the investigation activities included:

- Collecting soil samples within greenhouse areas, former planting areas, wetland areas, and former drum storage areas for pesticide analysis
- Collecting soil samples at the location of a reported former burn pit for dioxin analysis
- Collecting soil samples from an off-parcel area north of Anacostia Drive for analysis of carcinogenic polycyclic aromatic hydrocarbons (PAHs) and arsenic to evaluate anthropogenic impacts
- Collecting sediment samples from two storm drains near the southern greenhouses for pesticides analysis

- Sampling groundwater from seven monitoring wells at which several metals were reported by Brown at levels greater than their risk-based concentrations (RBCs)

4.1.1.8 Site Inspection – 2001

Resource Applications, Inc. (RAI) completed a Site inspection in July and August 2001 under contract to the U.S. Environmental Protection Agency (USEPA). The objectives were to establish the level of contamination in various media and develop a hazard ranking system preliminary ranking evaluation score (PREscore). During this investigation, the surface water migration pathway was evaluated, including potential groundwater to surface water migration. In addition, samples of surface soil, wetland sediment, and surface water were collected and analyzed for organic and inorganic chemicals (RAI, 2001). As described in Section 4.3, the locations of the RAI samples were not accurately located in the field, thus making data from this program of limited use.

4.1.1.9 Site Investigation and Off-Site Disposal Activities – 2002

In 2002, RIDOLFI was contracted by the NOAA, which had an interagency agreement with the District of Columbia Department of Health (currently reorganized into the District Department of the Environment referred to hereafter as DDOE) to conduct an environmental investigation and prepare a comprehensive report regarding soil, sediment, groundwater, and surface water conditions. The investigation was primarily focused on the DCL and AOC parcels, with much more limited work on the NRS and Perimeter Parcels (RIDOLFI, 2007). The investigation activities included:

- Completing a subsurface investigation, including 16 soil borings and installing 9 monitoring wells and 8 piezometers
- Collecting and analyzing approximately 45 surface and near-surface soil samples and collecting and analyzing 30 groundwater samples and surface water samples from Wetland 3 and Stickfoot Creek

The off-Site disposal activities included:

- Removing the main cluster of drums and associated debris (including some asbestos containing materials) from Wetland 3
- Removing empty gas cylinders
- Removing investigation derived waste including cuttings from soil borings and water from purging and sampling monitoring wells

4.1.2 NRS Parcel Previous Assessment Activities

Although the NRS parcel was included in various non-invasive environmental studies, only limited invasive (subsurface) environmental sampling was performed. RIDOLFI collected six surface soil samples, designated as SS-01 though SS-06, near Wetlands 4 and 5 near the Metro Green Line (RIDOLFI, 2007). MACTEC completed a Phase II ESA at the NRS parcel in January 2008, which included a passive soil-gas survey and the installation and sampling of three widely-spaced soil borings/monitoring wells (MACTEC, 2008).

During the Phase II ESA, 100 passive soil-gas samplers (PSG-1 through PSG-100) were deployed at representative former NRS buildings and at locations where contaminants were suspected to be found. Each soil-gas sample was analyzed for volatile organic compounds (VOCs) and for total petroleum hydrocarbons (TPH). Soil-gas samples from additional samplers placed at 25 of these 100 sample locations (primarily in the northwest corner of the NRS parcel at PSG-76M through PSG-100M) were also analyzed using gas chromatography/mass spectrometry (GC/MS) instrumentation to target munitions and explosives of concern (MEC). Soil-gas sample locations are shown on Figure 4-2.

After the passive soil-gas survey was completed, three direct-push Geoprobe® borings with 1-inch, inner-diameter (ID) groundwater monitoring wells (NRS-1, -2 and -3) were installed at representative locations where elevated VOCs were detected in soil-gas, or where historic MEC activities were suspected. Soil and groundwater samples collected from these three locations were laboratory analyzed for VOCs, semi-volatile organic compounds (SVOCs), explosives and metals to assist in providing a semiquantitative correlation between soil gas concentrations versus concentrations in both soil and groundwater.

A 10,000-gallon gasoline UST northwest of the USPP Motorcycle Shop was removed and closed in 1996, and approximately 1,116 tons of petroleum-contaminated soil was excavated, treated, and disposed off-Site. Although closure documents did not indicate the limits of excavation, soil samples were collected from what was believed to be the “bottom” and “north, east, south, and west” areas of the excavation on May 5, 1996. These samples were analyzed for TPH and benzene, toluene, ethylbenzene, and xylenes (BTEX). Before the UST and contaminated soil removal, Engineering Consulting Services completed two soil borings (SB-1 and 2) and seven monitoring wells (MW-1 through MW-7) within approximately 5 to 25 feet of the former UST in 1995. Soil and groundwater samples were collected and laboratory analyzed for TPH and BTEX. Static groundwater levels were approximately 7 feet bgs.

Under a Directive by the DC Department of Health (DOH), two on-Site monitoring wells (MW-1 and MW-2) were re-sampled in April 1999 and in July 1999, and analyzed for TPH and BTEX. In 2003, a Letter of Permanent Tank Closure and a No Further Action (NFA) Letter were issued by the DC DOH based on the groundwater laboratory results. No monitoring wells currently exist in this area, and these wells are suspected to have been closed or abandoned after case closure.

A second 10,000-gallon, double-walled gasoline UST with a Veederoot leak detection system was installed along the west side of the USPP Motorcycle Shop underneath a canopy in 1992. This UST system was removed in July 2008 by Atlantic Environmental Services. Four post-excavation soil samples were collected during the closure assessment and analyzed for TPH-diesel range organics (DRO) and for BTEX. Soil and groundwater sample locations near both former 10,000-gallon USTs are shown on Figure 4-1.

4.1.3 Perimeter Property Previous Assessment Activities

Five soil borings were completed between the Anacostia River and Anacostia Drive just north of the DCL parcel by Environ in 1999 (designated as SB-01 to SB-05 on Figure 4-1). RAI collected near-surface soil samples in 2001 along the northern border of the AOC/DCL parcels just south of Anacostia Drive (SO-1B, SO-2B, and SO-3B, Figure 4-1). In 2002, RIDOLFI collected three off-Site, near-surface soil samples (SS-30, SS-31 and SS-32) at the Howard Road Academy school property to the south. These sample results are included in the discussion of surface soil sampling in Section 5.2.1.

4.1.4 Investigations in the Anacostia River

In 2003 the Academy of Natural Sciences (ANS) conducted a sediment survey in the Anacostia River under contract to RIDOLFI as part of the Site characterization activities that were initiated in 2002. The study was initiated by District staff interested in evaluating whether there was a complete pathway from the upland portion of the Site (more narrowly the DCL and AOC parcels) and the river. In the study, the ANS used a vibracore to advance and collect six sediment cores, each between 4 and 5 meters long. Each core was segmented into 12 or 13 subsamples, generally 15 to 20 centimeters long. In addition, three pore water samples were extracted from the lower portions of each core and analyzed for arsenic. The lithology and other physical characteristics of the sediment were evaluated, as well as chemistry including inorganics, VOCs, SVOCs, PAHs, chlorinated pesticides, and PCBs. The laboratory analyses were performed in university laboratories using methods similar, but not identical to USEPA methods.

4.2 EVALUATION OF EXISTING DATA QUALITY

Table 4-1 summarizes the areas investigated, sample locations, substances analyzed, consultant performing the sampling, and related information regarding the quality and usefulness of the existing laboratory analytical data. RIDOLFI compiled the analytical results from the various studies into a database that contains results for more than1,300 soil, sediment, groundwater, and surface water samples with over 24,000 results for individual analytes. This database was built from a database obtained by RIDOLFI from Environ in 2002, who described their quality control procedures in their summary report (Environ, 2001). RIDOLFI added data collected in their work to the database by appending electronic data deliverables (EDD) files produced by the laboratory that analyzed the samples collected in 2002. More recent data collected by AMEC (formerly MACTEC) and contractors working for the NPS have not yet been integrated into the database because they have not undergone full review for quality and acceptability.

Previous soil and sediment data were collected using discrete methods and would not be directly comparable to samples collected using multi-incremental sampling (MIS) methods that are likely to be implemented for the RI. However, these data provide insight regarding potential contaminants of concern and probable locations of source areas on the AOC and DCL parcels. Groundwater and surface water results, both historical and those to be collected during the RI, were/will be collected as discrete samples. The inclusion of historical groundwater data may be used qualitatively for assessing overall groundwater and surface water data trends on the DCL, AOC, NRS, and Perimeter Properties parcels; however, these data will not be used for addressing the project data quality objectives (DQOs) presented in Section 9.0. Further discussion of RI/FS data needs is provided in Section 8.0.

4.3 REJECTED AND QUALIFIED DATA

As described in Section 4.2, most of the analytical data collected at the Site were retained for evaluation and potential limited use during the RI. Two categories of data generally were rejected (Table 4-2). The first category includes samples that characterize media that are not soil, sediment, surface water, or groundwater. This group includes samples collected in planting media within the greenhouses. The planting media were in man-made elevated beds that were isolated from the natural environment, though these contents may have impacted soil beneath the beds and greenhouses. The greenhouses are dilapidated and unsafe to enter for sampling purposes. The current condition of the greenhouses represents a data gap regarding whether planting material within the greenhouses is of concern. As part of the anticipated demolition of the greenhouses, soil within the planting beds and other greenhouse materials will be sampled and analyzed to evaluate the appropriate disposal options for these materials.

The second category of rejected samples is a group of surface soil/sediment samples collected in 2001 by RAI. RAI’s report (RAI, 2001) summarizing their sampling effort did not provide coordinates for the sample locations. A sketch map illustrating approximate sample locations was included in their report; however, attempts to superimpose or “rubber-sheet” the map over other scaled drawings demonstrated that the RAI map was inaccurate to the degree that sample locations were uncertain by up to several hundred feet. Because other samples were collected in the same general vicinity, the RAI data confused or conflicted with an evaluation of the pattern of surficial contamination. RAI also collected several surface water samples in Wetland

3. These surface water samples were not rejected because the precise station location within a standing water body is not as critical due to fluid mixing within the water body.

5.0 CONCEPTUAL SITE MODEL

This section presents a CSM for the Site that can be used to evaluate and prioritize areas that may require additional environmental investigations. Section 5.1 summarizes information that is known or suspected about where chemicals were used at the Site and that could have been released to the environment. Section 5.2 summarizes information about the nature and extent of contamination as documented by previous studies. Section 5.3 summarizes the fate and transport mechanisms that are likely to be responsible for the distribution of contaminants and will assist in the decision-making process for selecting additional sampling locations. Section 5.4 summarizes future land use scenarios, which factor into evaluations of ecological and human health risk assessments, and Section 5.5 discusses potential human and ecological receptors. Finally, Section 5.6 summarizes potential exposure pathways for human and ecological receptors that integrate the results of the fate and transport evaluation and future land use scenarios.

5.1 CONTAMINANT SOURCE HISTORY

Historical and current property uses described in Section 2.0 were used to develop Primary Contaminant Groups for the Site based on known or suspected land uses, documented releases, and contaminants previously detected. In general, land uses associated with known or suspected environmental concerns at the Site have included:

- Dredge spoils placed on Site from the Anacostia River between 1882 and 1927, with subsequent uncontrolled filling
- Former DCL and AOC plant nursery operations with associated pesticide/herbicide uses, petroleum USTs/ASTs, garage, and drummed wastes
- Former NRS ordnance laboratories, dry-cleaning facilities, chemical storage buildings, paint application and storage, and petroleum USTs/ASTs
- USPP motorcycle repair, JP-8 AST, chemical storage and former gasoline USTs
- Re-worked or imported fill material used to cover the Washington Metro Green Line tunnel excavation
- Former petroleum ASTs and petroleum storage/distribution at the defunct Green Fuel Oil facility

The specific buildings or areas previously investigated at the Site and their associated known or suspected contaminants are summarized in Table 2-1. Table 2-1 also includes the historical or current status for contaminants used/suspected, the results of previous investigations, and the locations of each area of concern (shown on Figure 1-2). Building uses and environmental concerns for the former NRS buildings are summarized in Table 2-2. Areas where cleanup activities have occurred are generally limited to isolated petroleum-impacted soil removals from leaking USTs or ASTs and the management and proper disposal of drums and cylinders. Based on the identified contaminants and related land uses, primary contaminant groups were developed for various areas of the Site, which are summarized below:

1. Petroleum hydrocarbons (including associated VOCs and SVOCs)
2. Pesticides/herbicides
3. Metals and metalloids
4. Chlorinated VOCs, solvents or other organic contaminants
5. MEC
6. PCBs
7. Dioxins and furans
8. Other potential site contaminants

Detailed descriptions of the suspected source areas for these seven primary contaminant groups are included in Tables 2-1 and 2-2, while the general source area locations are shown on Figures 5-1 through 5-6. The Sections 5.1.1 to 5.1.7 further describe the seven primary contaminant groups.

5.1.1 Petroleum Hydrocarbons (Including Associated VOCs and SVOCs)

Petroleum hydrocarbons are the most common contaminants identified or suspected to be present and are primarily associated with releases from ASTs, USTs, distribution piping, drums, or related vehicle-equipment maintenance, storage, and repair activities. Petroleum products are generally described as flammable, yellow-to-black mixtures of gaseous, liquid, and solid hydrocarbons that have been separated into fractions including gasoline, naphtha, kerosene, fuel, lubricating oils, and asphalt. They are also used as raw materials in a wide variety of derivative products. Petroleum products contain a broad range of organic chemicals, which are primarily mixtures of VOCs and SVOCs. Petroleum fluids known to have been stored or used at the Site include gasoline, diesel fuel/fuel oil, kerosene, JP-8, and motor oil. TPH in the diesel range and motor oil range and benzene have been detected at the Site. Descriptions of suspected petroleum hydrocarbon (including VOC and SVOC) source areas are summarized by parcel below (Refer to Figure 5-1):

DCL Parcel

- Former 275-gallon diesel fuel AST (near the southwest corner of the DCL former Greenhouse Buildings)
- Former main drum cluster area (southeast corner of the DCL parcel)
- Small former drum storage area (southeast of Wetland 7)
- Area adjacent and northeast to east of Green Fuel Oil property
- Former fuel pad (northeast of Green Fuel Oil property)
- Former burn pits (north and south of Wetland 3 near the center of DCL parcel)

AOC Parcel

- Boiler room for Southern Greenhouses (near the center of the Southern Greenhouses)
- Chemical storage buildings (north of the Southern Greenhouses)
- Garage building (along the northeast boundary of AOC parcel)
- Former 1,000-gallon gasoline UST (south of garage)
- Former 275-gallon kerosene AST (at southwest corner of garage)
- Former petroleum-stained soil pile (southeast of garage near fuel dispenser)
- Former location of pails (along north side of garage)
- Former vaulted 300-gallon AST and drums (southeast of Southern Greenhouses)
- Former 10,000-gallon fuel oil AST (next to boiler room between Southern Greenhouses)
- Former 275-gallon AST (north of Central Greenhouses)

NRS Parcel

- USPP Aviation Hangar 10,000-gallon JP-8 fuel AST (northeast of USPP Aviation Hanger)
- Motorcycle storage/maintenance building (north-central area of NRS within area of former NRS Building T30)

- Former USPP 10,000-gallon gasoline USTs and fuel pumps (northwest of motorcycle storage/maintenance building)
- Former NRS Building T2 (heating plant with AST)
- Former NRS Building T16 (Fire House and Garage with 5,000-gallon UST)
- Former NRS Building T20 (heating plant with AST)
- Former NRS Building T29 (school, music and boiler house-heating plant)
- Former NRS Building T31 (garage)
- Former NRS Building T40 (gas station, gun room and advanced fire control- two former 10,000-gallon gasoline USTs)
- Former NRS Building T48 (boiler house)
- Former NRS Building T56 (6,000-gallon gasoline UST and dispenser was located at southeast corner of building)
- Former NRS Building T65 (automobile hobby shop)
- Former NRS Building T81 (instrument repair shop)
- Former NRS Building T88 (gas station with UST)

Perimeter Properties

- Green Fuel Oil property ASTs and petroleum storage

5.1.2 Pesticides/Herbicides

Pesticides and herbicides are known or suspected to be present in former greenhouses, planting areas, and related tree nursery areas associated with planting and maintaining trees, flowers, and other vegetation and the apparent storage, use and application of pesticides and herbicides. Fertilizers, some of which contain perchlorate depending on where the fertilizer was produced, may have been used. Pesticides are substances or mixtures of substances intended to prevent, destroy, repel, or mitigate pests. Although often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides, grain fumigants, and various other substances used to control pests. This category includes dichlorodiphenyltri-chloroethane (DDT), which is one of the more common historically used pesticides. DDT has been detected in soil at multiple locations on Site. DDT was widely used as an insecticide in the

United States after World War II until 1972, when it was banned. It may have been used specifically at the Site or it may have been applied as part of broader, citywide spraying programs that were typical in many areas with mosquito problems. Chlorinated VOCs may also have been mixed with certain pesticides, including DDT, aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, hexachloride, and toxaphene for spreading applications.

Descriptions of the suspected pesticide/herbicide source areas are summarized by parcel below (refer to Figure 5-2):

DCL Parcel

- Former suspected Greenhouse Buildings (along southeast border of DCL)
- Former main drum cluster area
- Small former drum storage area
- Former burn pits

AOC Parcel

- Northern Greenhouses
- Southern Greenhouses
- Chemical Storage Buildings
- Lath House (northwest of Northern Greenhouses)
- Former flower beds (northeast of Southern Greenhouses)
- Former planting areas (northwest of Southern Greenhouses)
- Two storm drain/sumps (north of the Southern Greenhouses)

NRS Parcel

- Former NRS Building T35A (Ordnance & Gunnery Protection Building and Greenhouse)

No pesticides or herbicides were identified as apparent environmental concerns on Perimeter Properties.

5.1.3 Metals and Metalloids

Metals refer to several chemical elements, such as lead or copper, which are often lustrous ductile solids, have basic oxides, form positive ions, and are good conductors of heat and electricity. Metalloids are chemical elements that share some properties with metals and include the chemical arsenic. Metals and metalloids can be present in environmental soil or water as naturally occurring compounds or because of human activity. Pesticides containing arsenic as an active ingredient, lead from batteries, gasoline and paint, mercury from batteries, silver from photographic processing, and historical mining or filling operations are all common sources of metal contamination from human activities. Arsenic is a naturally occurring metalloid that has been detected in soil at multiple locations throughout the Site. Elevated arsenic concentrations may be associated with sediment dredged from the Anacostia River and placed on the Site as fill (see Figure 2-5). Suspected source areas for metals (excluding dredge spoils) are described by parcel below (refer to Figure 5-3):

DCL Parcel

- Former fuel pad (northeast of Green Fuel Oil property)
- Former burn pits (north and south of Wetland 3 near the center of DCL)

AOC Parcel

- Chemical Storage Buildings
- Garage Building
- Two storm drain/sumps (north of the Southern Greenhouses)

NRS Parcel

- Park Police Aviation Hangar (in area of former NRS Building T32)
- Motorcycle Storage/Maintenance Building (in area of former NRS Building T30)
- Former NRS Building T4 (dispensary)
- Former NRS Building T13 (engineering service unit with lab)
- Former NRS Building T21 (camouflage laboratory with possible photographic development)
- Former NRS Building T22 (experimental building)

- Former NRS Building T31 (garage)
- Former NRS Building T65 (hobby shop)
- Former NRS Building PL01/02 (paint lockers).

Perimeter Properties

- No specific sources for metals have been identified on the Perimeter Properties.

5.1.4 Chlorinated VOCs, Solvents and Other Organic Compounds

Chlorinated VOCs, solvents, and related other organic compounds storage and uses may have occurred at various locations throughout the Site. Chlorinated solvents are commonly used as degreasers, paint strippers, paint and lacquer thinners, and in dry cleaning. Common solvents include tetrachloroethylene (PCE), acetone, toluene, xylene, methylene chloride, ethanol, and methanol. The former NRS Building T32 was a laundry and dry cleaning plant from approximately 1943 to the mid-1960s, and solvent tanks were present in the dry cleaning room/space. Possible source areas for chlorinated VOCs, solvents, or other organic compounds storage are described by parcel below (refer to Figure 5-4):

DCL Parcel

- Small former drum storage area
- Former burn pits

AOC Parcel

- Northern Greenhouses
- Southern Greenhouses
- Chemical storage buildings
- Lath house
- Garage building
- Former flower beds
- Former planting areas

NRS Parcel

- USPP Aviation Hangar (area of former NRS Building T32-Laundry and Dry Cleaning Plant)
- Former NRS Building T22 (experimental building and paint storage)
- Former NRS Building T31 (garage)
- Former NRS Building T46, 47, 68, and 69 (laundry facilities with potential dry cleaning solvents)
- Former NRS Building T33 (heating plant with solvent ASTs and UST)
- Former NRS Building T65 (hobby shop)
- Former NRS Buildings T86 and T87 (paint shops and storage)
- Former NRS Building T93 (paint operations and material storage)
- Former NRS Building PL01/02 (paint lockers)

Perimeter Properties

- No suspected source areas

5.1.5 Munitions and Explosives of Concern

Because several former buildings at NRS were designated as Experimental Buildings for the Naval Ordnance Laboratory or were associated with the Mine Disposal School, munitions and explosives of concern (MEC) are a potential environmental concern. MEC is a broad term used to describe specific categories of military munitions that may pose unique explosive risks, including unexploded ordnance (UXO), discarded military munitions, and munitions constituents (such as 2,4,6-trinitrotoluene [TNT], hexahydro-1,3,5-trinitro-1,3,5-triazine [RDX], and perchlorate). Although no UXO was encountered and is not anticipated to be present at the Site, perchlorate and RDX have been detected at the NRS parcel. The most common uses for perchlorate are in explosives and rocket propellants, which have been widely used in military munitions items, such as mortars, grenades, flares and solid fuel rockets. In addition, ammonium perchlorate and the other perchlorate salts have been or are used in a wide range of applications, including pyrotechnics and fireworks, blasting agents, solid rocket fuel, matches, lubricating oils, nuclear reactors, air bags and certain types of fertilizers. The only explosive previously detected at the NRS parcel was RDX. RDX is extensively used in military munitions formulations and in its pure form is used as an explosive and in combination with other ingredients in explosives. Suspected source areas for MEC were generally limited to the NRS parcel and are described below (refer to Figure 5-5):

NRS Parcel

- Existing NPS ammunition storage buildings (along north border of NRS parcel near the Motorcycle Storage/Maintenance Building)
- Former NRS Buildings T22, 23, 24, 25, 26, 27, 36 and 37 (Experimental and storage buildings for Naval Ordnance Laboratory)
- Former NRS Building T30 (Mine Disposal School)
- Former NRS Building T31 (garage for Mine Disposal School)
- Former NRS Building T35A (Ordnance and Gunnery Protection Building)
- Former NRS Buildings T71, 73, 74, 75, 76, and 77 (former storage buildings for Naval Ordnance Laboratory).

No suspected source areas for MEC were identified at the DCL, AOC, or Perimeter Properties parcels. Perchlorate is potentially associated with some fertilizers, although there is no information indicating that it is associated with fertilizer use at the former DCL and AOC nursery operations.

5.1.6 Polychlorinated Biphenyls

PCBs are a group of man-made chemicals composed of numerous chemical compounds that contain two or more chlorine atoms, and are commonly found in oils used in electrical and hydraulic equipment. The largest use of PCBs is in electrical transformers, switches, and capacitors (including fluorescent light ballasts) and they are frequently used in heat transfer liquids, hydraulic fluids, plasticizers, and in caulking materials. Suspected source areas for PCBs are described by parcel below (refer to Figure 5-6).

AOC Parcel

- PEPCO transformers (four pole-mounted transformers near central planting area)

NRS Parcel

- Former NRS Building T11 (Subsistence Building with electrical switch gear)
- Former NRS Building T25 (Experimental Building – transformer on east side of building)

- Former NRS Building T29 (Music School with Heating Plant and transformer)
- Former NRS Building T40 (Gun Room School – transformer substation next to building designated as structure N-2).

No suspected source areas for PCBs were identified at the DCL parcel or on the Perimeter Properties.

5.1.7 Dioxins and Furans

“Dioxins and furans” is an abbreviated name for a family of toxic substances that share a similar chemical structure. Most dioxins and furans are not man-made or produced intentionally, but are byproducts created when other chemicals or products are made. Of all dioxins and furans, 2,3,7,8-tetrachloro-p-dibenzo-dioxin (TCDD) is considered the most toxic. Dioxins and furans are not made for any specific purpose; however, they are created when products like herbicides are made and are also created during the incineration of waste materials, secondary copper smelting, forest fires, coal-fired power plants, wood burning, and chlorine bleaching of wood pulp.

Two former burn pits in the central portion of the DCL parcel are considered suspect source areas for dioxins. The burning of the Bonus Army encampment on the NRS parcel may have also been a source of dioxins. Reportedly, the burning activities covered a wide area of the NRS so it is not possible to identify specific potential source areas from this activity. No other suspected sources of dioxins and furans were identified at the AOC, NRS or Perimeter Properties parcels.

5.1.8 Other Potential Site Contaminants

ACM and lead-based paint (LBP) have been identified or are suspected to be present in many of the greenhouse and related existing buildings at the AOC parcel, in the older (constructed before 1980) existing buildings at the NRS parcel, and in the Green Fuel Oil building (see Table 2-1). The presence of ACM or LBP in soil, sediment, groundwater, or surface water is not anticipated; however, these materials may be present in the area immediately surrounding the dilapidated greenhouse complexes on the AOC parcel or other structures, where loose insulation and other materials have been observed on the ground. These materials are primarily building contaminants and were therefore not identified as a Primary Contaminant Group.

5.2 NATURE AND EXTENT OF CONTAMINATION

This section describes the current understanding of the nature and extent of contaminants thought to be present at the Site, with a primary focus on the DCL and AOC parcels based on data collected by RIDOLFI in 2002 and from several other previous investigations. Sections

5.2.1 through 5.2.7 are adapted from a report prepared to summarize field investigations conducted through 2002 (RIDOLFI, 2007). Section 5.2.8 is adapted from a report summarizing an investigation on the NRS parcel (MACTEC, 2008). Data from each field event were integrated into an Excel spreadsheet and an ArcView project file that were used to generate maps and tables summarizing Site conditions.

Tables 5-1 through 5-21 summarize analytical results for chemicals detected at concentrations above identified screening levels (detailed below for each medium) in the surface soil, sediment, subsurface soil, and groundwater samples. Surface water results were not tabulated because only one chemical, in a single sample, exceeded a screening level (see Section 5.2.5). Sample results for chemicals with concentrations below screening levels are not included in Tables 5-1 through 5-21 so the reader is presented with a more concise and readable summary of only chemicals that exceed screening levels. In the results discussions and on the figures depicting sample results, comparisons to other screening levels are also presented to illustrate the magnitude of potential issues associated with a given chemical or to identify hotspots.

Screening levels are not intended to be used for cleanup purposes. Further, the screening levels referenced are those that were available at the time the sampling occurred. The screening levels used in this document simply identify samples with relatively elevated chemical concentrations and establish spatial patterns of contamination or areas that may have several chemicals at concentrations that exceed screening levels. These patterns provide insight into historical practices that may have released chemicals to the environment or into the fate and transport processes that affected the distribution of chemicals after their release.

5.2.1 Surface Soil

For this document, soil samples are considered “surface soil” if any portion of the sample was collected between the ground surface and 2 feet bgs. Concentrations of constituents detected in the surface soil samples were compared to the following screening levels:

- USEPA Region III Biological Technical Assessment Group (BTAG) Screening Levels (Soil) for Protection of Flora and Fauna
- District Risk-Based Screening Levels (RBSLs) for Residential Soils
- USEPA Region III Risk-Based Concentrations (RBCs) for Residential Soils
- USEPA Region III Soil Screening Levels (SSLs) for Groundwater Migration with Dilution Attenuation Factors (DAFs) of 1 and 20
- District Soil Quality Standards for Petroleum-Contaminated Soil

The screening tables were taken from the 2007 RIDOLFI report, and the screening levels were current for that time (RIDOLFI, 2007). The tables and discussion in this section include the analytical results of several sediment samples collected from storm drains and sumps because these sample results were compared to surface soil screening levels. Storm drain and sump sediment samples are also presented separately in Section 5.2.7.

5.2.1.1 Petroleum Hydrocarbons

Laboratory analytical results for petroleum hydrocarbons detected in surface soil samples at concentrations above the screening levels are summarized in Table 5-1. Figures 5-7 and 5-8 depict diesel-range and motor oil-range concentrations at each soil sampling location.

Petroleum hydrocarbon chromatographic profiles for 25 samples (surface soil, subsurface soil, and groundwater) were reviewed to identify petroleum hydrocarbon mixtures and to evaluate the potential for contaminant source identification using chemical "fingerprinting." Appendix I of the Site Characterization Report (RIDOLFI, 2007b) contains a memorandum summarizing the analysis of petroleum hydrocarbon profiles. The petroleum hydrocarbon detections appear to result from anthropogenic (petroleum-derived) sources. Four principal profiles were identified in the samples:

1) Light lube-type oil, possibly a vehicle for the application of other organic chemicals.

2) Medium-weight lube-type oil, possibly a motor oil and/or hydraulic pump fluid.

3) A discrete organic chemical exhibiting a characteristic pattern in the medium lube oil range.

4) Diesel-range and motor oil range hydrocarbons were detected at concentrations that exceed the DC soil quality standard for petroleum-contaminated soil in the three surface soil samples (one of which was a field duplicate) collected at sampling station SS-20, which is next to the northern portion of the Green Fuel Oil property. The concentrations of diesel-range hydrocarbons for these samples were 3,500, 3,600, and 2,300 milligrams per kilogram (mg/kg). The concentrations of motor oil-range hydrocarbons were also elevated in two of these samples (1,600 and 1,700 mg/kg).

5.2.1.2 Pesticides

Laboratory analytical results for 8 pesticides detected in surface soil samples at concentrations above the project screening levels are summarized in Table 5-2, with PCBs (refer to Section 5.2.1.6). The analytes most frequently detected at concentrations that exceed screening levels are the pesticides dichlorodiphenyldichloroethylene (DDE) and DDT.

Figure 5-9 shows DDT concentrations in surface soil samples. The detected concentrations of DDT ranged from 4.85 to 130,000 micrograms per kilogram (μg/kg), which exceed the District RBSL for residential soil. The highest concentrations were detected in samples collected at three locations, two near the southeastern portion of Wetland 3 and one at a more northerly location in Wetland 3.

The detected concentrations of DDE ranged from 100 to 8,700 μg/kg. Concentrations of DDE exceed the USEPA RBC for residential soil (1,900 μg/kg) seven samples collected from five separate locations on the DCL parcel.

The pesticide dichlorodiphenyldichloroethane (DDD) was detected at concentrations above the USEPA RBC for residential soil in four soil samples collected on the southern portion of the DCL parcel.

5.2.1.3 Metals and Metalloids

Laboratory analytical results for the 20 inorganic contaminants detected in surface soil at concentrations above the screening levels are summarized in Table 5-3. The analytes most frequently detected at concentrations that exceed screening levels are arsenic, chromium, lead, and zinc.

The USEPA RBC for arsenic in residential soil is 0.43 mg/kg. Most of the detected concentrations of arsenic in surface soil samples exceed the RBC for residential soil. None of the samples exhibited arsenic concentrations above the BTAG screening level for flora (328 mg/kg). The maximum arsenic concentration recorded in Site surface soils was 88 mg/kg. Figure 5-10 shows the surface arsenic data results.

Chromium was detected in the surface soil samples at concentrations ranging from 6.8 to 219 mg/kg. These concentrations exceed most screening levels shown on Table 5-3, but are below the USEPA RBCs for residential soil (230 mg/kg).

Lead detected in the surface soil samples exceeded the BTAG screening levels for flora. The mean detected lead concentration of the surface soil samples is 40.1 mg/kg, and the maximum lead concentration was 329 mg/kg. Zinc was detected in the surface soil samples at concentrations greater than the BTAG screening level of 10 mg/kg for flora and at one location on the DCL parcel at a concentration greater than the 680 mg/kg USEPA SSL for groundwater migration (DAF 1). Each of the zinc concentrations is below the USEPA RBCs and District RBSLs for residential soil.

5.2.1.4 Volatile Organic Compounds

Laboratory analytical results for VOCs detected in surface soil samples at concentrations above the screening levels are summarized in Table 5-4.

Methylene chloride was the only VOC detected at concentrations above screening levels in the surface soil samples. The detections of methylene chloride are likely the result of laboratory interferences; methylene chloride was also detected in the associated laboratory method blank for nearly every sample.

5.2.1.5 Semivolatile Organic Compounds

Laboratory analytical results for 22 SVOCs detected in surface soil samples at concentrations above the project screening levels are summarized in Table 5-5. The analytes most frequently detected at concentrations that exceed screening levels are benzo(a)pyrene, fluoranthene, and pyrene.

Benzo(a)pyrene was detected at concentrations above screening levels in 88 surface soil samples. Figure 5-11 shows benzo(a)pyrene concentrations in surface soil. Concentrations of benzo(a)pyrene above the USEPA RBC for residential soil were detected in most of the samples collected on the DCL parcel and the AOC parcel. Samples collected in the NRS Area were either non-detects or had analyte concentrations below the USEPA RBC for residential soil. Benzo(a)pyrene was also detected at elevated concentrations in the samples collected at the adjacent Howard Road Academy property.

The concentrations of fluoranthene and pyrene exceed only the BTAG screening levels for flora and fauna, with the exception of the fluoranthene concentration (133,000 micrograms per kilogram [µg/kg]) and pyrene concentration (62,900 µg/kg) in sample SB08 from 0 foot to 2 feet bgs. These concentrations exceed the District residential RBSL and USEPA SSL for groundwater migration (DAF 1), respectively. Soil boring SB08 was completed near the southeastern portion of Wetland 3. Fluoranthene and pyrene concentrations for all other samples are lower than the Distrct residential RBSLs and the USEPA residential RBCs.

Concentrations of anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)-perylene, or chrysene were detected at concentrations above the District RBSLs for residential soil in sample SB08 collected near the southeastern corner of Wetland 3 and in samples collected at MW04, MW07, SB07, SB15, SB37, SB45, SS22, SS31, and WL05 near the south adjoining P&P Auto Body property.

5.2.1.6 Polychlorinated Biphenyls

Fifteen soil samples (Table 5-2) exhibited total PCB concentrations exceeding the USEPA RBC for residential soil (320 μg/kg). The highest concentration of total PCBs (7,500 μg/kg) was detected at sample location SS-08. This total PCB concentration represents the concentration of Aroclor 1248 (2,800 μg/kg) summed with half the detection limits for other PCB Aroclors, which were not detected at or above the method detection limits. Taken alone, the concentration of Aroclor 1248 in this sample exceeds the USEPA RBC for residential soil (320 μg/kg).

Aroclor 1260 was detected at a concentration of 3,380 μg/kg at sample location SB40, which was the only PCB analyzed for in this sample. Sample station SB40 is near the northern portion of the former garage building on the AOC parcel.

5.2.1.7 Dioxins/Furans

As part of Environ's 1999 Site investigation, two surface soil samples were collected from sample station BP01 near the former northern burn pit. The samples were collected from 0.0 to 0.5 foot bgs and 1.0 foot to 1.5 feet bgs. The laboratory analytical results for these two samples are summarized in Tables 5-6 and 5-7.

In Tables 5-6 and 5-7, toxic equivalents (TEQs) are used to report the toxicity-weighted masses of the mixtures of dioxins for each sample. Each dioxin congener is assigned a toxic equivalency factor (TEF) as recommended by the World Health Organization (Van den Berg et al., 1998). The TEF denotes a given dioxin compound's toxicity relative to 2,3,7,8-TCDD, which is assigned the maximum toxicity designation of 1. Other dioxin congeners receive lower TEFs, with each TEF roughly proportional to that dioxin congener's toxicity relative to that of 2,3,7,8-TCDD.

To determine the total TEQ for each sample, the concentration in picograms per gram (pg/g) or parts per trillion (ppt) was multiplied by the corresponding TEF to obtain the TEQ for each congener. For congeners that were not detected at or above the laboratory method detection limits, one-half of the detection limit was used as the congener concentration. The TEQs for all congeners were then summed to obtain the total TEQ.

The total TEQ value for sample BP01 from 0.0 to 0.5 foot bgs was 15.7, and the TEQ value for sample BP01 from 1.0 foot to 1.5 feet bgs was 8.0. These values exceed the USEPA residential RBC for 2,3,7,8-TCDD (4.3 pg/g). Both TEQ values are below the BTAG screening level for 2,3,7,8-TCDD for the protection of fauna (10,000 pg/g).

5.2.2 Sediment from On-Site Wetlands

The distinction between soil and sediment is unclear in some areas of the Site and may change seasonally depending on weather conditions. During RIDOLFI's August 2002 field activities, areas identified as Wetlands 3, 4, and 5 on Figure 1-2 were dry, and the samples from these locations would logically be classified as soil. However, these same areas were wet in November 2002, with up to 2 feet of standing water at some sample locations. For completeness, chemical results from samples collected in these changing areas are compared to both soil screening levels in Section 5.2.1 and to sediment screening levels in this section. The following sediment screening levels were used in the comparison:

- USEPA Region III BTAG Screening Levels (Sediment) for Protection of Flora and Fauna
- NOAA's Threshold Effects Levels (TELs) and Probable Effects Levels (PELs) from its Screening Quick Reference Tables (SQRTs)

5.2.2.1 Pesticides

Laboratory analytical results for pesticides detected at concentrations above sediment screening levels are summarized in Table 5-8 (along with PCBs; refer to Section 5.2.2.4). Four pesticides (DDD, DDE, DDT and dieldrin) were detected at concentrations that exceed sediment screening levels in the surface soil/sediment samples.

The concentrations of DDD ranged from 4.1 to 110,000 μg/kg in the surface soil/sediment samples. All but one sample concentration (4.1 μg/kg at SS-01) exceeds the PEL (8.51 μg/kg).

The concentrations of DDE ranged from 64 to 8,700 μg/kg in the surface soil/sediment samples. Each concentration exceeds the PEL (6.75 μg/kg).

The concentrations of DDT ranged from 32 to 130,000 μg/kg in the surface soil/sediment samples. Each concentration exceeds the USEPA Region III BTAG Screening Levels (Sediment) for Protection of Flora and Fauna (1.58 μg/kg). A PEL is not available for DDT.

Dieldrin was detected at concentrations above the TEL (2.85 μg/kg) in two samples (SS-02 from 0.25 to 0.5 foot bgs, and WL03 from 0 foot to 2 feet bgs). Only the concentration in WL03 (50 μg/kg) also exceeded the PEL (6.67 μg/kg).

5.2.2.2 Metals and Metalloids

Laboratory analytical results for nine inorganic contaminants detected at concentrations above sediment screening levels are summarized in Table 5-9. The analytes most frequently detected at concentrations that exceed screening levels are chromium, lead, and nickel.

Detected concentrations of chromium in all 21 samples shown on Table 5-9 exceeded the screening level (flora). Two of the 21 detected sample concentrations for chromium exceed the PEL.

The concentrations of lead in the surface soil/sediment samples presented on Table 5-9 ranged from 56 to 315 mg/kg. Lead concentrations in 14 of the 21 samples exceed the PEL (91.3 mg/kg). The samples with lead concentrations below the PEL were collected at three locations in Wetland 3 (SS-09, SS-10 and WL02) and one location in Wetland 7 (SS-17).

Nickel was detected at concentrations that exceed sediment screening levels in 25 surface soil/sediment samples. Only seven samples contained nickel concentrations above the PEL (35.9 mg/kg). These samples were collected from seven locations near the southeastern portion of Wetland 3.

Cadmium was detected above the TEL (0.596 mg/kg) in 13 surface soil/sediment samples. Only one of these samples also exceeds the PEL (3.53 mg/kg); it was collected from a drain/sump near the southern portion of Wetland 3.

5.2.2.3 Semivolatile Organic Compounds

Laboratory analytical results for SVOCs detected at concentrations above sediment screening levels are summarized in Table 5-10. Several SVOCs were detected at concentrations above the BTAG screening levels; however, only benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, and pyrene were detected at concentrations above the TELs. Three of these sample concentrations also exceeded the PELs.

Benzo(a)anthracene was detected above the PEL (385 µg/kg) in three surface soil/sediment samples collected near the southeastern portion of Wetland 3. In one of these samples (SS-27), the concentrations of phenanthrene and pyrene also exceeded the PELs.

5.2.2.4 Polychlorinated Biphenyls

Laboratory analytical results for PCBs detected at concentrations above sediment screening levels are summarized in Table 5-8 (along with pesticides; refer to Section 5.2.2.1).

The concentrations of total PCBs exceeding screening levels ranged from 125 to 6,000 µg/kg in the surface soil/sediment samples. The concentrations of total PCBs in 12 samples exceed the PEL (277 µg/kg).

5.2.3 Subsurface Soil

In this document, soil samples are considered “subsurface soil” if the top portion of the sample (“depth from”) was collected at a depth of 2 feet bgs or more. Concentrations of the contaminants detected in the subsurface soil samples were compared to the following screening levels:

- USEPA Region III BTAG Screening Levels (Soil) for Protection of Flora and Fauna
- USEPA Region III RBCs for Residential Soil
- USEPA Region III SSLs for Groundwater Migration with DAFs of 1 and 20
- District RBSLs for Residential Soil
- District Soil Quality Standard for Petroleum-Contaminated Soil

Figures 5-7 and 5-8 depict diesel-range and motor oil-range concentrations at each soil sampling location.

Diesel-range hydrocarbons were detected at a concentration above the District soil quality standard for petroleum-contaminated soil (960 mg/kg) in one subsurface soil sample (SB37 from 5 to 9 feet bgs). This sample was collected at a soil boring completed near the former 275-gallon AST near the northwestern corner of the northern greenhouses.

Motor oil-range hydrocarbons were detected at an elevated concentration (1,100 mg/kg) in a sample collected at a soil boring completed in the former dog training area (DCMW0012-02). Motor oil-range hydrocarbons were also detected at an elevated concentration (970 mg/kg) in a sample collected at a soil boring completed near the former northern burn pit.

5.2.3.1 Pesticides

Laboratory analytical results for the four pesticides detected in subsurface soil samples at concentrations above the screening levels are summarized in Table 5-12 (along with PCBs; refer to Section 5.2.3.6). The analytes most frequently detected at concentrations that exceed the screening levels are the pesticides DDE and DDT.

The concentrations of DDE ranged from 130 to 7,200 μg/kg, with all ten sample concentrations exceeding the BTAG screening the levels for flora and fauna. A sample collected near the northern burn pit had the highest DDE concentration and was the only concentration to exceed the USEPA and District RBSLs for residential soil (1,900 and 2,260 μg/kg, respectively).

The concentrations of DDT ranged from 4.5 to 740 μg/kg in the subsurface soil samples. These concentrations exceed the District RBSL for residential soil, but are below the USEPA RBC for residential soil (1,900 μg/kg). The highest concentration of DDT was detected in the sample that had the highest concentration of DDE (collected near the northern burn pit). Figure 5-13 shows the DDT results for subsurface soil samples.

5.2.3.2 Metals and Metalloids

Laboratory analytical results for 18 inorganic analytes detected in the subsurface soil samples at concentrations above the screening levels are summarized in Table 5-13. The analytes most frequently detected at concentrations that exceed the screening levels are arsenic, beryllium, chromium, lead, nickel, and zinc.

Arsenic in subsurface soil (refer to Figure 5-13) was detected at concentrations above screening levels in 59 of the 65 subsurface soil samples. The concentrations ranged from 0.9 to 118 mg/kg. The arsenic concentration in each sample exceeds the District RBSL for residential soil (0.101 mg/kg), the USEPA SSLs for groundwater migration (DAF 1, 0.0013 mg/kg and DAF 20, 0.026 mg/kg), and the USEPA RBC for residential soil (0.43 mg/kg). Arsenic concentrations in 25 samples from intervals as deep as 7.5 to 9 feet bgs exceed the 90th percentile for background concentration, 5 mg/kg. All arsenic concentrations are below the BTAG screening level for flora (328 mg/kg). A BTAG screening level for fauna is not available for arsenic.

Chromium was detected at concentrations above screening levels in 65 subsurface soil samples. The chromium concentrations ranged from 6.6 to 119 mg/kg. These concentrations exceed the BTAG screening levels for flora (0.02 mg/kg) and fauna (0.0075 mg/kg), the District RBSL for residential soil (0.0461 mg/kg), and USEPA SSL for groundwater migration DAF 1 (2.1 mg/kg). In some cases, chromium concentrations also exceed the USEPA SSL for Groundwater Migration DAF 20 (42 mg/kg). The chromium concentrations do not exceed the USEPA RBCs for residential soil (230 mg/kg).

Lead was detected at concentrations above the BTAG screening levels for flora (2 mg/kg) and fauna (0.01 mg/kg), the only screening levels available for lead, in 65 subsurface soil samples. The lead concentrations ranged from 6 to 440 mg/kg.

Nickel was detected at concentrations above screening levels in 65 subsurface soil samples. The nickel concentrations range from 5.4 to 250 mg/kg. All concentrations exceed the BTAG screening level for flora but none exceed the USEPA RBC for residential soil (1,600 mg/kg).

Zinc was detected at concentrations above screening levels in 65 samples. The concentrations ranged from 11 to 421 mg/kg. These concentrations do not exceed the USEPA RBC for residential soil (23,000 mg/kg).

Cadmium was detected in 37 of the 65 subsurface soil samples at concentrations ranging from 0.5 mg/kg to 5.1 mg/kg. All of these sample concentrations exceed the District RBSL for residential soil (0.3 mg/kg). Eleven of the detected concentrations exceed the BTAG screening level for flora.

5.2.3.3 Volatile Organic Compounds

Laboratory analytical results for seven VOCs detected in subsurface soil samples at concentrations above the screening levels are summarized in Table 5-14. These VOC concentrations exceed the BTAG screening levels for flora and fauna or the USEPA SSLs for groundwater migration (DAF 1, and in some cases DAF 20). The VOC concentrations did not exceed the USEPA and District RBSLs for residential soil. Of the VOCs detected at concentrations above screening levels, benzene, toluene, ethylbenzene, total xylenes, and methyl tertiary butyl ether (MTBE) have a District cleanup standard for hydrocarbon-contaminated soil. None of the detected concentrations exceed the District cleanup standards. The analytes most frequently detected at concentrations that exceed the screening levels are MTBE and methylene chloride. However, methylene chloride was also detected in the laboratory method blank associated with many of these samples. It is likely that most of the methylene chloride detections result from laboratory contamination. Excepting acetone, which is also a common laboratory contaminant, the other VOCs that exceed screening levels are often associated with petroleum releases. These VOCs were detected at locations near USTs or ASTs, including MW03, SB37, and SB38. MW03, and SB38, which were completed near the former 1,000-gallon UST and the former 275-gallon AST near the former garage building on the northern portion of the AOC parcel. Soil boring SB37 was completed near the former 275-gallon AST at the northwestern portion of the northern greenhouses.

5.2.3.4 Semi-volatile Organic Compounds

Laboratory analytical results for 19 SVOCs detected in subsurface soil samples at concentrations above the screening levels are summarized in Table 5-15. The analytes most frequently detected at concentrations that exceed the screening levels are the following PAHs: benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, and pyrene.

Benzo(a)pyrene was detected at concentrations above screening levels in 23 subsurface soil samples. Figure 5-14 shows benzo(a)pyrene concentrations in subsurface soil. Benzo(a)pyrene concentrations in 23 subsurface soil samples exceed the District RBSL and the USEPA RBC for residential soil (105 µg/kg and 87 µg/kg, respectively). Benzo(b)fluoranthene was detected at concentrations above screening levels in 25 samples. The concentrations exceed the USEPA RBC for residential soil (870 µg/kg) in six samples and the District RBSL for residential soil (1,050 µg/kg) in four samples. The concentrations of fluoranthene and pyrene exceed only the BTAG screening levels for flora and fauna. The fluoranthene and pyrene concentrations did not exceed other screening levels.

Concentrations of chrysene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, or indeno(1,2,3-cd)pyrene are above the District RBSLs for residential soil or the USEPA RBCs for residential soil in some samples collected at MW10, SB01, SB02, SB21, and SS-29.

5.2.3.5 Polychlorinated Biphenyls

Laboratory analytical results for PCBs detected in subsurface soil samples at concentrations above the screening levels are summarized in Table 5-12 (with pesticides; refer to Section 5.2.3.2).

The concentration of Aroclor 1260 in one sample (DCMW006-02 from 2.5 feet to 4 feet bgs) exceeds the USEPA RBC for residential soil (320 μg/kg) and resulted in exceedance of total PCBs for this sample. DCMW006-06 was collected at the southwestern portion of the Site, near the Green Fuel Oil property.

5.2.4 Groundwater

Concentrations of the contaminants detected in the groundwater samples were compared to the following groundwater screening levels:

- USEPA Safe Drinking Water Act Maximum Contaminant Levels (MCLs)
- District Groundwater Criteria (Class G1)
- District RBSLs for Residential Groundwater
- District Cleanup Standards for Hydrocarbon-Contaminated Groundwater
- USEPA Drinking Water Advisory levels for MTBE
- USEPA Region III RBCs for Tap Water
- USEPA Region III BTAG Screening Levels

Figure 5-15 shows chemical constituents that exceeded regulatory criteria or risk-based concentrations in the most recent groundwater sampling event. In a few cases, described below, the most recent samples are below criteria and previous samples exceed the criteria. These results are not shown on the figure but all results are shown on the appropriate table.

5.2.4.1 Petroleum Hydrocarbons

Laboratory analytical results for petroleum hydrocarbons detected at concentrations above the District cleanup standards for hydrocarbon-contaminated groundwater are summarized in Table 5-16.

Diesel-range organics were detected above the District cleanup standard (3.57 milligrams per liter [mg/L]) in MW03 and MW07. MW03 is near the former garage on the AOC parcel and was last sampled in 1999 by Brown. Monitoring well MW07 is north of the Green Fuel Oil Property and was last sampled by RIDOLFI in 2002.

Concentrations of gasoline-range hydrocarbons were below the District cleanup standard (7.3 mg/L) in all samples.

5.2.4.2 Metals and Metalloids

Laboratory analytical results for 11 inorganic chemicals detected at concentrations above groundwater screening levels in the unfiltered groundwater samples are summarized in Table 5-17. The analytes most frequently detected at concentrations that exceed the screening levels are arsenic, lead, and manganese.

Arsenic was detected at concentrations above the USEPA RBC for tap water of 0.000045 mg/L in 39 samples (six additional samples were non-detects with detection limits greater than the RBC). Three samples collected by Brown in July 1997 (MW02, MW02A, and MW07) contained arsenic concentrations above the USEPA MCL (0.01 mg/L) and the District groundwater criteria (0.05 mg/L). Subsequent sampling and analysis of MW02 and MW07 (Brown in May 1999, Environ in December 1999, and RIDOLFI in November 2002) yielded arsenic concentrations below the USEPA MCL and the District groundwater criteria. Subsequent sampling and analysis of MW02A during these sampling events identified arsenic concentrations that exceed the USEPA MCL in December 1999 and November 2002.

Arsenic was detected in Wetland 3 at a concentration of 0.12 mg/L at piezometer PZ-1, and at a concentration of 0.053 mg/L in piezometer PZ-3, which both exceed the USEPA MCL and the District groundwater criteria.

Lead was detected at concentrations above screening levels in six of Brown’s 1997 samples. However, subsequent sampling and analysis at these wells resulted in lead concentrations below the groundwater screening levels. Lead was detected at concentrations above the USEPA MCL (0.015 mg/L) in four of RIDOLFI’s 2002 samples (DCMW006-02, DCMW008-02, DCMW012-02, and DCMW015-02) and in one of Brown’s May 1999 samples (MW21). Three of these concentrations (DCMW008-02, DCMW012-02, and MW21) also exceed the District groundwater criteria (0.05 mg/L). Monitoring well DCMW008-02 is east of the central north-south road. Monitoring well DCMW012-02 is in the former dog training area, and MW21 is north of the former garage building on the AOC parcel.

Manganese was detected at concentrations above the District groundwater criteria (0.05 mg/L) in 24 samples. In five of these samples (DCMW006-02, DCMW007-02, PZ-1, PZ-5, and PZ-7), manganese concentrations also exceed the USEPA RBC for tap water (5.1 mg/L). Monitoring wells DCMW006-02 and DCMW007-02 are near the Green Fuel Oil property, and PZ-1, PZ-5, and PZ-7 are in Wetland 3.

Arsenic, beryllium, cadmium, chromium, and lead were detected at concentrations above groundwater screening levels in Brown's 1997 groundwater sample identified as WL03. This sample was reportedly a grab sample collected directly from a test pit; test results may have been biased high by suspended or dissolved solids in the sample.

5.2.4.3 Volatile Organic Compounds

Laboratory analytical results for five VOCs detected at concentrations above the groundwater screening levels are summarized in Table 5-18.

Benzene was detected in five samples at concentrations above the USEPA MCL, District groundwater criteria, and the District cleanup standard for hydrocarbon-contaminated groundwater (all established at 5 μg/L). The July 1997 sample concentration (254 μg/L) from one well (MW03 near the former garage building on the AOC parcel) equals the DC residential RBSL for benzene in groundwater (254 μg/L). The only groundwater sample collected by RIDOLFI that exceeds screening levels is the sample collected from DCMW009-02. The benzene concentration in this sample (7.2 μg/L) exceeds the USEPA MCL, USEPA RBC for tap water, District groundwater criteria, and the District cleanup standard for hydrocarbon-contaminated groundwater.

Vinyl chloride was the only other VOC to exceed its USEPA MCL. The sample collected by Brown in May 1999 from MW21 contained vinyl chloride at a concentration of 2.2 μg/L. This concentration exceeds the USEPA MCL (2 μg/L), the USEPA RBC for tap water (0.015 μg/L), and the District groundwater criteria (2 μg/L) but is below the District residential RBSL (47.1 μg/L). Monitoring well MW21 is north of the former garage building on the AOC parcel.

Concentrations of 1,2-dichloroethane and ethylbenzene exceed the USEPA RBC for drinking water; MTBE, exceeds the USEPA drinking water advisory level, which is based on taste and odor.

5.2.4.4 Semivolatile Organic Compounds

Laboratory analytical results for two SVOCs detected at concentrations above the groundwater screening levels are summarized in Table 5-19. The two SVOCs are bis(2-ethylhexyl)phthalate and naphthalene.

The concentrations of bis(2-ethylhexyl)phthalate in Brown's May 1999 sample from MW10 and of naphthalene in Brown's July 1997 sample from MW03 exceed the USEPA RBCs for tap water, the only screening level available for these compounds. Monitoring well MW10 has not been sampled since Brown's May 1999 sampling event.

5.2.5 On-Site Surface Water

Concentrations of chemical constituents detected in surface water samples, including samples from Stickfoot Creek, were compared to the following screening levels:

- USEPA National Recommended Water Quality Criteria (NRWQC) for Fresh Water Criteria Maximum Concentration (CMC)s
- USEPA NRWQC for Fresh Water Criteria Continuous Concentration (CCC)s
- USEPA NRWQC for Human Health Consumption of Organisms

Only one analyte was detected in the surface water samples at a concentration above these screening levels: manganese at a concentration of 0.25 mg/L (dissolved) in RIDOLFI's field-filtered surface water sample 470E-SW-01, which was collected from the Stickfoot Sewer at a manhole near the pump house. This concentration exceeds the USEPA NRWQC for Human Health Consumption of Organisms. No other screening levels are available for manganese.

Some VOCs (chloroform, dibromochloromethane, acetone, and bromodichloromethane) were detected in surface water samples from Wetland 3 SW-1/1, SW-1/2, SW-1/2D, SW-1/3, SW-1/4, SW-1/5, SW-1/6, SW-01, and WL04. No surface water screening levels are available for these VOCs.

5.2.6 Stickfoot Creek Sediment Sample Results

Concentrations of analytes detected in the sediment sample collected from Stickfoot Creek Sewer (470E-SS-27) are presented in Tables 5-8 through 5-10 with the on-Site wetland sediment results and are included in the discussion in Section 5.2.2. The Stickfoot Creek Sewer sediment sample results are summarized below. Chromium and nickel were detected in 470E-SS-27 at concentrations above sediment screening levels. The concentration of chromium (23.5 mg/kg) exceeded only the BTAG screening level for flora (0.005 mg/kg). The concentration of nickel (58 mg/kg) exceeded each sediment screening level, including the PEL (35.9 mg/kg).

Eleven SVOCs were detected in sample 470E-SS-27 at concentrations above the lowest screening levels. Three of these SVOCs were detected at concentrations above the PELs.

Motor oil-range hydrocarbons were detected in 470E-SS-27 at a concentration of 160 mg/kg. Sediment and soil screening levels are not available for motor oil-range hydrocarbons.

5.2.7 Storm Drain/Sump Sample Results

Sediment samples were collected from three storm drains/sumps at the Site. One sample was collected from the storm drain/sump near the southeastern portion of Wetland 3. Four samples (one of which was a field duplicate) were collected from the storm drain/sump in the area between the chemical storage buildings and the pump house. Two samples were collected from the storm drain/sump in the office building of the northern greenhouses. Laboratory results for the storm drain/sump samples were compared to the surface soil screening levels (see Tables 5-1 through 5-5) and are included in the discussion in Section 5.2.1. The storm drain/sump sample results are summarized below.

Inorganic constituents, pesticides, and SVOCs were detected at concentrations above the lowest applicable screening levels in sample 470E-SS-07, which was collected from the storm drain/sump near the southeastern portion of Wetland 3. The concentrations of arsenic (63 mg/kg), DDD (110,000 μg/kg), and DDT (64,000 μg/kg) exceed the USEPA RBCs for residential soil.

Inorganic constituents, pesticides, and SVOCs were detected at concentrations above the lowest applicable project screening levels in the samples collected from the storm drain/sump between the chemical storage buildings and the pump house. Only the concentrations of arsenic exceed the USEPA RBC for residential soil.

Inorganic constituents, pesticides, VOCs, and SVOCs were detected at concentrations above the lowest applicable project screening levels in the samples collected from the storm drain/sump in the office building of the northern greenhouses. The concentrations of arsenic and benzo(a)pyrene exceed the USEPA RBCs for residential soil.

5.2.8 Additional NRS Sampling Results

The results of the passive soil gas survey and Phase II soil and groundwater sampling activities at the NRS parcel by MACTEC are described in Sections 5.2.8.1 and 5.2.8.2. The Preliminary Passive Soil-Gas Survey Report prepared by Beacon Environmental Services, Inc. (Beacon) is included in Appendix B of the Phase II report (MACTEC, 2008).

5.2.8.1 Passive Soil-Gas Survey Results

A total of 100 passive soil gas (PSG) samplers (designated as PSG343-1 through PSG343-100) were deployed at the approximate locations shown on Figure 5-16. Each PSG sampler was placed in the upper 6 inches of soil on November 8 and 9, 2007. The PSG samplers were retrieved on November 20 and 21, 2007, and delivered along with a trip blank to the Beacon laboratory for analysis. VOCs were only detected in 16 of the 100 PSG samplers retrieved. The laboratory analytical reports for the soil gas samples are included in Appendix B of the Phase II report (MACTEC, 2008), and are summarized in the following table:

Constituent Detected In Soil-Gas	**Range of VOCs Detected (ng)**	**Total Number of Detections**
Toluene	26 to 76	13
Total Xylenes	40	1
1,2,4-TMB	26 to 44	2
Naphthalene	26 to 525	2

ng = nanograms
TMB = trimethylbenzene

Toluene, xylenes, and naphthalene are common organic compounds found in gasoline and related petroleum products. 1,2,4-TMB is used as a gasoline additive, a solvent, a paint and lacquer thinner, in making dyes, and in producing prescription drugs. Total VOCs (the sum of all VOCs detected) at each PSG sampling point are shown on Figure 5-6. Based on these results, limited petroleum impact from VOCs has occurred at some locations, although a significant vapor plume was not detected. No MECs were detected at the 25 sample points (PSG-76M through 100M) at the northwestern portion of the Site where a historic ordnance laboratory and suspected MEC activities were located.

5.2.8.2 Preliminary Soil and Groundwater Sampling Results

Three soil borings/groundwater monitoring wells were installed at representative locations where elevated VOCs were detected in soil-gas or where historic MEC activities were suspected. The borings/wells were designated as NRS-1 (next to PGP-92), NRS-2 (next to PGP-34), and NRS-3 (next to PGP-11) on Figure 5-6.

5.2.8.3 Soil Sampling Results

Soil laboratory analytical results from MACTEC's preliminary Phase II sampling activities are summarized in Table 5-20, which lists the constituents detected, compared to their associated screening levels (District Tier 1 RBSLs, USEPA Region III RBCs, USEPA Region III SSLs for Groundwater Migration, and USEPA Region III BTAG screening levels). No explosives were detected in soil and none of the VOCs detected exceeded their screening levels. Methylene chloride exceeded the SSF DAF 1; however, this analyte is a common laboratory contaminant or artifact. No distinct correlation between vapor-phase VOCs detected in soil gas and VOCs detected in soil was established from the Phase II investigation. However, the SVOCs and metals detected in soil which exceeded one or more screening levels are listed in Table 5-20 and are summarized in the following table.

Constituent Detected in Soil	Concentration Range Detected (mg/kg)	Highest Regulatory Screening Level Exceeded
Semivolatile Organic Compounds		
Benzo(a)anthracene	0.441	USEPA Region III BTAG (flora and fauna)
Benzo(a)pyrene	0.428	SSL DAF 20
Benzo(b)fluoranthene	0.385	SSL DAF 1
Benzo(k)fluoranthene	0.332	USEPA Region III BTAG (flora and fauna)
Chrysene	0.443	USEPA Region III BTAG (flora and fauna)
Fluoranthene	0.847	USEPA Region III BTAG (flora and fauna)
Phenanthrene	0.387	USEPA Region III BTAG (flora and fauna)
Pyrene	0.811	USEPA Region III BTAG (flora and fauna)
Metals		
Arsenic	1.07 to 13.8	RBC for Residential Use
Chromium	4.00 to 29.4	SSL for DAF1
Lead	2.94 to 44.1	USEPA Region III BTAG (flora)
Mercury	0.10 to .487	USEPA Region III BTAG (flora and fauna)
Silver	1.20	USEPA Region III BTAG (flora)

The TPH-DRO diesel range organic concentrations detected at NRS-3 (9.03 mg/kg), NRS-1 (7.29 mg/kg), and NRS-2 (5.07 mg/kg) only slightly exceeded the laboratory reporting limit. These TPH concentrations did not exceed the 2008 District Soil Quality Standard for petroleum-contaminated soil of 960 mg/kg for residential use/commercial worker, or the DDOE 100 mg/kg release reporting concentration. As summarized in the table above, eight SVOCs exceeded USEPA BTAG Region III values and/or SSL DAF values. Arsenic, chromium, lead, mercury and silver exceeded one or more screening values.

5.2.8.4 Groundwater Sampling Results

Groundwater laboratory analytical results are summarized in Table 5-21, which compares detected constituents to their associated screening levels (District Tier 1 RBSLs, Groundwater Criteria, and Cleanup Standard for Hydrocarbon Contaminated Groundwater, and USEPA Region III RBCs and MCLs). Contaminants detected in groundwater samples collected at the Site which exceeded one or more of the screening levels are summarized and discussed below:

Constituent Detected in Groundwater	Concentration Range Detected	Highest Regulatory Screening Level Exceeded
Dissolved Metals		
Arsenic	0.02 mg/L	USEPA MCL
Mercury	0.00420 mg/L	USEPA MCL and DC Groundwater Criteria
Explosives by HPLC		
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.65 µg/L	Tap water RBC

No VOCs or SVOCs were detected in the three groundwater samples. Although dissolved barium was detected in groundwater, mercury and arsenic were the only dissolved metals detected which exceeded their MCL and/or DC Groundwater Criteria. However, both arsenic and mercury were detected at low concentrations, not much higher than their MCLs, and may represent naturally occurring or background levels. The TPH-DRO concentrations detected in groundwater (192 to 453 µg/L) were significantly less than the District Tier 1 RBSL and did exceed the DC Cleanup Standard for hydrocarbon-contaminated groundwater.

The only explosive detected in groundwater was RDX at 1.65 µg/L. RDX is used in military munitions formulations and as an explosive and in combination with other ingredients in explosives. It is a synthetic product that does not occur naturally in the environment and in its pure form is a white powder. In general, RDX dissolves very slowly in groundwater, and it evaporates very slowly from water.

Although perchlorate was detected at concentrations of 0.54 to 2.3 µg/L, these concentrations did not exceed the tap water RBC of 26 µg/L.

5.2.9 Summary of Contamination

Various contaminants have been detected at the Site in soil, groundwater, surface water, sediment, and soil vapor, primarily at the DCL and AOC parcels where more extensive sampling has been performed. Primary contaminant groups detected or identified generally include petroleum hydrocarbons (including associated VOCs and SVOCs), pesticides/herbicides, metals and metalloids, chlorinated VOCs, solvents, MEC, PCBs, dioxins, and furans. Tables 5-1 through 5-21 summarize the specific constituents detected compared to screening levels in place at the time of sampling. Figures 5-7 through 5-15 show the locations where representative contaminants or contaminant groups (arsenic, DDT, benzo(a)pyrene [B(a)P], and TPH) were detected, while Figure 5-16 shows the locations and results of soil gas samples collected at the NRS parcel. The chemicals shown in the tables and figures may drive further Site evaluations and/or remedial actions. It is anticipated that these tables and figures will be updated after additional data are collected during the upcoming Remedial Investigation to fully define the nature and extent of contamination.

5.3 FATE AND TRANSPORT OF CONTAMINANTS

This section integrates the physical transport pathways described in Section 3.4 with known and suspected source area information from Section 5.1 and existing Site chemical data from Section 5.2 to further refine the CSM for the Site. The CSM will be used to identify data gaps that will support development of the Sampling and Analysis Plan (SAP).

Large portions of the DCL and AOC parcels are heavily vegetated, which impedes the movement of surface water and the associated overland transport of contaminants. Historical aerial photographs show that the DCL and AOC parcels were less overgrown when nurseries were operating. Under previous conditions, surface water was likely to move more readily and over greater distances. Although it would be helpful to have a detailed understanding of the land cover characteristics when there was chemical usage at the Site, information offering this level of detail is not available.

As described in Section 3.4, surface water runoff at the Site is generally expected to flow from topographic highs to topographic lows, and will infiltrate through the soil strata into shallow groundwater where there are zones of relatively higher permeability. Shallow groundwater is generally perched on the Holocene Clay, and during the wet season the groundwater is apparently in direct communication with on-Site surface water in wetland areas. The Holocene Clay beneath the dredge fill likely restricts shallow groundwater from flowing downward into deeper water bearing units; therefore, surface water infiltration and shallow groundwater flow are likely limited to near-surface soils. Groundwater is expected to move toward the Anacostia River, in a northerly direction for most portions of the Site and in a westerly to southwesterly direction for the western (DCL) portion of the Site, where the Anacostia River bends southward. The effect of the seawall on groundwater movement is unclear and is expected to be evaluated during the RI.

The Holocene Clay is known to be absent in the southwest corner of the DCL parcel. In this area, there may be a vertical pathway for shallow groundwater impacts to migrate into deeper water bearing units (i.e., MPU or LPU). Vertical pathways for shallow groundwater to migrate into deeper water bearing units might also exist in areas with anthropogenic features (such as Stickfoot Creek and the Metro tunnel) or areas where relatively high permeability layers within the Holocene clay are present.

There is considerable uncertainty about groundwater interconnection with the Anacostia River at Poplar Point. A continuous stone and concrete seawall along the southern edge of the river may act as a barrier or partially restrict shallow flow of groundwater into the river. Deeper units (the

MPU and LPU) may be hydraulically connected to the river, but the lack of existing data to evaluate this connection represents a significant data gap. The importance of addressing the data gap will be driven in part by groundwater quality in wells near the river that could indicate where groundwater from the Site has the potential to impact the river.

5.3.1 Migration by Chemical Classes

Different primary contaminant groups or classes of chemicals were likely used in different ways at the Site and are likely to transport through environmental media differently. Because chemical properties influence fate and transport mechanisms, the following discussion is presented by chemical group. The intent is to identify data gaps by linking information for known or suspected chemical releases with fate and transport information.

5.3.1.1 Petroleum Hydrocarbons (including associated VOCs and SVOCs)

Diesel fuel and gasoline were stored in underground and aboveground storage tanks on the DCL, AOC, NRS, Perimeter Properties, and adjacent parcels. These constituents are typically quantified in laboratories as diesel range organics (DRO) or gasoline range organics (GRO). In addition, specific chemicals including benzene, ethylbenzene, toluene, and xylenes (which taken together are known as BTEX) and the gasoline additive MTBE are often associated with fuel releases. Releases from leaking tanks are generally point sources, which can impact soil and groundwater in the immediate area of the leak. Groundwater impacts can occur downgradient of the release through migration of fuel-related chemicals, either as light non-aqueous phase liquids (LNAPL) near the water table, or as dissolved constituents at or below the water table. Available groundwater data suggest that leaks from tanks at the Site are relatively localized and contained within the shallow soil and groundwater, which indicates relatively small leaks occurred and/or the presence of a relatively flat gradient in shallow groundwater. A possible exception that has not been well characterized is the area on the DCL parcel just north of the Green Fuel facility. Here, the Holocene Clay is absent, which creates a potential migration pathway between the surficial aquifer and the MPU or LPU.

5.3.1.2 Pesticides/Herbicides

This category includes DDT, which was widely used as an insecticide in the United States after World War II until 1972 when it was banned. It may have been used specifically at the Site or it may have been applied as part of broader citywide spraying programs that were typical in many areas with mosquito problems. Once applied, DDT is long-lived and stable, although it can break down into DDD and DDE in the environment. All three chemicals are hydrophobic and adsorb strongly to soil. As such, these chemicals are most likely in surface soils, although as described later for arsenic, DDT may have concentrated in ditches as particulates that settled in low areas.

5.3.1.3 Metals and Metalloids

Several elements have been detected in soils at the Site, but arsenic is the most prevalent. Arsenic is a naturally occurring element that may have been deposited at the Site as a component of dredge spoils from the Anacostia River that were used to fill historical wetland areas in the 1900s. Alternatively, or in addition to this association with dredge spoils, arsenical pesticides may have been used or applied at the Site. In the case of dredge spoils, the arsenic is expected to have limited mobility with respect to the location where the dredge spoils were placed. It is also likely that arsenic would be found in both surface and subsurface soils wherever the dredge spoils were placed. Similarly, arsenic associated with pesticides would more likely be found near the ground surface, but again is not anticipated to be highly mobile. Arsenic that was applied as a pesticide may tend to accumulate in topographic lows because of arsenic-bearing soil particles washing into surficial depressions, such as the former ditch areas on the DCL parcel. These ditches are now part of Wetland Area 3.

5.3.1.4 Chlorinated VOCs/solvents

This class of chemicals was widely used in dry-cleaning operations and in machine shops as a degreaser. A common example is PCE, which may have been used at the NRS parcel. Chlorinated VOCs are hydrophobic and most are denser than water. They are thus termed dense non-aqueous phase liquids (DNAPLs). DNAPLs will sink within an aquifer, making them both difficult to locate and difficult to remediate. PCE can dechlorinate under appropriate environmental conditions into breakdown products including vinyl chloride, which has been detected in one groundwater sample in a single well. Chlorinated solvents are usually associated with point sources of the type described above. The DCL and AOC parcels have been reasonably well-characterized in prior investigations using methods appropriate for detecting chlorinated solvents. The former operations at the NRS included activities that are often associated with chlorinated VOCs. Potential source areas and groundwater have not been well characterized within the NRS for this group of contaminants.

5.3.1.5 Munitions and Explosives of Concern

This class of chemicals includes high explosives and related chemicals that were reportedly tested and perhaps released at the NRS parcel. These compounds are solids and, when released to soils, they typically occur as discrete “chunks” with significant spatial variability. Explosive compounds can dissolve in water, and if a migration pathway exists from soil to groundwater, can cause groundwater contamination. The high explosive RDX has been detected in groundwater in a single sample at the NRS. Although perchlorate (commonly found in explosives and rocket propellants) was detected at two locations at the NRS parcel, these concentrations did not exceed the tap water RBC. Information about aquifer characteristics in the area where RDX and perchlorate were detected is insufficient to predict how these chemicals might migrate. If the Holocene Clay is present, their movement may be limited, but additional hydrogeological information is required to characterize transport of this group of chemicals.

5.3.1.6 Polychlorinated Biphenyls

PCBs are a group of chemicals that were used extensively beginning in the 1920s until they were banned in the United States in 1979 because of their toxic effects. PCBs were used in transformers for their insulating properties and in many other applications including paints and caulking. PCB "hot spots" are generally associated with point sources; however, they are also transported atmospherically, such that they are ubiquitous in the environment. PCBs are hydrophobic and tend to be associated with soil and sediment instead of groundwater or surface water. PCBs have been detected in several surface soil samples within the DCL and AOC parcels. Because of their hydrophobic nature, PCBs are anticipated to have limited mobility, unless the soil is eroded or excavated. Investigations at the NRS parcel are insufficient to determine whether PCBs are present, and if so, their distribution or fate and transport at the Site.

5.3.1.7 Dioxins and Furans

Dioxins and furans are a group of chemicals that share many of the chemical characteristics, including toxic effects, of PCBs. Dioxins were not manufactured as specific chemical products, but are a by-product of both chemical manufacturing and combustion of organic materials containing chlorine. Because of their hydrophobic nature and the relatively gentle topography of the Site, dioxins are not expected to be transported significant distances from source areas.

5.3.2 Chemical Distribution and Migration by Parcel

This section describes the distribution of chemicals of concern by parcel with a focus on primary chemicals, a mention of secondary chemicals, and a discussion of the inferred transport direction and mechanisms and associated data gaps.

5.3.2.1 DCL Parcel

The primary chemicals of concern at the DCL parcel are arsenic, DDT, and B(a)P. These chemicals are generally found in surface soil throughout the DCL parcel, but samples with the highest concentrations were detected in the soil/sediment in Wetland 3. Arsenic was also detected in subsurface soil; however, fewer subsurface soil samples were collected for arsenic analysis and the pattern of elevated arsenic concentrations is not well defined. There is no notable pattern of groundwater contamination for these chemicals, which suggests that transport from soil to groundwater is limited. However, monitoring wells were last sampled almost 10 years ago, so current groundwater conditions on the DCL parcel are unknown. The topography on the DCL parcel is relatively flat with only a few feet of relief. Wetland 3 is in a topographic low, such that surface water runoff is directed radially toward this feature. However, the southern and southwestern portions of the DCL parcel are paved, and most of the remainder of this parcel is heavily vegetated with grass, shrubs, and trees. Therefore, erosion and transport of contaminated surface soil is expected to be limited.

5.3.2.2 AOC Parcel

The primary chemicals of concern at the AOC parcel are inorganics arsenic, DDT, and B(a)P. These chemicals were detected in surface soil, particularly in the southern part of the parcel where historical facilities, such as the greenhouses, were located. Arsenic was also detected in subsurface soil; however, fewer subsurface soil samples have been collected for arsenic analysis and the pattern of elevated arsenic concentrations is not well-defined. There is no notable pattern of groundwater contamination for these chemicals, which suggests that transport from soil to groundwater is limited. However, monitoring wells were last sampled almost 10 years ago, so current groundwater conditions on the AOC parcel are unknown. The topography on the AOC parcel is relatively flat with only a few feet of relief. An exception is a mound of fill material approximately 15 feet high that is in the north-central portion of the parcel. Concrete-lined trenches around the southern greenhouses collect surface water runoff from adjoining areas. In addition, a defunct stormwater collection and conveyance system was historically used to carry water pumped from the DCL parcel and discharged into Stickfoot Creek. Accumulated water may now drain backwards through this system from the AOC parcel into the DCL parcel. The southern third of the AOC parcel is paved or contains dilapidated structures, while the remaining areas are vegetated with grass, shrubs, and trees. Therefore, erosion and transport of contaminated surface soil is expected to be minimal.

A former garage building in the east central portion of the AOC parcel was historically a source of petroleum contamination in soil and groundwater caused by leaking USTs. The USTs and associated contaminated soil were removed, and groundwater samples collected in 2002 detected TPH-DRO, and TPH-GRO, and MTBE at concentrations below regulatory standards. Benzene and vinyl chloride were detected in groundwater above regulatory standards in one well during 2002. Benzene was detected in the fill and may be associated with the gasoline leak. Vinyl chloride, which was also detected in the fill, may be a breakdown product from a solvent, such as PCE or TCE.. Groundwater flow directions are apparently westerly or southwesterly in the AOC parcel, but these directions have not been confirmed.

NRS Parcel

Limited environmental sampling has been conducted at the NRS parcel, except at a few monitoring wells and soil borings associated with removal of USTs, and three monitoring wells installed by MACTEC in 2008. RDX, arsenic, and mercury were detected in groundwater in one monitoring well (NRS-3) at a concentration exceeding a risk-based screening level (for RDX), or exceeding an MCL (for arsenic and mercury). However, no nearby monitoring wells were installed to delineate the nature and extent of these chemicals. The groundwater flow direction is presumed to be north, toward the Anacostia River, but this was not established by measurement of static groundwater elevations.

5.3.2.3 Perimeter Properties

Very limited environmental sampling has been conducted at the Perimeter Properties, except at five soil borings completed north of the DCL parcel near Anacostia Drive. The primary contaminant detected in soil at these locations was B(a)P, with the highest concentrations detected in subsurface samples, particularly in SB01 and SB02 (see Figure 5-14). Monitoring wells were not installed in these locations; therefore, the presence or absence of groundwater contamination is unknown. The groundwater flow direction was not established in the Perimeter Properties, but it is suspected to flow toward the Anacostia River.

The former Green Fuel facility abuts the southwest corner of the DCL parcel, and TPH-DRO was detected in surface soil, subsurface soil, and groundwater in this area. It is presumed that the TPH-DRO is migrating from petroleum release(s) at Green Fuel, but this was not confirmed by sampling directly on the Green Fuel facility. The southwest corner of the DCL parcel has relatively complex subsurface conditions. The Holocene Clay is absent in this area, which places the shallow unconfined aquifer in contact with the MPU. Groundwater flow directions in this area are apparently toward the west or southwest, which may reflect a localized bend that is related to the shape of Poplar Point as a geographic feature.

5.4 FUTURE LAND USE SCENARIOS

Land uses were developed in the draft EIS by examining a broad range of alternatives that 1) may meet the objectives of the Proposed Action and 2) reduce or eliminate impacts to important environmental, social, and economic resources.

While each alternative has its own approach to integrating community development within a waterfront park system, several elements are common among the action alternatives, including the relocation of the USPP headquarters and aviation, and the redevelopment of Poplar Point with a mix of uses.

Each action alternative proposes a mixed-use plan with enhanced connectivity to the Anacostia Metrorail station and its associated facilities. The Site likely will be redeveloped for mixed use (commercial office space, retail, and residential), with open areas for passive recreation/wetlands (natural ecological areas, boardwalks, and stormwater control areas), active recreation (athletic fields, playgrounds, waterfront piers and marinas, and event plazas), and government offices. Considered alternatives for redevelopment and future land use may include terracing, relocation of wetlands on-Site and/or the "day-lighting" of Stickfoot Creek sewer into a natural, at-grade stream system.

The amount and mix of development varies among the action alternatives. However, as specified in the DC Lands Act, future land use plans must include the following provisions:

- Site redevelopment must include not fewer than 70 acres (including wetlands) which shall be set aside for park purposes
- Identification of existing and replacement facilities and properties for the NPS
- At least two sites within the areas designated for park purposes are designated for placement of potential commemorative works or memorial

In any event, the NPS remains the land manager until the transfer of Poplar Point lands formally occurs.

As land use designations are identified and finalized, the data collected during the RI/FS will be used to qualify whether 1) additional data are needed in the area; 2) the area is suitable for the reasonable anticipated future land use; or 3) recommendations can be made to either change the project land use, complete a remedial action, and/or address potential exposures using engineering and institutional controls. The land use designations will also factor into the exposure scenarios that will be evaluated in the risk assessment. Until an alternative is selected, it will be necessary to evaluate the range of land uses that are under consideration in each area.

5.5 POTENTIAL HUMAN AND ECOLOGICAL RECEPTORS

As discussed in Section 5.4, the Site likely will be redeveloped for mixed use (commercial office space, retail, and residential), with open areas for passive recreation/wetlands (natural ecological areas, boardwalks, and stormwater control areas), active recreation (athletic fields, playgrounds, waterfront piers and marinas, and event plazas), and government offices. Seventy acres of the property will be maintained as "parkland." To make areas within the floodplains appropriate for projected land use, it is probable that the land will be terraced. To construct the terraces, soil will be transported onto the Site. Therefore, some currently exposed soils will be under a cover of clean soil.

Because multiple alternatives are proposed for the development, and the proposed land use varies by alternative, it is not currently possible to identify specifically how subunits within the Site will be used after redevelopment. Therefore, the human health and ecological risk assessments will be formulated to reflect the most protective scenarios of human and ecological risk throughout the Site.

Potential human receptors may include commercial and retail workers, utility/construction workers, maintenance workers, residents, and recreational visitors. Potential ecological receptors may include plants, mammals, birds, soil invertebrates, amphibians, and benthic macroinvertebrates that live and/or forage at the Site and may be exposed to COPCs in the surface soil, sediments, and dietary prey items present at the Site. A literature search for threatened and endangered (T&E) species will be performed for the District, and the results will be presented in the screening level ecological risk assessment (SLERA). A Site visit was completed in May 2012 to review the current environmental setting, and a habitat assessment will be used to provide the rationale for selecting the species to be used as representative ecological receptors in the SLERA. The rationale for the selection of representative ecological receptors will be presented in the WP.

5.6 POTENTIAL EXPOSURE PATHWAYS

5.6.1 Human Exposure Pathways

During construction and utility/Site maintenance activities, utility/construction and maintenance workers may come into contact with surface and subsurface soil, shallow groundwater, and, potentially, surface water and sediment during and after day-lighting actions for Stickfoot Creek. Potential exposure pathways for these workers may include incidental ingestion, inhalation of particulates, and dermal contact with soil or water. To date, VOCs have not been detected at significant concentrations in surface and subsurface soils; therefore, inhalation of volatile emissions from soil is likely an incomplete or limited exposure pathway. If VOCs are detected in soil or groundwater during the RI at concentrations greater than health-based screening concentrations, then exposure to volatiles in soil and groundwater will be included in the human health risk assessment (HHRA). Government, commercial, and retail workers may be exposed to impacted shallow soil during outdoor work via incidental ingestion, dermal contact, and inhalation of fugitive dust or volatile emissions from soil.

Residents may be exposed to surface soil and groundwater used as potable water. Residential receptors may be exposed through ingestion, dermal contact, and inhalation exposures. Recreational receptors may be exposed to surface soils, surface water, and sediments on the Site. These receptors may be exposed to surface soils through incidental ingestion, dermal contact, and inhalation of fugitive dust. Current and future water-based recreational receptors (i.e., fishing, boating, and wading children and adults) may be incidentally exposed to surface water and sediments through ingestion and dermal contact where access to either the Stickfoot Creek or the Anacostia River is possible. Exposure through ingestion of fish is a potentially complete exposure pathway for recreational receptors. However, the source of fish would be primarily the Anacostia River rather than Stickfoot Creek because the Creek is expected to be a limited habitat for larger edible fish. One objective of the current investigation is to assess whether Poplar Point constituents are migrating into the Anacostia River. Because a clear connection between the Site and impacts noted for the Anacostia River has not yet been established, the fish ingestion pathway will not be addressed in the risk assessment. If a connection between the Site and impacts to the Anacostia River are identified, this pathway will be considered in the HHRA.

It is unlikely that groundwater will be used for potable purposes in this area because City water is readily available, and regulations preclude installation of drinking water wells. Ingestion of groundwater, inhalation during showering with groundwater, and dermal contact with groundwater exposure pathways for on-Site residents and workers are currently considered incomplete and are likely to remain incomplete, but will be assumed to be in the HHRA. Very low levels of volatile compounds have been detected previously on the DCL, AOC, and NRS parcels. If volatile compounds are detected in soil and groundwater during the RI at concentrations greater than screening concentrations, indoor air exposure to volatile compounds in soil and/or groundwater will be addressed in the HHRA. Potential human exposure routes and receptors are summarized in the Conceptual Exposure Model (CEM) and summarized on Figure 5-17.

5.6.2 Ecological Exposure Pathways

The identification of ecological exposure pathways varies between the different organisms selected as potential receptors. Varying exposure to constituents in the Site ecosystem is expected due to differences in habitat and life cycles of different species. Mammals, birds, soil invertebrates, and benthic macroinvertebrates that live and/or forage at the Site may be exposed to constituents in surface soil, sediment, surface water, and dietary items present at the Site. Potential ecological exposure routes and receptors are summarized in the CEM and presented on Figure 5-18.

Complete pathways likely to be identified for semiaquatic and terrestrial wildlife, such as mammals and birds who may be exposed to contaminants while using the Site as a source of food and drinking water, include incidental ingestion of surface soil or sediment, ingestion of surface water, and ingestion of plants and dietary prey items that may bioaccumulate constituents from soil, sediment, or surface water. Wildlife exposure to constituents in soil and sediment varies by species because of diverse life cycle characteristics. Terrestrial and aquatic plants may uptake constituents from soil or sediments via root uptake.

Sediments in Stickfoot Creek will be evaluated for potential impacts by comparison to ecological screening levels. If impacts are observed in Stickfoot Creek sediments, the potential for transport to the Anacostia River will be examined. If impacted sediments are observed on the Site and sustainable habitat is present, risk to benthic macroinvertebrates will be addressed in the SLERA. During this initial phase of investigation, aquatic receptors, including fish in the Anacostia River, will not be addressed in the SLERA, because transport pathways and potential constituents migration from the Site to the river has not yet been identified. The rationale for the selection of representative ecological species for the SLERA will be discussed in the WP and the SLERA.

6.0 PRELIMINARY ARARS AND TBCS

Under CERCLA, remedial response actions must comply with the environmental and facility siting requirements which are determined to be "applicable" or "relevant and appropriate" (ARARs). These ARARs are identified on a site-specific basis. In general, the identification process involves comparing several site-specific factors with the statutory or regulatory requirements of the relevant environmental laws. These factors may include:

- Contaminants present
- Types of remedial actions considered
- Physical circumstances of the Site

In addition to the ARARs, materials "to be considered" (TBC) are also identified during the determination of remedial response objectives. The TBC materials are non-promulgated advisory or guidance measures issued by the district or federal government. They are not legally binding and do not have the status of ARARs. However, the TBC requirements are used with the baseline risk assessments to aid in determining the level of cleanup for the protection of human and environmental health. Examples of TBCs relating to risk assessments are the calculated risk-based action levels, health advisories, reference doses and cancer slope factors, and guidance policy documents developed to implement regulations. Site-specific, non-NPS-specific, and federal location-specific ARARs and TBCs were identified by the NPS; and action-specific and chemical-specific ARARs were identified by the DDOE. These values are summarized in Sections 6.1 and 6.2.

6.1 POTENTIAL ARARS AND TBCS IDENTIFIED BY NPS

The NPS identified the following potential ARARs and TBCs for the Site:

6.1.1 Potential NPS Site-Specific Federal ARARs and TBCs

1. National Park Service Organic Act, 16 U.S.C. §§ 1 *et seq.*

   This statute created the National Park Service and mandates that "[t]he service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations ... by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Section la-l further provides that "the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established ...."

2. Establishment of Anacostia Park: "An Act providing for a comprehensive development of the park and playground system of the National Capital" as amended, 68th Congress, Sess. I., Ch. 270 (1924), 69th Congress, Sess. I, Chs. 197, 198 (44 Stat. 374, 1926), Capper-Cramton Act, 46 Stat. 482, as amended by 60 Stat. 960, 66 Stat. 781, 791, and 72 Stat. 705.

   There is no specific "enabling" legislation authorizing and establishing Anacostia Park. There is, however, legislation authorizing the acquisition of lands along the Anacostia River, among other places in the District of Columbia, for "suitable development of the National Capital park, parkway, and playground system." The purpose of such development was "to prevent pollution of ... [the] Anacostia River[ ], to preserve forests and natural scenery in and about Washington, and to provide for the comprehensive, systematic, and continuous development of park, parkway, and playground systems of the National Capital and its environs …" The Capper-Crampton Act expressly provided for "the extension of the Anacostia Park system up the valley of the Anacostia River …"

3. National Park Resource Protection, Public Use and Recreation, 36 C.F.R. Part 2

   This regulation proscribes and regulates various activities in National Parks. For example, Section 2.1 (a) prohibits "(1) Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state: (i) ... wildlife or fish. . .. (ii) Plants or the parts or products thereof ... : (2) Introducing ... plants ... into a park area ecosystem. (3) Tossing, throwing or rolling rocks or other items inside caves or caverns, into valleys, canyons, or caverns, down hillsides or mountainsides, or into thermal features." Section 2.2(a)(2) prohibits "feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding or other activities." Section 2.14(a) prohibits "(1) Disposing of refuse in other than refuse receptacles … (6) Polluting or contaminating park area waters or water courses."

4. National Park Area Nuisance, 36 C.F.R. Part 5.13

   This regulation prohibits the creation or maintenance of a nuisance on NPS land.

5. Park Solid Waste Act, 16 U.S.C. § *460l·22(c),* and Solid Waste Disposal Sites in Units of the National Park System, 36 C.F.R. Part 6

   The statute generally prohibits the operation of solid waste disposal sites within the boundary of any unit of the National Park system. The regulations prohibit the operation of any solid waste disposal site within the boundary of any unit of the National Park System, except as specifically provided for by the regulations. Among other things, this regulation bars the disposal of solid waste containing specified materials including hazardous waste, CERCLA hazardous substances, or petroleum.

6. National Park Service, Procedural Manual #77-1: Wetland Protection.

6.1.2 Potential Non-NPS Location-Specific Federal ARARs and TBCs

7. Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661 et seq.

   These standards require that federally funded or authorized projects ensure that any modification of any stream or other water body affected by such project provide for adequate protection of fish and wildlife resources.

8. Floodplain Management Order, Executive Order No. 11988,42 Fed. Reg. 26951 (May 24, 1977)

   This requirement mandates that federally funded or authorized actions within the 100-year floodplain avoid, to the maximum extent possible, adverse impacts associated with development of a floodplain.

9. Protection of Wetlands Order, Executive Order No. 11990, 42 Fed. Reg. 26961 (May 24, 1977)

   This requirement mandates that federal agencies and potentially responsible parties (PRPs) avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. Section 404(b)(1) of the Clean Water Act, 33 U.S.C. § 1344(b)(1), also prohibits the discharge of dredged or fill material into waters of the United States. Together, these requirements create a standard of "no net loss" of wetlands.

10. The Endangered Species Act, 16 U.S.C. §§ 1531 et seq. and 50 C.F.R. Part 402

    This statute and implementing regulations require that any federal activity or federally authorized activity may not jeopardize the continued existence of any threatened or endangered species known to live or to have lived in the affected environment or destroy or adversely modify a critical habitat. *See* 40 C.F.R. §§ 300.430(d)(2)(vii) and (e)(2)(i)(G) and USEPA Guidance Document OSWER Dir. No. 9285.7-28P, *Ecological Risk Assessment and Risk Management Principles for Superfund Sites* (October 1999), page 3.

11. The National Historic Preservation Act, 16 U.S.C. §§ 470 et seq. and 36 C.F.R. Part 800

    This statute and implementing regulations require federal agencies or federal projects to take into account the effect of any federally assisted undertaking or licensing on any district, site building, structure, or object that is included in, or eligible for, the National Register of Historic Places. If effects cannot be reasonably avoided, measures should be implemented to minimize or mitigate the potential effect. In addition, Indian cultural and historical resources must be evaluated, and effects avoided, *minimized*, or mitigated.

12. Protection and Enhancement of the Cultural Environment, Executive Order No. 11593, 36 Fed. Reg. 8921 (May 13, 1971)

    This Order directs federal agencies to initiate measures for the protection and enhancement of the cultural environment. These measures include assuring that steps are taken to make records, drawings, and/or maps and have such items deposited in the Library of Congress when, as the result of a federal action, a property listed on the National Register of Historic Places is to be substantially altered.

13. Archaeological and Historic Preservation Act, 16 U.S.C. §§ 469 et seq.

    This statute and implementing regulations establish requirements for evaluation and preservation of historical and archaeological data, including Indian cultural and historic data, which may be destroyed through alteration of terrain as a result of federal construction projects or a federally licensed activity or program. If eligible scientific, prehistoric, or archaeological data are discovered during site activities, such data must be preserved in accordance with these requirements.

14. Archaeological Resources Protection Act, 16 U.S.C. §§ 470aa et seq.

    This statute provides for the protection of archaeological resources located on public and tribal lands. The Archaeological Resources Protection Act establishes criteria which must be met for the land manager's approval of any excavation or removal of archaeological resources if a proposed activity involves soil disturbances.

15. Historic Sites, Buildings, and Antiquities Act, 16 U.S.C. § 461 et seq.

    This statute and implementing regulations require federal agencies, in conducting an environmental review of a remedial action, to consider, *inter alia,* the existence and location of historic or prehistoric sites, buildings, objects, and properties of national historical or archaeological significance.

16. Migratory Bird Treaty Act, 16 U.S.C. §§ 703 et seq.

    This requirement establishes a federal responsibility for the protection of the international migratory bird resource and sets forth a consultation requirement.

17. Responsibilities of Federal Agencies to Protect Migratory Birds, Executive Order 13186, 66 Fed. Reg. 3853 (Jan. 10, 2001)

    This Order directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act, including supporting the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.

18. Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C. §§ 3001 et seq.; 43 CFR §§ 10.1 et seq.

    NAGPRA and its implementing regulations provide for the disposition of Native American remains and objects inadvertently discovered on federal or tribal lands after November 1990 (25 U.S.C. § 3002(d)).

6.2 POTENTIAL DISTRICT OF COLUMBIA ARARS AND TBCS

The DDOE identified potential action-specific and chemical-specific ARARs for the Site. The associated District regulation for each ARAR, and relevant text from that regulation and the reason for inclusion, are summarized in the following table.

ACTION-SPECIFIC

District Regulation	Relevant Text	Reason for Inclusion
20 DCMR § 7099	**Non-aqueous phase liquids (NAPL)**-- chemicals that are insoluble or only slightly soluble in water that exist on or below the water table	Provides District regulatory definition of NAPL which differs from federal definition under 40 CFR 280.12E.
20 DCMR 2804. EXPLOSIVES	2804.1 Noise emanating from explosives shall be prohibited during the hours specified in this section irrespective of its compliance with § 2701 of Chapter 27 of this subtitle. 2804.2 No blasting with explosives shall be performed on any Sunday or legal holiday or at nighttime on weekdays, except by special permit as provided in § 1301 of the Second Amendment to the 1972 Building Code of the District of Columbia (Title 12 DCMR).	District sets specific times for when explosives can be detonated. (See below)
2803. CONSTRUCTION IN RESIDENTIAL ZONES	2803.1 Noise emanating from construction in residential zones shall be prohibited during the hours specified in this section irrespective of its compliance with § 2701 of Chapter 27 of this subtitle. 2803.2 No noise from construction, excluding minor home repairs, shall be permitted within a residential, special purpose, or waterfront zone on any Sunday or legal holiday, or after 7:00 p.m. and before 7:00 a.m. on any weekday.	The District has specific maximum decibel levels for construction activities depending on the surrounding area.
20 DCMR 4261.7	The provisions of 40 CFR § 261.5 (special requirements for hazardous waste generated by conditionally exempt small quantity generators), are adopted with the following modifications: (a) With respect to 40 CFR § 261.5(b), each conditionally exempt small quantity generator's hazardous wastes shall be subject to the notification requirements of § 3010 of RCRA; (b) The provisions of 40 CFR § 261.5(j), which regulate mixtures of conditionally exempt small quantity generator waste and used oil that are to be recycled as used oil under 40 CFR Part 279, are excluded from the incorporation by reference.	RCRA exempt small quantities of hazardous waste are not exempt under the District's regulatory scheme.
20 DCMR 605.1	CONTROL OF FUGITIVE DUST 605.1—Reasonable precautions shall be taken to minimize the emission of any fugitive dust into the outdoor atmosphere.	District's regulations on dust minimization relating to construction

District Regulation	Relevant Text	Reason for Inclusion
20 DCMR 4205. EMERGENCY AND RELEASE NOTIFICATION	4205.1 Notwithstanding any provision in the RCRA regulations, 40 CFR Parts 124, 260 through 266, 268, 270, 273, and 279, to the contrary, whenever the RCRA regulations require that telephonic emergency or release notification be given to USEPA, DOT, the National Response Center, or another federal agency, the person required to provide the notice shall, at the same time, provide telephonic notice to the District of Columbia Emergency Management Agency at (202) 727-6161 and the District Department of the Environment, Hazardous Waste Division at (202) 535-2270.	Specific notification of the District in the event of an emergency is not covered in the CFR
20 DCMR 4202. PROHIBITIONS SPECIFIC TO THE DISTRICT OF COLUMBIA	4202.1 Except as provided in 20 DCMR § 4202.4, the prohibitions in this section supersede any provision to the contrary in the RCRA regulations, 40 CFR Parts 124, 260 through 266, 268, 270, 273, and 279, incorporated by reference in 20 DCMR §§ 4260 through 4279.	District specific prohibitions which may not be fully encompassed in CFR provisions.

District Regulation	Relevant Text	Reason for Inclusion
21 DCMR 1501.4	The following shall apply to discharges to the wastewater system: (a) No person shall introduce into the wastewater system any discharges with pH of less than 5 or greater than 10 and temperatures more than 140 degrees Fahrenheit or 60 degrees Centigrade; (b) No person shall discharge to the wastewater system arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, silver, zinc, cyanide, oil and grease, or Polychlorinated Biphenyls (PCBs) in concentrations greater than those listed in Table I of this subsection; (c) Dischargers may be required to monitor other pollutants, including chromium, selenium, total toxic organics (TTO), and any other pollutants as required; (d) For purposes of this subsection, "concentrations," shall be determined using composite samples collected over the daily operation in proportion to flow except for those parameters requiring grab samples including cyanide, total phenols, oil and grease, and volatile organic compounds. When flow-proportional composite sampling is not feasible, time-proportional composite sampling may be used. "Total toxic organics" (TTO) shall be defined as set forth in paragraph (e) of this subsection: The term “TTO” shall mean total toxic organics, which is the summation of all quantifiable values greater than .01 milligrams per liter for the following toxic organics:… *[Full relevant text not included in this table]*	This section applies because the C.F.R. does not appear to have a corresponding provision.
21 DCMR 542.3	EROSION CONTROL PRINCIPLES: BUILDING, DEMOLITION, AND SITE DEVELOPMENT PROJECTS	District regulations regarding erosion control and associated guidance associated with Site development and potential remediation.

District Regulation	Relevant Text	Reason for Inclusion
21 DCMR 606.	VISIBLE EMISSIONS	District requirements regarding visible emissions that may be associated with Site development and potential remediation.
20 DCMR 700. ORGANIC SOLVENTS Air emissions	700.1 Sources subject to the requirements of §§ 701 through 713 shall not be subject to § 700. 700.2 No person shall discharge into the atmosphere more than fifteen (15) pounds of photochemically reactive solvents in any one (1) day, nor more than three (3) pounds in any one (1) hour, from any article, machine, equipment, or other contrivance, unless the uncontrolled organic emissions are reduced by at least eighty-five percent (85%). 700.3 No person shall discharge into the atmosphere more than forty (40) pounds of nonphotochemically reactive solvents in any one (1) day, nor more than eight (8) pounds in any one (1) hour, from any article, machine, equipment, or other contrivance, unless the uncontrolled organic emissions are reduced by at least eight-five percent (85%).	This section applies because the Volatile Organic Compounds in 40 C.F.R. Part 59 does not appear to have a corresponding provision. District requirements regarding organic air emissions that may be associated with Site development and potential remediation.

CHEMICAL-SPECIFIC

District Regulation	Relevant Text	Reason for Inclusion
21 DCMR 1155.3 Maximum Groundwater Standards	Section 1155.3 of Title 21. Criterion and early warning values are provided for various chemical constituents including primary and secondary trace metals, organics radionuclides and microbiological constituents.	Includes numerical criteria for Class G1 ground waters as the most restrictive.
Title 21 of the District of Columbia Municipal Regulations, Chapter 11, Water Quality Standards	This chapter establishes the Water Quality Standards (WQS) for the waters of the District of Columbia, as authorized by section 5 of the Water Pollution Control Act of 1984, effective March 16, 1985 (DC Law 5-188; DC Official Code § 8-103.04). For the purposes of the water quality standards, the surface waters of the District are classified on the basis of their (i) current uses, and (ii) future uses to which the waters will be restored.	Provides water quality standards (numeric criteria) to attain and maintain designated uses.
DDOE Underground Storage Tank (UST) Program Cleanup Standards	Includes Tier 1 Screening Levels, for Soil, Ground Water and Surface Water, adopted from the DDOE Risk Based Corrective Action Guidance 2001. These levels are the most recent and applicable standards for case closure/No Further Action, under 20 DCMR 6208-6210. Tier 2 (Site-specific cleanup target levels) and completion of RBCA Report with the relevant forms are acceptable for cases on a Site-by-Site basis, that are eligible for the RBCA Program, 20 DCMR 6206.	Provides screening levels and guidance for developing Site-specific cleanup levels for petroleum contaminants of concern.

7.0 PRELIMINARY REMEDIAL ACTION ALTERNATIVES

This section describes potential preliminary remedial alternatives for soil, groundwater, and soil vapor at the Site. The term “alternatives” is used to describe what are often referred to as “technologies” in a feasibility study. These technologies are typically combined to create remedial alternatives. This section identifies technologies that may be appropriate for the Site, so that data to evaluate the technologies can be collected during field investigation activities. Section 7.1 describes technologies that may be applicable for areas with contaminated soil, and Section 7.2 describes technologies that may be applicable for contaminated groundwater. Section 7.3 describes technologies that may be applicable to mitigate vapor intrusion beneath existing or proposed buildings and occupied structures. In each case, the intent is to identify technologies that have a reasonable chance of being implemented at the Site in a manner that will achieve the remedial action objectives (RAOs) described in the Technical Memorandum on Remedial Action Objectives (RAO Tech Memo), (AMEC, 2012). The RAO Tech Memo presented preliminary remedial action objectives for the Site to focus the remedy selection during the RI/FS process and to provide benchmarks against which the remediation can be evaluated. The following remedial action objectives were proposed in the RAO Tech Memo:

- Prevent or eliminate unacceptable risks to human or ecological receptors from exposure to Site contaminants
- Eliminate or reduce contaminant-related constraints to the full enjoyment and use of Park resources
- Attain federal and District ARARs

Section 7.1 has a higher degree of detail because it is likely that the soil characterization data from previous Site investigations are representative of the current conditions. In contrast, Sections 7.2 and 7.3 present general alternatives because the nature of groundwater and soil vapor contamination may have changed substantially since samples were last collected or has yet to be fully characterized. Surface water will be evaluated if an impact is detected; however, no surface water impacts to the Anacostia River are anticipated based on the presence of the concrete and stone seawall that separates the Site from the river channel.

7.1 PRELIMINARY REMEDIAL ACTION ALTERNATIVES FOR SOIL

The remedial alternatives for soil are generally focused on the remediation of surficial contamination because direct exposure to surface media represents the pathway that poses the greatest risk to both human and ecological receptors. In addition, the discussion in this section focuses on the remediation of arsenic and DDT because remedies that effectively reduce the risks associated with those constituents will also likely reduce the risk associated with other constituents detected at the Site, and their spatial distributions are similar. The focus of the remedial actions in terms of the extent of contamination and which chemicals are used as indicators may change, depending on sample results from the remedial investigation.

7.1.1 No Action

The No Action Alternative is included to provide a baseline against which action alternatives can be compared. By definition, the No Action Alternative does not implement remedial actions to reduce risk. However, risk could nonetheless decline over time if chemical and physical processes, such as chemical degradation, dispersion, and burial affect chemical concentrations or the availability of chemicals to receptors. Under the No Action Alternative, no attempt is made to measure or monitor such processes, and possible risk reductions are not typically accounted for in the feasibility study process.

7.1.2 Institutional Controls

Institutional controls include administrative and engineering measures intended to prevent human receptors from coming in contact with contaminated media; institutional controls are typically not effective at reducing risk to ecological receptors. The goal of institutional controls is to reduce risk by eliminating or limiting the exposure pathways for humans.

Examples of administrative measures that could be applicable at the Site include restrictions to preclude residential or certain types of commercial development (e.g., daycare facilities or schools) as a means of preventing activities that could lead to chemical exposure for sensitive populations. Restrictions that limit the disturbance of soil through prohibitions on grading or construction would address potential risk by eliminating the exposure pathway to construction and utility workers.

Engineering measures at the Site could include construction and maintenance of a perimeter fence to preclude public access to areas of the Site with surficial contamination. The existing discontinuous fence around the DCL and AOC properties is approximately 4,000 feet long.

The Site is within the NACE complex and is administered by the NPS. In late 2006, the Real Property Act of 2006 was enacted and initiated transfer of the Site to the District.

7.1.3 Capping

Capping refers to technologies that incorporate a physical barrier to isolate contaminants. Caps can consist of single or multiple layers using several different materials, depending on the nature of the contaminants and the specific purpose of the cap. One cap type that is applicable for the Site is intended to physically separate contaminated media from potential receptors. A second cap type which may be applicable for the Site is intended to control or prevent the infiltration of precipitation as a means of controlling contaminant migration in the subsurface.

Caps can include a surface layer of soil to support plant growth, which can increase evapotranspiration and thus decrease infiltration, and to promote restoration of native vegetation communities. However, root development should be considered when selecting plants during the design of such a cap, because extensive root systems can compromise the integrity of the impervious layers within multi-layer caps.

The primary purpose of a cap would be to create a physical barrier between contaminated surface soil and sediment and human or ecological receptors. The cap would not be designed to reduce infiltration, which is not considered a significant means of contaminant migration at the Site because groundwater (based on historical sampling) has not been significantly impacted by the COIs detected in soil, such as arsenic and DDT. These constituents were likely released or placed on Site decades ago and the probability that they will significantly impact groundwater in the future is low, based on the concentrations detected and their chemical properties. The capping alternative primarily evaluates capping in wetland areas that are likely to have regulatory protection from disturbances associated with future development activities. Capping of surface soils outside the wetland areas could be integrated with Site redevelopment. For instance, large-scale Site grading and placement of surface and topsoil, with institutional controls, could effectively address direct exposure pathways to surface soil contaminants.

7.1.4 Excavation and Off-Site Disposal

Soils with chemical concentrations exceeding an action criterion could be excavated and taken to an off-Site facility for disposal or treatment, depending on the contaminants. Implementing a removal action would require mobilizing a remedial contractor to the Site and establishing the boundaries of the removal areas. After the removal, a growth medium (top soil) would be placed in the excavated areas and plants appropriate to the local environment would be planted. Contaminated material would be transported to a properly permitted disposal/treatment facility. Based on prior sampling results, it is anticipated that the soil would not be classified as a characteristic hazardous waste material. Therefore, the soil could be disposed of at a facility that is permitted to accept contaminated nonhazardous waste.

7.2 POTENTIAL REMEDIAL ACTION ALTERNATIVES FOR GROUNDWATER

The need for a groundwater remedy is unclear because groundwater at the Site has not been sampled since 2001 (aside from three wells sampled in 2008 at the NRS parcel). Chemicals exceeded regulatory standards at few locations, and there was no indication of a significant plume of contamination. It is anticipated that the remedial investigation activities will include resampling most, if not all, of the existing monitoring wells and will likely include installation and sampling of additional monitoring wells. Consequently, it is premature to describe groundwater treatment technologies in detail until these new data are available to characterize the nature and extent of groundwater contamination.

Depending on the results of the new sampling, the range of technologies that may be applicable at the Site includes:

- No action
- Institutional controls (such as deed restrictions to prevent the installation of drinking water wells)
- Monitored natural attenuation
- In situ treatment (such as air sparging, chemical oxidation or bioremediation)
- Pump and ex situ treatment (such as air stripping and granular activated carbon)
- Vertical barriers or walls

7.3 POTENTIAL REMEDIAL ACTION ALTERNATIVES FOR SOIL VAPOR

Limited VOCs were detected during the passive soil-gas survey performed at the NRS parcel in 2007 (see Section 5.2.8). Toluene, xylenes, naphthalene, and 1,2,4-TMB were detected in passive soil-gas samplers at values ranging from 26 to 525 ng. Toluene, xylenes, and naphthalene are common organic compounds found in gasoline and related petroleum products. TMB is used as a gasoline additive, as a solvent, as a paint and lacquer thinner, in making dyes, and in producing prescription drugs. Dry cleaning operations were also known to have occurred at former NRS Building T32, where chlorinated solvents or mineral spirits may have been released. Sub-slab depressurization systems, soil vapor extraction, or the installation of vapor intrusion barriers may be required for future buildings, if they are constructed in areas with elevated concentrations of VOCs in soil vapor, soil, or groundwater.

7.4 RI/FS DATA NEEDS

Although a significant amount of chemical and subsurface data is available for the Site (primarily at the AOC and DCL parcels), various data needs or data gaps exist which will require further investigation and evaluation. These data gaps have been categorized into three primary categories, which include the Site's physical setting (geology, hydrogeology, and surface water hydrology), known or suspected contaminants of concern, and future land uses.

7.5 PHYSICAL SETTING DATA GAPS

Section 3.0 describes the physical characteristics of the Site in detail and summarizes the current understanding of Site geology, hydrogeology, and surface water/wetlands hydrogeology. Data gaps generally associated with the Site's physical setting include:

- The Holocene Upper Permeable Unit is apparently the most shallow permeable unit at the Site, and is, therefore, most likely to have been impacted by contaminant releases.

However, the extent of this unit with respect to contaminant migration is not well defined, and data is limited in areas of the Site which may be areas of transport in the UPU. Understanding the characteristics of this unit will help evaluate groundwater movement and contaminant transport. Shallow groundwater transport pathways may be highly variable locally due to the presence of multiple interbedded permeable and impermeable units with uncharacterized lateral and vertical continuity, which is typical of the natural geologic variability associated with fluvial systems.

- Deep groundwater transport pathways may be highly variable locally as a result of the natural geologic variability associated with fluvial systems.

- Intra-unit flow directions for the permeable units and the inter-connectedness of these units are not well defined. This is particularly important for the permeable and fill units in the southwest corner of the DCL parcel where the Holocene clay is absent. Here, if the aquifers are connected, a conduit for contamination from surface releases into the deeper subsurface is a possibility. In other words, multi-level vertical monitoring is limited at this Site and considered a significant data gap given the vertical geologic variability potential in this fluvial environment and given the contaminant variability which may include DNAPL compounds.

- There are large spatial geological and hydrogeological data gaps on the NRS parcel, especially in the deeper units.

- The hydraulic conductivity, porosity, and total organic carbon (TOC) content of the water bearing units have not been characterized, and are important for understanding flow velocities and contaminant transport.

- Seasonal variation in groundwater elevations and flow directions in the water-bearing units have not been characterized.

- The full extent of the Holocene Clay, its hydraulic conductivity, topographic surface, and influence on contaminant migration, have also not been fully characterized. This information will help delineate areas where the Holocene Clay is a barrier to downward migration of groundwater and contaminants.

- While groundwater flow is anticipated to be towards the Anacostia River, it is unclear how and where groundwater enters the river. The more local groundwater transport pathways and the potential for impact to the river from groundwater have not been resolved. The presence of the seawall and floodwall may also affect surface water/groundwater interaction.

- The adjacent Anacostia River and associated sediments in the river are known to contain various contaminants (such as PCBs, PAHs and metals). Documented periodic flooding of the river channel could also deposit sediment containing contaminants of concern onto the ground surface in portions of the Site located within the flood zone.

- Evaluating tidal influences in the various water-bearing units in monitoring wells near the river would determine the degree of connectivity between potentially contaminated units and the river. Installation of pressure transducers should be performed to assess tidal influence on units determined to be contaminated.

- Transport pathways may be influenced locally by anthropogenic conduits or obstructions, such as underground utility lines (storm and sanitary sewers, water lines, and communications lines) drainage swales, floodwalls, the seawall, the Stickfoot Creek storm sewer, and the Metro Green Line tunnel. It is unclear what influence, if any, these anthropogenic pathways have on groundwater and contaminant movement.

- The hydrology of the Stickfoot Creek Sewer system has not been quantified, no flow monitoring has been performed and only limited sediment and surface water sampling was performed at a partially up gradient manhole.

- There is likely to be a stormwater collection and conveyance system for the active NPS and Capitol Police facilities, that presumably discharges directly to the Anacostia River but documentation of such a system remains a data gap.

7.6 ANALYTICAL DATA GAPS

Seven Primary Contaminant Groups were developed for the Site which are described in Section 5.1, while the general source areas for these contaminants are shown on Figures 5-1 through 5-6. The following data gaps exist for these known or suspected contaminants of concern:

- The lateral and vertical extent of dioxins and furans in the vicinity of the former burn pits on the DCL portion of the Site is unknown.

- Perchlorate is a common contaminant associated with MEC, although it can also be found in some types of fertilizers. It is unknown whether perchlorate from historical fertilizer uses or stockpiling of suspected MEC-contaminated soil excavated during construction of the METRO tunnel may have impacted the AOC and DCL portions of the Site.

- The analytes most frequently detected in soil at concentrations in excess of the screening levels are arsenic, chromium, lead, nickel, and zinc. However, arsenic is the most prevalent. The depth and spatial extent of metals (primarily arsenic) and pesticides within the DCL and AOC parcels (primarily in the area of Wetland 1) has not been characterized.

- The lateral and vertical extent of contamination by benzo(a)pyrene and other SVOCs is not fully characterized in several locations across the Site.

- The lateral extent of DDT (and degradation products) on the AOC and DCL parcels is not fully characterized. The vertical extent of these pesticides is not fully characterized on the DCL parcel.

- The source of, and associated lateral extent of impacts of, vinyl chloride detected in MW-21 is unknown.

- The source of, and associated lateral extent of, benzene impacts in DCMW009-02 (LPU) is unknown.

- The extent of contamination associated with the Green Fuel Oil company, both on that property and on DCL has not been characterized.

- The most recent groundwater quality data for the Site was collected by RIDOLFI in 2006 and unlikely represents current conditions, and other historical data was collected by different consultants using non-uniform sampling protocols. Existing groundwater monitoring wells should be re-sampled to establish current baseline conditions using uniform sampling, field preparation and analytical testing protocols.

- Potential impact from off-Site up gradient properties along Howard Road (such as P&P auto) has been discussed in previous reports but has not been fully evaluated.

- Based on historical ordnance training activities that occurred at the NRS from the 1940s through the 1960s, and the presence of RDX and perchlorate detected in groundwater, MEC and explosives may be present at the NRS parcel. Additional soil and groundwater sampling is needed at former NRS building locations suspected of storing, using or discharging MEC and other chemicals such as: the two heating plants T2 and T20; four former laundry facilities T32, T33, T68 and T69; two ordnance training schools T29 and T30; a dispensary T4; a gun room and school T40; a boiler house T48; a Hobby shop T65; instrument repair shop T81 and photographic interpretation building T21.

- Chlorinated solvents and potential DNAPL may be present in areas at the NRS parcel where dry-cleaning facilities or maintenance facilities were located, such as Buildings T32, T33, T68 and T69.

- Groundwater and soil chemistry data between Anacostia Drive and the Anacostia River has not been evaluated and is also poorly understood.
- Establishing background concentrations in soil for several metals and other commonly detected contaminants will likely be needed for the risk assessment. Locating appropriate up gradient and potentially off-Site sample points for representative background samples is needed.

7.7 FUTURE LAND USE DATA GAPS

Specific future land uses are mostly undetermined with the exception of the following land uses that must be incorporated into Site redevelopment, as specified in the DC Lands Act:

- Site redevelopment must include not fewer than 70 acres (including wetlands) which shall be set aside for park purposes
- Identification of existing and replacement facilities and properties for the NPS
- At least two sites within the areas designated for park purposes are designated for placement of potential commemorative works or memorial

A total of four land use alternatives were proposed in the draft EIS by examining a broad range of alternatives that 1) may meet the objectives of the Proposed Action and 2) reduce or eliminate impacts to important environmental, social, and economic resources.

The Site likely will be redeveloped for mixed use (commercial office space, retail, and residential), with open areas for passive recreation/wetlands (natural ecological areas, boardwalks, and stormwater control areas), active recreation (athletic fields, playgrounds, waterfront piers and marinas, and event plazas), and government offices. Considered alternatives for redevelopment and future land use may include terracing, relocation of wetlands on-Site and/or the “day-lighting” of Stickfoot Creek sewer into a natural, at-grade stream system.

The District government has not established a preferred alternative but will identify their preference in the Final EIS following a public review period. As land use designations are identified and finalized, the data collected during the RI/FS will be used to qualify whether 1) additional data is needed in the area, 2) the area is suitable for the reasonable anticipated future land use or 3) recommendations can be made to either change the project land use, complete a remedial action, and/or address potential exposures through the use of institutional controls. The land use designations will also factor into the exposure scenarios that will be evaluated in the risk assessment.

Until an alternative is selected, it will be necessary to evaluate the range of land uses that are under consideration in each area.

8.0 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are qualitative and quantitative statements defining the type, quality, and quantity of data needed to support defensible risk management decision-making (USEPA, 1994). Preliminary DQOs are included in this scoping document to support decisions on sampling areas and COPCs. Development of DQOs is an iterative process throughout the RI/FS. These DQOs will be further defined in the RI Work Plan, QAPP and SAP.

DQOs have been developed for both field and laboratory operations to clarify study objectives and identify data needs. DQOs establish the type, quantity, and quality of data needed to obtain defensible data. This section presents an overview of the preliminary DQO process completed for this scoping document.

The DQO process leads to the specification of sample handling procedures; preparatory (extraction/digestion), cleanup, and determinative methods; target analytes; method quantitation or reporting limits; field and laboratory quality control samples; measurement quality objectives (QC acceptance limits); required corrective actions; and data assessment procedures necessary to meet the intended use of the data.

The DQO process consists of the USEPA seven steps (USEPA, 2006) and these steps are used during the planning of the Site investigation process to ensure that field activities, data collection operations, and the resulting data meet the project objectives.

As discussed above, the DQO process is iterative throughout the RI/FS, and the output of one step may affect prior steps. This may lead the Site investigation team to revisit some previous steps but should ultimately lead to a more efficient data collection design. This procedure provides a systematic approach for defining the criteria that a data collection design should satisfy, including when and where to collect samples, the tolerable level of decision errors, and how many samples to collect. These criteria may be evaluated by several technical professions which include engineering, scientific, and legal disciplines. The DQOs presented in the RI Work Plans will, at a minimum, reflect use of analytical methods for identifying contamination and remediating contamination consistent with the levels for remedial action objectives identified in the National Contingency Plan. The ultimate goal of the DQO process is to support collection of data that will lead to Site closure.

The following DQOs have been identified.

Step 1 – State the Problem. The Poplar Point Site has been slated for future reuse as a park and/or recreational facility, including both residential and commercial development. While future land likely will be mixed, the DC Lands Act specifies the following:

- 70 acres set aside for park purposes;
- Identification of existing and replacement facilities and properties for the NPS; and
- 2 designated memorial Sites

Previous environmental investigations have focused on the DCL and AOC parcels with limited assessment of the NRS parcel and generally no significant assessment of the Perimeter Properties. Various data gaps have been identified regarding environmental impacts and remedial actions (see Section 8.0). Based on the constituents identified and related land uses, Primary Contaminant Groups were developed for various areas of the Site, which include:

- Petroleum hydrocarbons (including associated VOCs and SVOCs)
- Pesticides/herbicides
- Metals and metalloids
- Chlorinated VOCs, solvents and other organic compounds
- MEC
- PCBs
- Dioxins and furans.
- Other Potential Site contaminants

Screening level human health risk assessments previously conducted at the DCL and AOC parcels indicated that some of these COPCs may present an unacceptable risk to both human and ecological receptors. Limited environmental sampling has been performed at the NRS and on Perimeter Properties. Additional assessment will be required to address the data gaps identified in Section 8.0.

Step 2 – Identify the Decision. Perform a RI/FS to investigate and evaluate potential environmental impacts and to evaluate whether interim responses and/or remedial actions are necessary for specific areas of the Site based on known or projected land use. The activities will be designed to answer the following: Do Site contaminants present unacceptable risk to human and ecological receptors under current or future land use conditions? Does the distribution of contaminants need to be further evaluated prior to making risk-based remediation decisions? Do other areas with limited data available, such as the NRS and Perimeter Properties, also potentially pose a risk to site receptors under current and future land use scenarios?

Step 3 – Identify inputs into the Decision. Site investigation activities will be performed to address identified data gaps. The specific locations of proposed sampling points, media sampled, and associated laboratory analytical parameters will be established in the forthcoming Work Plan. Inputs into the RI/FS investigation and decision will include the following:

- Comparison of groundwater concentrations to MCLs and USEPA Regional Screening Levels (RSLs)
- Comparison of soil concentrations to Site-specific background concentrations, RSLs for residential soil, and soil RSLs protective of groundwater resources
- Comparison of soil and sediment concentrations to screening levels protective of ecological receptors, including USEPA Region III BTAG screening levels
- Development of area-specific exposure point concentrations representative of current and future exposure conditions
- Characterization of hazards and risks for human Site receptors and identification of COCs
- Characterization of hazards for terrestrial ecological receptors and identification of COCs
- Comparison of area- and media-specific exposure point concentrations for COCs, when identified, to Site-specific remediation goals

Step 4 – Define the boundaries of the study. The Poplar Point Site consists of an approximately 96-acre property located in the District of Columbia on the south bank of the Anacostia River (refer to Figure 1-1). The terrestrial portions of the approximately 96-acre Poplar Point study area can be generally broken into four separate areas or parcels defined as:

- An approximately 20-acre parcel previously occupied by the DCL Tree Nursery;
- An approximately 13-acre parcel previously occupied by the AOC;
- An approximately 46-acre parcel previously occupied by the NRS, currently occupied in part by NPS and USPP;
- Approximately 17 acres of additional Perimeter Properties primarily along the north side of Anacostia Drive adjacent to the Anacostia River and the former Green Fuel Oil property (located at the northeast corner of the intersection of Howard Road and South Capitol Street) that have been incorporated as part of the proposed land transfer.

Step 5 – Develop a Decision Rule. Risk management decisions concerning surface soil (0-1 foot), subsurface soil (1 to 10 feet [ft] or to the top of the water table), groundwater, surface water, and sediment will be based on the baseline human health and ecological risk assessments and/or regulatory requirements (ARARs) and potential for exposure to COCs in these media in the absence of land use restrictions. Representative media concentrations will be compared to Site-specific remediation goals and a combination of remediation, institutional controls, and engineering controls will be selected to limit future exposures and protect human health and the environment.

Decision rules will be developed in the RI work plan on a media-specific and receptor-specific basis. Land use, which is an important element in developing decision rules is in flux. Therefore, it may not be possible to finalize the decision-rules until after future land use has been clarified.

Step 6 – Specify the Limits on Decision Errors. The null hypothesis for a Site, as defined by USEPA in its DQO guidance, assumes that, as a baseline condition, the Site is impacted. Acceptance of this hypothesis will lead to land use controls and/or remediation, while rejection of the null hypothesis will serve as a basis for Site close-out with no further action required prior to redevelopment of the areas within Poplar Point. A decision error to reject the null hypothesis is considered to be a more severe error because of the risk that may be posed to human and ecological receptors without Site remediation. A decision error to accept the null hypothesis and cleanup a Site that does not pose a risk to human and ecological receptors is a less severe error and allows for a greater acceptable margin of error. Preliminary decision error percentages are presented below, but will be further defined in the Work Plan:

- A false acceptance rate of 5 percent is proposed for the areas within Poplar Point, which is consistent with use of the 95 percent upper confidence limits (95 UCLs) of the mean to represent exposure point concentrations. UCLs are recommended values to address the reasonable maximum exposure scenarios presented in risk assessments (USEPA, 2002).

- A false rejection rate of 20 percent is proposed.

- COCs for each area have not yet been established at this time. The acceptable range for the COCs within each area will depend on the area background concentrations and the risk assessments and will be assessed in the Feasibility Study.

The precision and accuracy for the sampling and analytical data will be discussed in the RI/FS Work Plan. The following is a summary of the acceptable tolerances for error.

- Measurement error (physical sampling process, analysis and data reduction)

- Chemical data quality (within laboratory limits)
- Tier-specific SW-846, USEPA and other specified methods (within acceptable limits)
- Detection limits (within method and laboratory limits as compared to screening levels)
- Statistical data evaluation requirements

Step 7 – Optimize the Sampling Design. The Work Plan will present the proposed sampling methodology for the RI/FS, which will be developed using a deterministic approach. A detailed Site characterization of the DCL and AOC parcels was performed in 2002 with a limited environmental assessment of the NRS parcel in 2008. To complete the RI for the entire Site, additional sampling of areas known or suspected to be contaminated will be performed in 1) those areas where the extent of contamination has not been thoroughly assessed, and 2) those areas where historical detections of contaminants may be associated with unacceptable hazard or risk, but the concentrations have not been confirmed in later sampling events. As additional data are collected, including the distribution of contaminants, fate and transport information, and specific information of project land use, the DQOs will be refined in order to further optimize the sampling design.

9.0 REFERENCES

AMEC, 2012. *Technical Memorandum on Remedial Action Objectives, Poplar Point, Washington, D.C.*, July 31, 2012

Anacostia Watershed Restoration Partnership, 2010. Hydrology Data, accessed from http://www.anacostia.net/history/hydrology.html, August 12, 2010.

DeLeuw, Cather & Company (DeLeuw et al.), 1981. *Report No. 8, Contract No. 3Z725S, Section F0004, Anacostia River Crossing Branch Route Subsurface Investigation,* April 22, 1981.

District of Columbia Department of Health (DOH) Environmental Health Administration, 2003. *Final Total Maximum Daily Load for Fecal Coliform Bacteria in Upper Anacostia River/Lower Anacostia River,* June 2003.

Ecology and Environment Inc., 1999. *Soils Sampling Results at the Former Architect of the Capitol Nursery Site, Howard Road Washington D.C.* January 7, 1999.

Environ International Corporation, 2002. *Completion and Compilation of Site Inspection and Remedial Assessment Activities at 1900 Anacostia Drive, Southeast, Washington, D.C*. March 2002.

Froelich, A.J., and J.T. Hack, 1975. *Preliminary Geological Map, District of Columbia, U.S. Geological Survey, Open File Report 75-537*., 1975.

Horne, 2005. Revised Draft Cap Completion Report for Comparative Validation of Innovative “Active Capping” Technologies, Anacostia River, Washington, DC.

ITRC (Interstate Technology & Regulatory Council). 2012. Incremental Sampling Methodology. ISM-1. Washington, D.C.: Interstate Technology & Regulatory Council, Incremental Sampling Methodology Team. www.itrcweb.org

MACTEC, 2005. Executive Summary for Phase I Environmental Site Assessment and Contaminated Materials Management Report, Proposed South Capitol Street Bridge Realignment, SE Washington, D.C. MACTEC Engineering and Consulting, Inc. December 7, 2005

MACTEC Engineering, and Consulting, Inc., 2008. *Preliminary Phase II Environmental Site Assessment Report, Poplar Point – Former Naval Receiving Station Parcel, Southeast, Washington, D.C.,* February 27, 2008.

National Oceanic and Atmospheric Administration (NOAA), 2010. *NOAA Tides and Currents, tidesandcurrent.noaa.gov, Washington, DC station 8594900.* August 14, 2010.

National Park Service (NPS), 2012. Transfer of Poplar Point Section of Anacostia Park to the District of Columbia, http://parkplanning.nps.gov/projectHome.cfm?projectID=22344.

Research Planning, Inc., 2002. *Stratigraphic Characterization, Ground Water Flow and An Evaluation of Existing Subsurface Interpretations in the Poplar Point Area, Anacostia River Basin, Washington, D.C.,* January 15, 2002.

Resource Applications, Inc. (RAI) completed a Site inspection in July and August 2001.

RIDOLFI Inc., 2007. *Site Characterization Report, Poplar Point Washington D.C.,* May, 2007.

RIDOLFI, 2002, Phase I Environmental Site Assessment, District of Columbia Properties, Poplar Point, Washington, D.C. Prepared for the National Oceanic and Atmospheric Administration.

RIDOLFI, 2007a. *Focused Feasibility Study, Poplar Point Washington D.C.*, April 2007.

RIDOLFI, 2007b. *Site Characterization Report, Poplar Point Washington D.C.,* May, 2007

Schnabel, 1994. Subsurface Investigation Report, Building T-1 U.S. Park Police Anacostia Operations Facility. Schnabel Engineering Associates. January, 1994.

Tenbus, F. J. 2003. *Lithologic Coring in the Lower Anacostia Tidal Watershed, Washington, D.C., U.S. Geological Survey, Open File Report 03-318.*

Thomas L. Brown Associates (Brown), 1997a. *Site Characterization Work Plan for Anacostia Station Access Road and Parking Lot,* March 1997.

Thomas L. Brown Associates (Brown), 1997b. *Asbestos Survey Report, Anacostia Station Access Road and Parking Lot, Washington, D.C*., April 10, 1997.

Thomas L. Brown Associates (Brown), 1997c. *Tri-County Drum Samples, Anacostia Station Access Road and Parking Lot, Washington, D.C*., April 10, 1997.

Thomas L. Brown Associates (Brown), 1997d. *Sampling Results Associated with the Phase III USCG Priority Response at the Anacostia Station Access Road and Parking Lot, Washington, D.C.*, April 29, 1997.

Thomas L. Brown Associates (Brown), 1997e. *Underground Storage Tank closure Assessment Report for the Anacostia Station Access Road and Parking Lot, Washington, D.C.*, April 29, 1997.

Thomas L. Brown Associates (Brown), 1999. *Phase II Environmental Site Assessment of the Proposed Anacostia Station's Regional Parking Lot & Access Roads, Southeast Washington, D.C.,* August 1999.

USDOT, 1981. Final Environmental Impact Statement, Washington Metrorail System, Anacostia Segment, September 1981

USEPA. 1992. Framework for Ecological Risk Assessment. Risk Assessment Form. EPA/603/R-92/001.

USEPA, 1994. *Using the Data Quality Objectives Process in Risk Assessment. Office of Environmental Guidance, EH-231-023/0794*, July 1994.

USEPA, 2002. *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites, OSWER 9258.6-10*, December 2002.

USEPA, 2006. *Guidance on Systematic Planning Using the Data Quality Objective Process.* EPA 240-B-06-001. U.S. Environmental Protection Agency, Office of Environmental Information. February 2006.

Van den Berg, M., et al., *Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. Environmental Health Perspectives, 106(12):775-792*, December 1998.

Velinksy, Dr. David (Velinsky), 2003a. *Memorandum to Colin Wagoner, RIDOLFI Engineers, Inc., Subject: Anacostia Sediment Core Sampling*, July 28, 2003.

Velinksy, Dr. David (Velinsky), 2003b. *Memorandum to Colin Wagoner, RIDOLFI Engineers, Inc., Subject: Anacostia Sediment Core Sampling*, September 25, 2003.Volkert Environmental Group, 1995. *Phase 1 Environmental Site Assessment, D.C. Nursery, Howard Road, Washington D.C.,* December 29, 1995.

Table 2-1
Summary of Areas of Interest and Previous Investigations/Off-Site Disposal Activities

Building or Area of Concern	Description and Uses	Historical and Current Status	Potential Environmental Concerns	Previous Investigations/ Removal Actions
DC LANHAM (DCL) PARCEL				
Former Suspected Greenhouse Buildings	Three suspected Greenhouse Buildings formerly located along the far southeastern border of the DCL parcel near Howard Road. The two longest buildings appeared to be between 100 and 150 feet long and approximately 30 feet wide based on a 1948 aerial photograph.	Buildings constructed prior to 1957 but were demolished prior to 1970. No other buildings were indicated on historical maps to be located on DCL.	Pesticides/herbicides, potential perchlorate in fertilizers	No significant investigation or removal activities have been conducted in this area of DCL although boring SB07 was completed along the northwestern side of the westernmost building.
Former 275-Gallon Diesel Fuel AST	Contained approximately 50 gallons of diesel fuel; stained soil beneath AST; tank co-located with a waste pile.	Installation date unknown. AST removed in March 1997.	Petroleum hydrocarbons.	AST removed as part of USCG Phase III priority response under Brown supervision in March 1997 Further investigation of this area in 1997 indicated no additional actions warranted.
Former Main Drum Cluster Area	Drum storage (approximately 128 55-gallon drums) and wetlands located along the southeast border of DCL parcel.	Presence of drums and other trash noted in this area in August 1995 when wetlands were delineated. Drum placement date unknown. Most drums were empty although several contained some form of substance, generally consisting of kerosene to lube-oil range petroleum products. The full extent of this area is uncertain.	Petroleum hydrocarbons, potential perchlorate in fertilizers.	Drum inventory and removal required as part USCG Phase II priority response activities. Nine of 140 drums contained some type of substance. Where possible, drum contents were analyzed. The contents generally consisted of kerosene to lube oil-range petroleum products. Soil, groundwater and surface water investigated by Brown in 1997. Groundwater investigated by Brown and ENVIRON in 1999. In December 1999, ENVIRON collected composite surface soil samples in the wetlands, biased toward locations of drum storage area and debris piles. Drums and other debris were removed in 2002 under contract to Ridolfi.
Small Former Drum Storage Area	Relatively small Drum Storage area south of Wetland Area #7.	Drum placement date unknown. Drums removed contained kerosene to lube-oil range petroleum products, with some containing pesticides.	Pesticides/herbicides, chlorinated VOCs, petroleum hydrocarbons	Drum inventory and removal activities were included as part of the USCG Phase II priority response. Drums found generally to contain kerosene to lube oil range petroleum products; some contained pesticides. Data generated during investigation of this area in by Brown in 1997 indicated no further remedial investigation warranted. Drums and other debris were removed in 2002 under contract to Ridolfi.
Portion of the Site Adjacent to the Green Oil Company	Along the southwestern Site boundary; surface soil staining; also waste pile in the area.	Staining observed in 1997 emanating from adjacent Green Oil property. The extent of the staining is not documented.	Petroleum hydrocarbons.	Staining observed to be emanating from Green Oil property. Waste pile reportedly contained tree trunks, concrete, bricks paving squares, wood pallets, household appliances, bottles, cans, street light ballasts and "other materials." May have resulted from demolition of DCL Nursery. Monitoring well just beyond stained area contained TPH-DRO above DCDOH criteria. Waste pile area investigated by Brown in 1997. ENVIRON, NPS and DOI representatives concluded that the demolition debris in itself did not constitute an environmental concern for the Site that warranted further investigation. Ridolfi installed wells in this area in 2002.
Former Fuel Pad	Southwestern Site boundary, within waste pile area; appears on a Site map in the 1997 *Phase III Response* report	Ownership/use unknown but suspected fuel loading area. Staining or impact in this area is not documented.	Petroleum hydrocarbons.	Not identified as a location requiring additional investigation in any reports; no information pertaining in the documents reviewed. Ownership/use unknown. Soil samples were collected by Brown in this area during 1997 SI activities. Data indicate no constituents of concern associated with past Site operations detected at this location.
Former "Burn Pits"	One pit reported to be in the vicinity of the eastern portion of Wetland #7 and other pit was reported to be in the area north of Wetland #3.	Reportedly used to burn tree stumps from nursery operations.	Petroleum hydrocarbons, pesticides, chlorinated VOCs, volatile and semi-volatile organics, dioxins	Documented only in Brown's 1997 *Work Plan.* Individuals familiar with Site operations report DC Nursery used to burn tree stumps in the burn pits; specific locations of the pits not documented, but ENVIRON noted potential burn pit consistent with Brown's description in historical aerial photographs. Brown collected soil samples in 1997. ENVIRON collected one soil sample in the burn pit area north of Wetland Area #4 in December 1999 to complete characterization. Ridolfi resampled these areas in 2002.
ARCHITECT OF THE CAPITOL (AOC) PARCEL				
Northern Greenhouses	Six greenhouse buildings and attached office building located in the northern-central portion of AOC.	Greenhouses constructed prior to 1963 and were vacated in 1993. All Greenhouses are currently vacant and abandoned.	Pesticides/herbicides and chlorinated VOCs in Planting Medium and underlying soil. Potential perchlorate in fertilizers. Lead-based paint and asbestos in buildings.	1995 *Phase I* recommended investigation due to potential ACM. No priority response required. Investigations of soil and groundwater by Brown in 1997 and 1999. E&E collected samples of planting medium in 1999 for pesticide analysis. ENVIRON sampled planting medium and underlying soil in 1999 to complete investigation.
Southern Greenhouses	Eight greenhouse buildings located at far southern border of AOC near Howard Road.	Greenhouses constructed prior to 1948 and were vacated in 1993. All Greenhouses are currently vacant and abandoned.	Pesticides/herbicides and chlorinated VOCs in Planting Medium and underlying soil. Potential perchlorate in fertilizers. Lead-based paint and asbestos in buildings.	1995 *Phase I* recommended investigation due to potential ACM. No priority response required. Investigations of soil and groundwater by Brown in 1997 and 1999. E&E collected samples of planting medium in 1999 for pesticide analysis. ENVIRON sampled planting medium and underlying soil in 1999 to complete investigation.

Table 2-1
Summary of Areas of Interest and Previous Investigations/Off-Site Disposal Activities

Building or Area of Concern	Description and Uses	Historical and Current Status	Potential Environmental Concerns	Previous Investigations/ Removal Actions
Boiler Room for Southern Greenhouses	Boiler Room building located in the center of the Southern Greenhouses Area.	Building constructed prior to 1948 and was vacated in 1993. Currently Abandoned.	Petroleum hydrocarbons.	Brown investigated this area is 1997 and hydrocarbon stained concrete floor adjacent to a fuel oil AST was cleaned in March 1997. Ridolfi installed a monitorign well adjacent to the boiler room in 2002.
Chemical Storage Buildings	Two Chemical Storage Buildings located north of the Southern Greenhouses; former containers labeled with chemical names; also lab kits.	Buildings constructed prior to 1970. Date chemicals and containers were placed on site is unknown. Containers and laboratory kits removed in 1997. Two Chemical Storage Buildings are currently vacant and abandoned.	Pesticides/herbicides, VOCs, SVOCs, metals, potential perchlorate in fertilizers.	All full or partially full containers overpacked and stored in a temporary staging area pending off-site disposal. Phase II priority response required for laboratory kits. This work was performed by or under the direction of Brown. Further investigation of this area in 1997 indicated no additional actions warranted.
Lath House	Building located northwest of and adjacent to the Northern Greenhouses. A Lath House is typically a partially open structure used to protect plants from the weather and to get them adjusted to the weather before planting.	Building constructed prior to 1963 and currently abandoned.	Pesticides/herbicides, potential perchlorate in fertilizers and chlorinated VOCs.	Brown installed a boring near the Lath House in 1997.
Garage Building	Located northeast of the Northern Greenhouses. Used to store and service Nursery equipment and vehicles.	Constructed prior to 1965 and vacated in 1993. Currently vacant and abandoned.	Petroleum hydrocarbons, chlorinated VOCs, metals.	See notes on underground storage tanks (below).
Former 1,000 Gallon Gasoline UST	South of the Garage. Associated with nearby fuel pump located outside the eastern wall of the Garage.	Installation date unknown.	Petroleum hydrocarbons.	UST, piping and dispenser removed on March 18, 1997 under Brown supervision, as part of Phase III priority response. Soil removed. Post-excavation samples collected. Further soil and groundwater sampling during Brown SI, 1997-1999.
Former 275-gallon kerosene AST	Formerly located at southwest corner of Garage.	AST installation and removal dates not identified (likely removed in 1997).	Petroleum hydrocarbons.	Brown installed a boring near the tank in 1997.
Former Petroleum Stained Soil Pile	Southeast of the Garage near location of the fuel dispenser.	Soil placement date unknown.	Petroleum hydrocarbons.	Removed in March 1997 under Brown supervision; part of the Phase III priority response. Some underlying soil also removed, post-excavation samples collected. Soil investigations by Brown in 1997; groundwater investigation by Brown 1997-1999.
Former Location of Pails	Four 5-gallon pails containing petroleum products, on the north side of the Garage.	Date of placement unknown.	Petroleum hydrocarbons.	USCG Phase II priority response item. Pails overpacked and moved to temporary staging area in March 1997, pending later removal and disposal. Six to eight inches of underlying soil reportedly excavated. Post-excavation samples collected. Soil investigations by Brown in 1997; groundwater investigations by Brown 1997-1999.
Pump House	Pump House building located east of the Chemical Storage Buildings and Southern Greenhouses adjacent to Stickfoot Creek Sewer. Equipment in pumphouse used to recover water and pump/discharge into Stickfoot Sewer.	Constructed prior to 1948 and vacated in 1993. Currently vacant and abandoned.	None identified.	No investigations specifically targeted the Pump House, although soil and groundwater samples were collected in this general area by Brown in 1997.
Storm Drains	Two storm drains in the Southern Greenhouse area, which were formerly used to collect runoff prior to pumping of this water to the Stickfoot Sewer.	Installation date unknown. Currently abandoned lines.	Petroleum hydrocarbons, metals, pesticides, chlorinated VOCs, volatile and semi-volatile organics	Due to low-lying nature of region encompassed by Southern Greenhouses, storm water flowing into this area was collected via a storm drain system, and was pumped up to the Stickfoot Sewer for discharge. Brown did not collect sediment samples from storm drains. E&E collected samples in August 1998. ENVIRON collected samples in December 1999. Ridolfi collected sediment samples from sumps and catch basins in 2002.
Stickfoot Creek Sewer Line and Outfall	10 foot by 10 foot storm sewer line located along the entire eastern border of the AOC parcel, which discharges at an outfall into the Anacostia River to the north.	Construction date uncertain but likely prior to 1942. Currently not actively used by AOC. Conveys stormwater and potentially surface water from unknown locations to the south of the Poplar Point site.	Petroleum hydrocarbons, metals, pesticides, chlorinated VOCs, volatile and semi-volatile organics	Soil and sediment samples were collected in the manhole near the pump house by Ridolfi in 2002.
Former Vaulted 300-Gallon AST and Drums	Riveted steel AST enclosed in a concrete vault, southeast of Southern Greenhouses. Area contained 55 and 35-gallon drums; underlying soils reportedly stained.	Installation date unknown.	Petroleum hydrocarbons.	Drums overpacked and transferred to temporary staging area as part of the USCG Phase II priority response. Vaulted AST removed under Brown supervision as part of the USCG Phase III priority response in March 1997. Soil investigations by Brown in 1997; groundwater investigations by Brown 1997-1999.
Former 10,000-Gallon Fuel Oil AST	Adjacent to boiler between Southern Greenhouses; lacked secondary containment; stained ground around AST; oil leaked from piping into Boiler House.	Installation date unknown.	Petroleum hydrocarbons.	As part of Phase III priority response in March 1997 under Brown supervision, AST and associated piping were drained and cleaned, hydrocarbon-stained areas on the floor of the boiler house also were cleaned, and the AST was removed from the Site. Further investigaion of this area in 1997 indicated no additional actions warranted.

Table 2-1
Summary of Areas of Interest and Previous Investigations/Off-Site Disposal Activities

Building or Area of Concern	Description and Uses	Historical and Current Status	Potential Environmental Concerns	Previous Investigations/ Removal Actions
Former 275-Gallon AST North of Central Greenhouses	Neither use nor contents of AST could be established; not discussed in reports reviewed, and appears sporadically on Site maps.	Installation date unknown.	Unknown. Suspected petroleum hydrocarbons.	Removal not *required* in March 1997 priority response. Based on information in 1997 *Draft Phase II Report,* this AST was apparently removed with other AST's under direction of Brown in March 1997, during priority response activities. Soil investigated by Brown in 1997.
Former Flower Beds	North of the Southern Greenhouses and east of the chemical storage area.	Cultivation of this area observed on aerials prior to 1940s though 1990s but currently fallow and overgrown. The full extent of this area is uncertain.	None detected historically, suspected pesticides/herbicides, potential perchlorate in fertilizers and chlorinated VOCs.	Investigation not required as priority response or recommended in 1995 *Phase I.* Brown investigated soil and groundwater in 1997. Data indicates further remedial investigation not warranted.
Former Planting Areas	Between Northern and Southern Greenhouses, west of Wetland Area #4, east of Central Greenhouses (cold frame area), and north of greenhouses to property boundary.	Cultivation of this area observed on aerials prior to 1940s though 1990s but currently fallow and overgrown. The full extent of this area is uncertain.	Pesticides/herbicides, potential perchlorate in fertilizers and chlorinated VOCs.	Brown collected soil samples in 1997, except from northern planting area. ENVIRON collected soil samples from northern planting area, as well as from one location in the cold frame area, in 1999 to complete characterization.
Potomac Electric and Power Company (PEPCO) Transformers	Four transformers owned by PEPCO, mounted on a utility pole in the central former planting area.	Installation date unknown. Fire in 1997 reportedly burned most of the transformer oil.	Potential PCBs.	Fire in 1997 allegedly caused by vandals attempting to steal copper wire. Transformer pole fell, fire started, reportedly burning off most of the oil contained within or released from the transformers. PEPCO reportedly excavated contaminated soil and replaced with clean soil.
NAVAL RECEIVING STATION (NRS) - CURRENT NATIONAL PARK SERVICE PARCEL				
U.S. Park Police Anacostia Operations Facility (AOF).	The AOF main building is a two-story structure with an address of 1901 Anacostia Drive, SE. The current AOF building is approximately 68,000 square feet, and primarily includes office and training rooms, law enforcement operations, holding cells, an auditorium, an indoor firing range, and a forensic laboratory (which does not utilize chemicals).	The original NRS Building at this location designated as T-1 (Recreation Building and Ships Store) was constructed in 1947 and was occupied until approximately 1961. This building was fully renovated in 2000 to 2001 by the Park Police AOF.	None identified.	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.
U.S. Park Police Aviation Hangar and 10,000-gallon JP-8 fuel AST	The aviation hangar was is used primarily to house helicopters involved in search and rescue operations. To the northeast of the aviation hanger is a 10,000-gallon AST containing JP-8 fuel used to fuel helicopters. Maintenance is performed inside of the hangar building.	Former NRS Building T32 (Laundry Building) was located within the Aviation Hanger Building footprint, which was constructed in 1943 and demolished in 1961. This building was demolished and the Aviation Hangar building reportedly constructed in 2004.	Dry cleaning solvents from former Laundry Building/naphtha/petroleum hydrocarbons, metals	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. Soil and groundwater samples were subsequently collected from one boring/monitoring well (NRS-2) located along the northwest side of the Hangar facility by MACTEC in January 2008.
NPS National Capital Parks-East Headquarters	The NPS HQ building is a single-story structure with a concrete slab-on-grade, with an address of 1900 Anacostia Drive, SE. Currently houses NPS offices and administrative staff.	The original NRS Building at this location was designated as T-4 (Dispensary), but this building has undergone several renovations since it was originally constructed in the 1940s.	Metals from x-rays/medical-related chemicals	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.
Motorcycle storage/maintenance building and dog kennels (Park Police)	The AOF motorcycle storage and repair building and inactive dog kennels are located adjacent to the northwest of the AOF building.	The original NRS Building at this location was designated as T-31 (Garage for Mine Disposal School) which was constructed in 1943, and has undergone minor renovations until it was occupied by the Park Police. Motorcycle repair and kenneling of dogs no longer performed.	Petroleum hydrocarbons, munitions, chlorinated VOCs, metals	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.
Former 10,000-gallon gasoline USTs and fuel pumps (Park Police).	Located west of and adjacent to the AOF Motorcycle Repair building.	10,000-gallon gasoline UST and fuel dispenser island were removed in July 2008. Previous 1,000-gallon and 10,000 gallon USTs also existed here which were removed in 1990 and 1996, respectively. Installation dates for these 3 USTs could not be obtained or verified.	Petroleum hydrocarbons/munitions	A 10,000-gallon gasoline UST located northwest of the USPP Motor Cycle Shop was removed and closed in 1996, and approximately 1,116 tons of petroleum contaminated soil excavated and treated off site. Soil samples collected on May 5, 1996 did not have detectible TPH or BTEX concentrations. Prior to the UST and contaminated soil removal, ECS completed two soil borings (SB-1 and 2) and seven monitoring wells (MW-1 through MW-7) in 1995. In 2003, a Letter of Permanent Tank Closure and a NFA Letter were issued by the DC DOH. A second 10,000-gallon double-walled gasoline UST with Veederoot leak detection system was installed in 1992. This UST system was removed in July 2008 by Atlantic Environmental Services.
Ammunition Storage Buildings (Park Police)	Located northwest of and adjacent to the AOF Motorcycle Repair building.	The original NRS Building at this location was designated as T-30 (Mine Disposal School) which was constructed in 1943, and demolished in the 1980s. Construction date for existing ammunition storage buildings is unknown.	Munitions	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.

Table 2-1
Summary of Areas of Interest and Previous Investigations/Off-Site Disposal Activities

Building or Area of Concern	Description and Uses	Historical and Current Status	Potential Environmental Concerns	Previous Investigations/ Removal Actions
Storage Trailers (Park Police)	The AOF also has several office and storage trailers for office supplies, files and dry goods, located to the west-southwest of the main AOF building.	The original NRS Building at this location was designated as T-28 (EIC School) which was constructed in 1943, and demolished in the late 1980s. No buildings exist here currently and the trailers were staged in this area in the late 1990s to early 2000s.	None identified.	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.
METRO Green Line and Emergency Exit/Vent Shaft	The METRO Green Line tunnel was constructed in a north-south alignment along the western side of the NRS Parcel from the Metro Anacostia Station Parking Garage to beyond the Anacostia River.	Tunnel was constructed in the 1980s, completed in 1990 and is currently in use.	None identified.	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.
Flood Wall	A East-West Flood Wall is located along most of the entire northern border of the NRS Parcel along the southern side of Anacostia Drive, while a North-South Earthen Flood Wall is located along its western side extending up to near Howard Road.	The flood wall appears to have been constructed in the early 1940s.	None identified.	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.
Dog Training Area	Dog Training area and obstacle course are located north of the Aviation Hangar near Anacostia Drive. This areas is used to train Park Police dogs.	Former NRS Buildings T-44/45 were in this area (Officers Quarters) constructed in 1943 and demolished in the 1960s. Area is currently open field used to train dogs.	None identified.	A *Preliminary Assessment Report of Anacostia Drum Site* , Washington, D.C., prepared by Tetra Tech, Inc., dated March 31, 1992 indicates that two 55-gallon drums were illegally dumped along the fenceline south of Anacostia Drive between the AOF building and a former K-9 storage area. The source of the drums could not be established and the contents were sampled in February 1991. One of the drums reportedly contained soil, while the other contained mud with 3-6 inches of water over the mud. Screening indicated the soil in Drum # 1 contained chlorine, and drum # 2 tested positive for combustibility. Both drums were placed into overpacks, removed and properly disposed of off site. No organic vapor readings above background were recorded at the site using a Microtip photoionization detector, and no indications of a release from the drums was apparent. The case was subsequently closed by USEPA.
Soccer Field	Open grass covered soccer field and recreation area located northeast of Aviation Hangar.	Former NRS Buildings T-58 to T-62 (Barracks) constructed in 1944 and demolished in the early 1960s. Area is currently an open field.	None identified.	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected.
Wetland Areas #4 and #5.	Located along the southwestern border of the NRS parcel just west of the Metro Greenline tunnel alignment.	Wetlands suspected to have been created by construction of the METRO Greenline tunnel. Initially delineated by GSI and USACE in August 1995.	None identified.	Tier 1 passive soil gas survey was completed in the general area of this builidng by MACTEC in November 2007. No soil or groundwater samples were collected. Ridolfi collected surface soil samples from these areas in 2002.
Former Naval Receiving Station Buildings constructed in the 1940s and demolished from 1959 to 1980.	See Table 2-2 for descriptions of former NRS buildings.	See Table 2-2 for historical uses and Figure 2-4 for locations of former NRS buildings.	See Table 2-2 for former NRS Building environmental concerns.	A Tier 1 passive soil gas survey was completed in the general area of most of these former NRS builidngs by MACTEC in November 2007. Soil and groundwater samples were subsequently collected from three borings/monitoring wells located near former NRS Building T27 (NRS-1), T32 (NRS-2) and T44 (NRS-3) by MACTEC in January 2008.
PERIMETER PROPERTY PARCELS				
Bank of Anacostia River north of Anacostia Drive	Currently undeveloped. Overland Flow or groundwater transport could have impacted these areas.	Undeveloped	Potential impact to Anacostia River.	No significant investigation or removal activities have been conducted in this area aside from five soil borings completed just north of the DCL parcel by Environ in 1999 (designated as SB-03 to SB-05).
Triangular open parcel north of DCL and south of Anacostia Drive	Currently undeveloped. Overland Flow or groundwater transport could have impacted these areas.	Undeveloped	Potential impact to Anacostia River.	No significant investigation or removal activities have been conducted in this area aside from near-surface soil samples collected by RAI in 2001 along the northern border of the AOC/DCL just south of Anacostia Drive (SO-1B, 2B, and 3B).
Former Green Fuel Oill Parcel (632 Howard Road)	The Green Fuel Oil parcel is currently under the jurisdiction of the District of Columbia, and includes a single-story building with a brick front or façade, a smaller partially open concrete block shed and open parking areas enclosed by a chain-link fence. This parcel is currently vacant and the former petroleum ASTs, drums and fuel trucks have been removed although the buildings are still present.	Undeveloped and cleared prior to 1957. Green Fuel Oil building costructed in late 1950s, and a petroleum distribution company operated at this parcel until the mid 2000's. Parcel formerly contained two diesel fuel ASTs, one kerosene AST, one "Duralane" brand oil AST, and one gasoline AST. Staining was observed on the Duralene AST and on the ground surface beneath the AST in 2002.	Petroleum hydrocarbons	No significant investigation or removal activities have been conducted within the specific limits of Green Fuel Oil. However, Ridolfi completed borings and monitoirng wells adjacent to the west and north of this parcel and petroleum impacted soil and groundwater were detected.

Table 2-1
Summary of Areas of Interest and Previous Investigations/Off-Site Disposal Activities

Building or Area of Concern	Description and Uses	Historical and Current Status	Potential Environmental Concerns	Previous Investigations/ Removal Actions
Combined sewer outfalls 005 and 006 located along the northeast border of the Site discharging into the Anacostia River.	No detailed information was available regarding the pipe sizes or associated flows within these outfalls, although their locations and estimated alignment (for outfall 005) are shown on Figure 1-2.	Currently in use although construction dates unknown.	Potential impact to Anacostia River.	No significant investigation or removal activities have been conducted in the area of these outfalls, although it is likely DCWASA performes efflutent sampling.

Notes:
See locations of Buildings and Areas of Concern on Figure 1-2.

PREPARED BY/DATE: BRC 02/08/11
REVISED BY/DATE: EFC 01/11/13

Table 2-2
Summary of Naval Receiving Station Environmental Concerns
(Taken from Industrial History Report dated December 20, 2001)

Building No.	Years Listed	Use	Year Demolished	Potential Environmental Concerns Identified by MACTEC
NRS BUILDINGS LOCATED WITHIN FOOTPRINT OF POPLAR POINT SITE				
T1	1947-1961	Recreation Building & Ships Store (Area of Existing US Park Police Anacostia Operations Facility Building).	---	None
T2	1947-1961	Heating Plant	---	Served as a heating Plant from 1963 to 1969. May have contained petroleum fuel oil USTs or ASTS and piping.
T3	1947-1961	Chapel	---	None
T4	1947-1961	Dispensary (Building currently occupied by National Park Service).	---	Dental Laboratory, X-Ray facilities and general medical facilities. May have included heavy metals use/disposal.
T5	1947-1961	School, Advance Fire Control	---	None
T6	1947-1961	Administration Building	---	None
T20	1947-1961	Heating Plant	---	ASTs present in 1970. Three ASTs designated as No. 1, 2 and 3 each 20,000-gallon-steel 10'6"x21" cylindrical. Suspected petroleum uses.
T21	1947-1961	Photographic Interpretation Center	---	Building also served as a Camouflage Laboratory with a color development section. Possibly included film development. May have included heavy metals use/disposal.
T22	1947-1961	Experimental Building	---	Used to store paint from 1943 to 1945. After 1945, used as an experimental building by the naval Ordnance Laboratory and was demolished prior to 1965. Suspected solvent uses.
T23	1947-1961	Experimental Building	---	Constructed in 1943 as an experimental building for the Naval Ordnance Laboratory until 1955. Suspected MC.
T24	1947-1961	Experimental Building	---	Constructed in 1943 as an experimental building for the Naval Ordnance Laboratory until 1955. Suspected MC.
T25	1947-1961	Experimental Building	---	Constructed in 1943 as an experimental building for the Naval Ordnance Laboratory until 1955 with suspected MC. Transformer located on east side of building (suspected PCBs).
T26	1947-1961	Experimental Building	---	Constructed in 1943 as an experimental building for the Naval Ordnance Laboratory until prior to 1965. Suspected MC.
T27	1947-1961	Experimental Building	---	Constructed in 1943 as an experimental building for the Naval Ordnance Laboratory until 1955. Suspected MC.
T28	1947-1961	School, Electrical Interior Communication	---	None
T29	1947-1961	School, Music & Boiler House	---	A Heating Plant was co-located within the structure with suspected petroleum hydrocarbons. Large transformers installed in 1967 (suspected PCBs).

Table 2-2
Summary of Naval Receiving Station Environmental Concerns
(Taken from Industrial History Report dated December 20, 2001)

Building No.	Years Listed	Use	Year Demolished	Potential Environmental Concerns Identified by MACTEC
T30	1947-1961	School, Navy Intelligence	---	Constructed in 1943 as a Mine Disposal School. Suspected MC.
T31	1947-1961	Storage	---	Garage for Mine Disposal School. Suspected petroleum hydrocarbons and MC.
T32	1947-1961	Laundry	---	A dry cleaning plant was constructed at the site and likely utilized Naptha or solvents such as tetrachloroethene (PCE).
T35	1947-1961	Personnel Classification Building	---	None
T35A	1947-1961	Ordnance & Gunnery Projection Building (1947), Greenhouse	---	Ordnance and Gunnery Protection (suspected MC) and greenhouse (suspected pesticides/herbicides).
T35B	1947-1961	Barracks	<1961	None
T36	1947-1961	Experimental Building	<1961	Experimental Laboratory by the Naval Ordnance Laboratory from 1945 to 1955. Suspected MC.
T37	1947-1961	Experimental Building	---	Storage Building for the Naval Gun factory from 1943 to 1945. Experimental Laboratory by the Naval Ordnance Laboratory from 1945 to 1955. Suspected MC.
T39	1947-1961	School, Ordnance Gunnery Offices	1961	None
T40	1947-1961	Gun Room & School, Advanced Fire Control	---	Two 10,000-gallon USTs located at gasoline Station at Building T-40. Transformer substation located adjacent to Building T-40 (designated as Structure N-2) with suspected PCBs.
T41	1947-1961	Barracks	1961	None
T42	1947-1961	Office, Chaplain	---	None
T43	1947-1961	Gatehouse, OOD	---	None
T44	1947-1961	Quarters, Officer	---	None
T45	1947-1961	Quarters, Officer	---	None
T48	1947-1961	Boilerhouse/Heating Plant	1961	Coal handling equipment and potential heating oil/petroleum hydrocarbons.
T49	1947-1961	Mark I Training Building	---	None
T50	1947-1961	Ship's Service Building	---	None
T51	1947-1961	Utility Building	---	None
T52	1947-1961	Storage	1961	None
T53	1947-1961	Barracks	1961	None
T54	1947-1961	Barracks	1961	None
T55	1947-1961	Barracks	1961	None
T56	1947-1961	Mess Hall & Public Works Shop	1961	A 6,000-gallon gasoline UST and dispenser were located at SE corner of this building.
T58	1947-1961	Barracks	1961	None

Table 2-2
Summary of Naval Receiving Station Environmental Concerns
(Taken from Industrial History Report dated December 20, 2001)

Building No.	Years Listed	Use	Year Demolished	Potential Environmental Concerns Identified by MACTEC
T59	1947-1961	Barracks	1961	None
T60	1947-1961	BOQ Barracks	1961	None
T61	1947-1961	BOQ Barracks	1961	None
T62	1947-1961	BOQ Barracks	1961	None
T63	1947-1961	School, Advanced Gunners Mate	1961	None
T64	1947-1961	Cold Storage Warehouse	1961	None
T65	1947-1961	Shop, Hobby	---	Automobile Hobby Shop until prior to 1965. Suspected petroleum hydrocarbons, metals and solvents.
T66	1947-1961	Storage	1961	None
T67	1947-1961	School Annex, Gunners Mate	1961	None
T68	1947-1961	Laundry, Crews	1961	Crews Laundry from 1945 to prior to 1965. Suspected dry cleaning solvents.
T69	1947-1961	Laundry, Crews	1961	Crews Laundry from 1945 to prior to 1965. Suspected dry cleaning solvents.
T71	1947-1961	Experimental Building, Ordnance Laboratory	---	Experimental Building for Naval Ordnance Laboratory from 1945 until prior to 1955. Suspected MC.
T72	1947-1961	Storage, Photographic Interpretation Center	---	None
T73	1947-1961	Storage, Ordnance Laboratory	---	Storage Building for Naval Ordnance laboratory from 1945 until prior to 1965. Suspected MC.
T74	1947-1961	Storage, Ordnance Laboratory	<1961	Storage Building for Naval Ordnance laboratory from 1945 until prior to 1965. Suspected MC.
T75	1947-1961	Storage, Ordnance Laboratory	<1961	Storage Building for Naval Ordnance laboratory from 1945 until prior to 1965. Suspected MC.
T76	1947-1961	Storage, Ordnance Laboratory	<1961	Storage Building for Naval Ordnance laboratory from 1945 until prior to 1965. Suspected MC.
T77	1947-1961	Storage, Ordnance Laboratory	<1961	Storage Building for Naval Ordnance laboratory from 1945 until prior to 1965. Suspected MC.
T78	1947-1961	Gun Trainer Building	<1961	None
T81	1955	Sentry House	<1970	Paint spraying and buffing, lacquer storage, and hazardous/flammable materials storage.
T83	1955	Trailer Pump House	<1965	None
T86/T87	1955	Paint Shop	<1965	Paint and potential flammable/hazardous materials storage
CY01	1948-1949	Robinson Coal Yard	---	South side of T63.
CY02	1948-1949	Coal Yard	---	East side of T17.
CY03	1948-1949	Coal Yard	---	West side of T2.

Table 2-2
Summary of Naval Receiving Station Environmental Concerns
(Taken from Industrial History Report dated December 20, 2001)

Building No.	Years Listed	Use	Year Demolished	Potential Environmental Concerns Identified by MACTEC
PL01	1948-1949	Paint Locker	---	North side of T21. Suspected solvents.
PL02	1948-1949	Paint Locker	---	South side of T21. Suspected solvents.
TX01	1948-1949	Transformer	---	East side of T25. Suspected PCBs.
NRS BUILDINGS LOCATED OUTSIDE FOOTPRINT OF POPLAR POINT SITE				
T7	1947-1961	Barracks	---	None
T8	1947-1961	Barracks	---	None
T9	1947-1961	Barracks	---	None
T10	1947-1961	Supply Building	---	None
T11	1947-1961	Subsistence Building	---	None
T12	1947-1961	Barracks	---	None
T13	1947-1961	Naval Aviation Electronics Service Unit	---	Contained a laboratory and shop for the installation, maintenance, repair and operation of all types of aviation systems and equipment. Suspected petroleum hydrocarbons, metals and solvents.
T14	1947-1961	Barracks	---	None
T15	1947-1961	School, Languages	---	None
T16	1947-1961	Fire House & Garage	1961	Fire Department and Garage. One 5,000-gallon UST (listed to be removed on 1961 Demolition Map). Also included a gas pump.
T17	1947-1961	Heating Plant	1961	Coal handling equipment installed.
T18	1947-1961	Brig	1961	None
T19	1947-1961	Storehouse	1961	Storehouse from 1943 to 1965. One 5,000 Gallon petroleum UST at SE corner.
T33	1947-1961	Laundry, Boilerhouse	1961	Heating Plant for the Laundry. Two solvent ASTs and one solvent UST located at site.
T34	1947-1961	Office Building	---	None
T46	1947-1961	Laundry, Crews	---	Crews Laundry Building from 1943 to prior to 1965. Suspected dry cleaning solvents.
T47	1947-1961	Laundry, Crews	---	Crews Laundry Building from 1943 to prior to 1965. Suspected dry cleaning solvents.
T57	---	Not assigned	---	Not assigned.
T70	1947-1961	Storage	1961	None
T79	1947-1961	Refrigerated Storage	<1961	None. Building location could not be established on NRS Maps.
T82	1955	Sentry House	<1965	None
T88	1955	Gas Station	<1965	Gas station. Suspected petroleum hydrocarbons.

Table 2-2
Summary of Naval Receiving Station Environmental Concerns
(Taken from Industrial History Report dated December 20, 2001)

Building No.	Years Listed	Use	Year Demolished	Potential Environmental Concerns Identified by MACTEC
T89	1961	Garbage House	1961	None. Building location could not be established on NRS Maps.
T90	1961	Garbage House	1961	None. Building location could not be established on NRS Maps.
T91	1955	Unlisted-Reported as Storage Building from 1955 until prior to 1965	---	None. Building location could not be established on NRS Maps.
T92	1955	Unlisted-Reported as Lieutenant Garage from 1955 until prior to 1976	---	None. Building location could not be established on NRS Maps.
T93	1951	Unlisted-Reported as Instrument Repair Shop from 1951 until 1960's, then hazardous and flammable materials storage from 1960's to 1970's	1975	Paint spraying and buffing, lacquer storage, and hazardous/flammable materials storage. Builidng location could not be established from NRS maps.

PREPARED BY/DATE: DD 2/27/08
REVISED BY/DATE: BRC 3/29/11

Notes:

---	No data available
None	No obvious environmental concerns/recognized environmental conditions were identified in the Building Histories included in the Industrial History Report.
🟨	Sites with suspected environmental concerns are highlighted yellow.
🟧	Sites with suspected munitions constituents (MC) concerns are highlighted orange.

Table 3-1
Monitoring Well and Piezometer Screened Interval Units

Monitoring Well/ Piezometer Identification	**Screened Interval Water Bearing Unit**	**December 21, 2002 Groundwater Elevation** (feet above msl)	**Time Measured**
DCMW012-02	**fill**	**3.34**	**9:35 AM**
MW-3	**fill/Holocene clay**	**7.26**	**2:38 PM**
MW-9	**fill/Holocene clay**	**6.80**	**2:45 PM**
MW-10A	**fill/Holocene clay**	**5.59**	**2:36 PM**
MW-11	**fill/Holocene clay**	**7.20**	**2:41 PM**
MW-21	*fill/Holocene clay*	*6.79*	*2:30 PM*
MW-20	**fill/Holocene clay**	**5.29**	**2:37 PM**
MW-22	**fill**	**7.07**	**2:43 PM**
NRS-1	**fill/Holocene clay**	**10.00**	**NA (1)**
NRS-2	**fill/Holocene clay**	**9.46**	**NA (1)**
NRS-3	**fill/Holocene clay**	**3.98**	**NA (1)**
PZ-1	**fill/upper permeable unit**	**3.36**	**3:03 PM**
PZ-2	**fill/upper permeable unit**	**3.19**	**3:10 PM**
PZ-3	**fill/upper permeable unit**	**3.30**	**3:05 PM**
PZ-4	**fill/upper permeable unit/Holocene clay**	**3.13**	**11:07 AM**
PZ-5	**fill/upper permeable unit/Holocene clay**	**3.00**	**1:15 PM**
PZ-6	**fill/upper permeable unit**	**3.30**	**1:22 PM**
PZ-7	**upper permeable unit/Holocene clay**	**3.37**	**2:06 PM**
PZ-8	**fill/upper permeable unit**	**3.03**	**9:08 AM**
MW-2A	**fill/upper permeable unit**	**3.68**	**9:00 AM**
DCMW010-02	**fill/upper permeable unit**	**3.23**	**8:21 AM**
MW-5	**fill/upper permeable unit/Holocene clay**	**5.77**	**10:55 AM**
MW-4	*Holocene clay*	*3.39*	*10:35 AM*
MW-6	*Holocene clay*	*4.57*	*10:40 AM*
MW-8	*Holocene clay*	*6.53*	*2:55 PM*
MW-1	**middle permeable unit**	**1.63**	**3:16 PM**
DCMW006-02	**middle permeable unit**	**1.02**	**11:55 AM**
DCMW007-02	**middle permeable unit**	**1.14**	**3:45 PM**
DCMW011-02	**middle permeable unit**	**1.32**	**3:32 PM**
DCMW013-02	**middle permeable unit**	**3.13**	**9:50 AM**
DCMW014-02	**middle permeable unit**	**1.87**	**10:30 AM**
DCMW015-02	**middle permeable unit**	**1.84**	**3:36 PM**
MW-7	*middle permeable unit*	*0.86*	*3:40 PM*
MW-23A	*middle permeable unit*	*0.90*	*3:12 PM*
MW-23B	*middle permeable unit/Cretaceous clay*	*1.08*	*3:13 PM*
DCMW008-02	**lower permeable unit**	**1.60**	**10:50 AM**
DCMW009-02	**lower permeable unit**	**1.58**	**11:00 AM**
MW-10	**Holocene clay/lower permeable unit**	**1.80**	**2:35 PM**
MW-2	**lower permeable unit**	**1.20**	**9:06 AM**

12/21/02 TIDE LEVELS (feet above MLLW):
8:18 am = 2.85
3:42 pm = 0.407
Tide data obtained from http://co-ops.nos.noaa.gov/data_retrieve.shtml?input_code=100111111vwl

NOTES:
Bold font indicates the well is screened in an interval which is useful for assessing hydraulic head relationships in the corresponding unit.
Italicized font indicates the well is screened in an interval which is not useful for assessing groundwater elevations.

Water table elevations made by MACTEC are based on top of casing elevations estimated with a hand-held GPS, which is not as accurate as elevations measured with conventional survey equipment. Additionally, the measurements were made six years after the other measurements and are therefore incompatabile. Reference: MACTEC, 2008

PREPARED BY/DATE: AN 7/15/05
CHECKED BY/DATE: CW 1/22/11

Table 3-2
Vertical Hydraulic Gradients

Monitoring Well	Groundwater Elevation (ft above msl)	Mid-Point of Screen (ft above msl)	Vertical Hydraulic Gradient (ft/ft)
MW-10A	5.59	9	0.09
MW-10	1.8	51.5	
MW-2A	3.68	10	0.06
MW-2	1.2	49	
MW-5	5.77	9.5	0.1
DCMW008-02	1.6	52	

Note: All gradients are downward.

PREPARED BY/DATE: EB12/14/10
CHECKED BY/DATE: CW 12/14/10

Table 3-3
Monthly and Annual Precipitation and Snowfall at Reagan National Airport

	Precipitation (inches)	Snowfall (inches)
January	3.21	6.2
February	2.63	5.2
March	3.60	1.6
April	2.77	Trace
May	3.82	0
June	3.13	0
July	3.66	0
August	3.44	0
September	3.79	0
October	3.22	Trace
November	3.03	0.7
December	3.05	1.5
Annual	**39.35**	**15.2**

30 year average 1971-2000
http://www.erh.noaa.gov/lwx/climate/dca/dcaprecip.txt
Accessed August 14, 2010

PREPARED BY/DATE: EB 12/14/10
CHECKED BY/DATE: CW 2/07/11

Table 3-4
Hydrology of the Anacostia River

Average Daily Discharge (cfs[1])	Maximum Discharge, June 1972[2] (cfs)	Minimum Discharge, Sept. 1996 (cfs)	Surface Area of Tidal River (acres)	Average Tidal Time Detention (days)	Average Volume of Tidal River (gallons x 10^9	Average Tidal Rage (feet)
138	31,180	1.8	850	27-36	2.64	2.95

[1] cfs (cubic feet per second)= 7.48 gallons per second or 448.8 gallons per minute.

[2] Maximum discharge associated with Hurricane Agnes.

http://www.anacostia.net/history/hydrology.html

PREPARED BY/DATE: EB 12/14/10
CHECKED BY/DATE: CW 12/14/10

Table 4-1
Summary of Existing Laboratory Analytical Data for Poplar Point RI/FS

Area	General Area/Station	Consulting Firm	Matrix	SampDate	CDD/CDF	Herbicides	Inorganics	Other	Pest/PCB	Petr_Dist	Physical Charact.	SVOCs	VOCs	MC	Lab QA/QC Acceptable	Field QA/QC Acceptable	Prev. Validation Confirmed	DATA REJECTED	Comments
AOC	275-Gallon AST North of Central Greenhouses	Brown	Soil	7/2/1997		1	1	2	1	2		1	3		**X**				
PP	Anocostia River	ANS	Pore Water	6/24/2003			15												
PP	Anocostia River	ANS	Sediment	6/24/2003			73		73		73	73	73	73	X	X			See table endnotes
AOC	Central Greenhouses	Brown	Groundwater	7/7/1997									1		**X**				
AOC	Central Greenhouses	Brown	Groundwater	7/9/1997		1	1	1	1	1		1	2		**X**				
AOC	Central Greenhouses	Brown	Groundwater	5/4/1999			1			1		1	1		**X**				
AOC	Central Greenhouses	ENV	Groundwater	12/15/1999			1								**X**		**X**		
AOC	Central Greenhouses	E&E	Planting Medium	8/11/2002			2	2	2						**X**			X	Not Environmental Media
AOC	Central Greenhouses	E&E	Planting Medium	10/26/2002				10	5						**X**			X	Not Environmental Media
AOC	Central Greenhouses	Brown	Soil	6/20/1997		1	3	4	1			1	4		**X**				
AOC	Central Greenhouses	Brown	Soil	7/1/1997		1	2	3	1	1		1	3		**X**				
AOC	Central Greenhouses	Brown	Soil	7/2/1997		1	3	4	1			1	4		**X**				
AOC	Central Greenhouses	Brown	Soil	7/3/1997		1	2	3	1			1	3		**X**				
AOC	Central Greenhouses	Brown	Soil	7/7/1997		1	1	2	1			1	2		**X**				
AOC	Central Greenhouses	ENV	Soil	12/13/1999		4		4	5						**X**		**X**		
AOC	Central Greenhouses	ENV	Soil	12/14/1999		1		2	2						**X**		**X**		
DCL	DCMW006-02	Ridolfi	Groundwater	12/20/2002		2		1	1						**X**	**X**			
DCL	DCMW006-02	Ridolfi	Soil	12/18/2002		2		2	2						**X**	**X**			
DCL	DCMW007-02	Ridolfi	Groundwater	12/21/2002		2		1	1						**X**	**X**			
DCL	DCMW007-02	Ridolfi	Soil	12/19/2002		2		2	2						**X**	**X**			
AOC	DCMW008-02	Ridolfi	Groundwater	12/17/2002		2		1							**X**	**X**			
AOC	DCMW008-02	Ridolfi	Soil	11/19/2002		2		2							**X**	**X**			
AOC	DCMW009-02	Ridolfi	Groundwater	12/17/2002		2		1	2				1		**X**	**X**			
AOC	DCMW009-02	Ridolfi	Soil	11/18/2002		2		2	4				2		**X**	**X**			
DCL	DCMW010-02	Ridolfi	Groundwater	12/20/2002		2		1	2				1		**X**	**X**			
DCL	DCMW010-02	Ridolfi	Soil	12/18/2002		2		2	4						**X**	**X**			
DCL	DCMW011-02	Ridolfi	Groundwater	12/17/2002		2		1	1						**X**	**X**			
DCL	DCMW011-02	Ridolfi	Soil	11/17/2002		2		2	2						**X**	**X**			
AOC	DCMW012-02	Ridolfi	Groundwater	12/17/2002		2		1	2				1		**X**	**X**			
AOC	DCMW012-02	Ridolfi	Soil	11/20/2002		2		2	4						**X**	**X**			
AOC	DCMW013-02	Ridolfi	Groundwater	12/20/2002		4		2	2						**X**	**X**			
AOC	DCMW013-02	Ridolfi	Soil	12/18/2002		2		2	2						**X**	**X**			
AOC	DCMW014-02	Ridolfi	Groundwater	12/17/2002		2		1	1						**X**	**X**			
AOC	DCMW014-02	Ridolfi	Groundwater	12/17/2002		2		1	1						**X**	**X**			
AOC	DCMW014-02	Ridolfi	Soil	11/21/2002		1		1	1						**X**	**X**			
AOC	DCMW014-02	Ridolfi	Soil	11/21/2002		1		1	1						**X**	**X**			
DCL	DCMW015-02	Ridolfi	Groundwater	12/21/2002		2		1	1						**X**	**X**			
DCL	DCMW015-02	Ridolfi	Soil	12/19/2002		2		2	2						**X**	**X**			
AOC	Dog Training Area/Off-site	E&E	Soil	8/11/2002			2	6	4						**X**				
AOC	Dog Training Area/Off-site	E&E	Soil	10/26/2002				6	9						**X**				
DCL	Drum Storage Area West of Wetland Area #1	Brown	Soil	7/9/1997		1	1	2	1			1	2		**X**				
DCL	Former "Burn Pits"	Brown	Soil	7/10/1997		1	4	5	1	1		1	4		**X**				
DCL	Former "Burn Pits"	Brown	Soil	7/11/1997			1	2	1			1	2		**X**				
DCL	Former "Burn Pits"	ENV	Soil	12/14/1999	2			2							**X**		**X**		
AOC	Former 1,000-Gallon	Brown	Groundwater	7/10/1997			1	1		1		1	2		**X**				
AOC	Former 1,000-Gallon Gasoline UST	Brown	Groundwater	7/14/1997						1		1	1		**X**				

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Summary of Existing Laboratory Analytical Data for Poplar Point RI/FS

Area	General Area/Station	Consulting Firm	Matrix	SampDate	CDD/CDF	Herbicides	Inorganics	Other	Pest/PCB	Petr_Dist	Physical Charact.	SVOCs	VOCs	MC	Lab QA/QC Acceptable	Field QA/QC Acceptable	Prev. Validation Confirmed	DATA REJECTED	Comments
AOC	Former 1,000-Gallon Gasoline UST	Brown	Groundwater	8/6/1997				1		1			1		X				
AOC	Former 1,000-Gallon Gasoline UST	Brown	Groundwater	5/4/1999			1	1		1		1	1		X				
AOC	Former 1,000-Gallon Gasoline UST	ENV	Groundwater	12/15/1999			1								X		X		
AOC	Former 1,000-Gallon Gasoline UST	Brown	Soil	6/23/1997		1		1	1	1		1	3		X				
AOC	Former 1,000-Gallon Gasoline UST	Brown	Soil	7/8/1997		1	1	2	1	1		1	3		X				
AOC	Former 10,000-Gallon Fuel Oil AST	Brown	Soil	7/3/1997		1	1	2	1	1		1	2		X				
DCL	Former 275-Gallon Diesel Fuel AST	Brown	Soil	7/9/1997		1	1	2	1	1		1	2		X				
AOC	Former Chemical Storage Area	Brown	Soil	7/1/1997		1	1	2	1			1	2		X				
AOC	Former Chemical Storage Area	Brown	Soil	7/8/1997		1	1	2	1			1	3		X				
AOC	Former Chemical Storage Area	Brown	Soil	7/11/1997		1	1	2	1			1	2		X				
AOC	Former Flower Beds	Brown	Groundwater	7/9/1997		1	1	1	1			1	2		X				
AOC	Former Flower Beds	Brown	Groundwater	5/4/1999			1			1		1	1		X				
AOC	Former Flower Beds	ENV	Groundwater	12/16/1999			1								X		X		
AOC	Former Flower Beds	Brown	Soil	6/20/1997		1	2	3	1			1	3		X				
AOC	Former Flower Beds	Brown	Soil	7/7/1997		1	1	2	1			1	2		X				
DCL	Former Fuel Pad	Brown	Groundwater	5/4/1999			1			1		1	1		X				
DCL	Former Fuel Pad	Brown	Soil	7/9/1997		1	1	2	1	1		1	2		X				
AOC	Former Location of Pails	Brown	Groundwater	5/4/1999			1			1		1	1		X				
AOC	Former Location of Pails	Brown	Soil	7/7/1997		1	2	3	1	1		1	2		X				
NRS	Former NRS Buildings T27 and T32	MACTEC	Groundwater	1/1/2008			3			3		3	3	3	X	X	X		
NRS	Former NRS Buildings T27	MACTEC	Soil	7/1/2008			6			6		6	6	6	X	X	X		
AOC	Former Petroleum Stained	Brown	Groundwater	7/10/1997		1		3	1	3			3		X				
AOC	Former Petroleum Stained	Brown	Groundwater	5/4/1999			1			1		1	1		X				
AOC	Former Petroleum Stained	Brown	Soil	6/27/1997		1	2	3	1	1		1	3		X				
AOC	Former Petroleum Stained Soil Pile	Brown	Soil	6/30/1997						1			1		X				
AOC	Former Planting Areas	Brown	Groundwater	7/9/1997						1			1		X				
AOC	Former Planting Areas	Brown	Groundwater	5/4/1999			1			1		1	1		X				
AOC	Former Planting Areas	Brown	Soil	7/1/1997		1	2	3	1			1	3		X				
AOC	Former Planting Areas	Brown	Soil	7/2/1997		1	1	2	1			1	2		X				
AOC	Former Planting Areas	ENV	Soil	12/14/1999		8		15	15						X		X		
AOC	Former Vaulted 300-Gallon AST and Drums	Brown	Groundwater	7/10/1997		1		1	1	1		1	2		X				
AOC	Former Vaulted 300-Gallon AST and Drums	Brown	Groundwater	5/4/1999			1			1		1	1		X				
AOC	Former Vaulted 300-Gallon AST and Drums	Brown	Soil	6/20/1997		1	2	3	1	1		1	3		X				
AOC	Former Vaulted 300-Gallon AST and Drums	Brown	Soil	7/3/1997		1	1	2	1			1	2		X				
AOC	General AOC	RAI	Soil	7/30/2001			3	1	3			3	3		X			X	Data locations are uncertain
AOC	General AOC	RAI	Soil	7/31/2001		2	2	2	2			2	2		X			X	Data locations are uncertain
AOC	General AOC	RAI	Soil	8/1/2001		3	3	2	3			3	3		X			X	Data locations are uncertain
DCL	General DCL	RAI	Soil	7/31/2001		2	2	2	2			1	2		X			X	Data locations are uncertain

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NRS	General NRS	RAI	Soil	7/31/2001		1	2		1			2	2		X			X	Data locations are uncertain
PP	General PP	RAI	Soil	7/31/2001		7	7	4	7			7	7		X			X	Data locations are uncertain
PP	General PP	RAI	Soil	8/1/2001		5	5	2				4	5		X			X	Data locations are uncertain
AOC	Greenhouse Area	RAI	Soil	7/30/2001			6	6	6			6	6		X			X	Data locations are uncertain
AOC	Greenhouse Floor Drain	RAI	Soil	7/30/2001		1	1		1			1	1		X			X	Not Environmental Media
AOC	Greenhouse Office Area	RAI	Soil	7/30/2001		1	1	1	1			1	1		X			X	Data locations are uncertain
AOC	Greenhouse Office Area	RAI	Soil	7/31/2001		1	1		1			1	1		X			X	Data locations are uncertain
AOC	Greenhouse Office Area	RAI	Surface Water	7/30/2001				1					1		X				
AOC	Greenhouse Office Area	RAI	Surface Water	7/30/2001			1								X				
DCL	MW-02	Ridolfi	Groundwater	11/24/2002		2									X	X			
DCL	MW-02A	Ridolfi	Groundwater	11/24/2002		2									X	X			
AOC	MW-04	Ridolfi	Groundwater	11/19/2002		2		1	1						X	X			
AOC	MW-05	Ridolfi	Groundwater	11/16/2002								1			X	X			
DCL	MW-07	Ridolfi	Groundwater	11/18/2002		2			1						X	X			
DCL	MW-23	Ridolfi	Groundwater	11/18/2002					1						X	X			
DCL	MW-23A	Ridolfi	Groundwater	11/18/2002					1						X	X			
NRS	National Park Police AOF Maintenance Building 10,000-gallon UST	Powell	Groundwater	07/2008						1			1		X	X			
NRS	National Park Police AOF Maintenance Building 10,000-gallon UST	Powell	Soil	07/2008						4			4		X	X			
PP	North of Anacostia Drive	ENV	Soil	12/13/1999			10	15				10	10		X		X		
AOC	Planting Area	RAI	Soil	7/30/2001		1	4	3	3			3	4		X			X	Data locations are uncertain
AOC	Planting Area	RAI	Soil	7/31/2001			2	2	2			2	2		X			X	Data locations are uncertain
AOC	Portion of the Site Adjacent to the Green Oil Comp	Brown	Groundwater	7/9/1997		1	1	1	1	1		1	2		X				
AOC	Portion of the Site Adjacent to the Green Oil Comp	Brown	Groundwater	5/4/1999			1			1		1	1		X				
AOC	Portion of the Site Adjacent to the Green Oil Comp	ENV	Groundwater	12/16/1999			1								X		X		
AOC	Portion of the Site Adjacent to the Green Oil Comp	Brown	Soil	6/23/1997		1	1	2	1	1		1	3		X				
AOC	Portion of the Site Adjacent to the Green Oil Comp	Brown	Soil	7/9/1997		1	3	4	1	1		1	4		X				
DCL	PZ-1	Ridolfi	Groundwater	11/18/2002		2		1	2						X	X			
DCL	PZ1-01	Ridolfi	Groundwater	11/19/2002			2		1	1					X				
DCL	PZ-2	Ridolfi	Groundwater	11/24/2002		2		1	2						X	X			
DCL	PZ2-01	Ridolfi	Groundwater	11/25/2002			2		1	1					X				
DCL	PZ-3	Ridolfi	Groundwater	11/18/2002		2		1	2						X	X			
DCL	PZ3-01	Ridolfi	Groundwater	11/19/2002			2		1	1					X				
DCL	PZ-4	Ridolfi	Groundwater	11/21/2002		2		1	2						X	X			
DCL	PZ4-01	Ridolfi	Groundwater	11/22/2002			2		1	1					X				
DCL	PZ-5	Ridolfi	Groundwater	11/21/2002		2		1	2						X	X			
DCL	PZ5-01	Ridolfi	Groundwater	11/22/2002			2		1	1					X				
DCL	PZ-6	Ridolfi	Groundwater	11/21/2002		2		1	2						X	X			
DCL	PZ6-01	Ridolfi	Groundwater	11/22/2002			2		1	1					X				
DCL	PZ-7	Ridolfi	Groundwater	11/21/2002		2		1	2						X	X			
DCL	PZ7-01	Ridolfi	Groundwater	11/22/2002			2		1	1					X				
DCL	PZ-8	Ridolfi	Groundwater	11/24/2002		2		1	2						X	X			
DCL	PZ8-01	Ridolfi	Groundwater	11/25/2002			2		1	1					X				
AOC	SB-101	Ridolfi	Soil	11/20/2002		3		3	3						X	X	X		

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DCL	SB-102	Ridolfi	Soil	12/18/2002		3		3	6			3			X	X	X		
AOC	SB-103	Ridolfi	Soil	11/20/2002		2		2	4						X	X	X		
AOC	SB30-01	Ridolfi	Soil	12/19/2002			2		2	2					X				
AOC	SB31-01	Ridolfi	Soil	12/20/2002			2		2	2					X				
AOC	SB32-01	Ridolfi	Soil	11/21/2002			3		3	3					X				
AOC	SB33-01	Ridolfi	Soil	11/20/2002			2		2						X				
AOC	SB34-01	Ridolfi	Soil	11/19/2002			2	2	2	2			2		X				
AOC	SB35-01	Ridolfi	Soil	12/19/2002			2		2	2					X				
AOC	SB36-01	Ridolfi	Soil	12/19/2002			3		3	3		3	3		X				
AOC	SB37-01	Ridolfi	Soil	11/18/2002			2		2	2					X				
AOC	SB38-01	Ridolfi	Soil	11/21/2002			2		2	2					X				
AOC	SB39-01	Ridolfi	Soil	11/21/2002			2		2	2					X				
AOC	SB40-01	Ridolfi	Soil	12/19/2002			2		2	2					X				
AOC	SB41-01	Ridolfi	Soil	11/22/2002			2		2	2					X				
AOC	SB42-01	Ridolfi	Soil	12/20/2002			2		2	2					X				
AOC	Southern Greenhouses	E&E	Planting Medium	8/11/2002			6	6	6						X			X	Not Environmental Media
AOC	Southern Greenhouses	E&E	Planting Medium	10/26/2002				12	11						X			X	Not Environmental Media
AOC	Southern Greenhouses	Brown	Soil	7/1/1997		1	1	2	1			1	2		X				
AOC	Southern Greenhouses	Brown	Soil	7/3/1997		1	2	3	1			1	3		X				
AOC	Southern Greenhouses	Brown	Soil	7/11/1997		1	1	2	1			1	2		X				
AOC	Southern Greenhouses	ENV	Soil	12/13/1999		7		7	8						X		X		
AOC	SS-21	Ridolfi	Soil	8/26/2002		2		2				2			X	X	X		
AOC	SS-22	Ridolfi	Soil	8/26/2002		3		3				3			X	X	X		
AOC	SS-23	Ridolfi	Soil	8/26/2002		2		2				2			X	X	X		
AOC	SS-24	Ridolfi	Soil	8/26/2002		2		2				4			X	X	X		
NRS	SS-26	Ridolfi	Soil	8/26/2002		2		2				2			X	X	X		
NRS	SS-01	Ridolfi	Soil	8/27/2002		2		2	4			2			X	X	X		
NRS	SS-02	Ridolfi	Soil	8/27/2002		2		2				2			X	X	X		
NRS	SS-03	Ridolfi	Soil	8/27/2002		2		2				2			X	X	X		
NRS	SS-04	Ridolfi	Soil	8/27/2002		2		2				2			X	X	X		
NRS	SS-05	Ridolfi	Soil	8/27/2002		2		2	4			2			X	X	X		
NRS	SS-06	Ridolfi	Soil	8/27/2002		2		2	4			2			X	X	X		
DCL	SS-07	Ridolfi	Soil	8/27/2002		1		1				2			X	X	X		
DCL	SS-08	Ridolfi	Soil	8/27/2002		3		3				6			X	X	X		
DCL	SS-09	Ridolfi	Soil	8/27/2002		2		2				2			X	X	X		
DCL	SS-10	Ridolfi	Soil	8/27/2002		2		2	4			2			X	X	X		
DCL	SS-11	Ridolfi	Soil	8/27/2002		2		2				2			X	X	X		
DCL	SS-13	Ridolfi	Soil	8/27/2002		2		2				2			X	X	X		
AOC	SS-27	Ridolfi	Soil	8/27/2002		1		1	2			2			X	X	X		
DCL	SS-12	Ridolfi	Soil	8/28/2002		2		2				2			X	X	X		
DCL	SS-14	Ridolfi	Soil	8/28/2002		2		2				2			X	X	X		
DCL	SS-15	Ridolfi	Soil	8/28/2002		2		2				2			X	X	X		
DCL	SS-16	Ridolfi	Soil	8/28/2002		2		2				2			X	X	X		
DCL	SS-17	Ridolfi	Soil	8/28/2002		2		2				2			X	X	X		
DCL	SS-18	Ridolfi	Soil	8/28/2002		2		2				2			X	X	X		
DCL	SS-19	Ridolfi	Soil	8/28/2002		2		2				2			X	X	X		
DCL	SS-20	Ridolfi	Soil	8/28/2002		3		3	6			3			X	X	X		
AOC	SS-25	Ridolfi	Soil	8/28/2002		1		1				2			X	X	X		
DCL	SS-28	Ridolfi	Soil	11/17/2002		2		2	4			2			X	X	X		
AOC	SS-29	Ridolfi	Soil	11/17/2002		3		3	6			3			X	X	X		
PP	SS-30	Ridolfi	Soil	11/25/2002		1		1	2			1	1		X	X	X		
PP	SS-31	Ridolfi	Soil	11/25/2002		1		1	2			1	1		X	X	X		
PP	SS-32	Ridolfi	Soil	11/25/2002		1		1	2			1	1		X	X	X		
AOC	SS-21d	Ridolfi	Soil	8/27/2002			2		2			2	2		X	X	X		
AOC	SS-22d	Ridolfi	Soil	8/27/2002			2		2			2	2		X	X	X		
AOC	SS-23d	Ridolfi	Soil	8/27/2002			2		2			2	2		X	X	X		
AOC	SS-24d	Ridolfi	Soil	8/27/2002			2		2			2	2		X	X	X		

Table 4-1
Summary of Existing Laboratory Analytical Data for Poplar Point RI/FS

Area	General Area/Station	Consulting Firm	Matrix	SampDate	CDD/CDF	Herbicides	Inorganics	Other	Pest/PCB	Petr_Dist	Physical Charact.	SVOCs	VOCs	MC	Lab QA/QC Acceptable	Field QA/QC Acceptable	Prev. Validation Confirmed	DATA REJECTED	Comments
NRS	SS-26d	Ridolfi	Soil	8/27/2002			2		2			2	2		X	X	X		
PP	SS-36	Ridolfi	Soil	8/27/2002			1		1			1	1		X	X	X		
NRS	SS-01d	Ridolfi	Soil	8/28/2002			2		2	2		2	2		X	X	X		
NRS	SS-02d	Ridolfi	Soil	8/28/2002			2		2			2	2		X	X	X		
NRS	SS-03d	Ridolfi	Soil	8/28/2002			2		2			2	2		X	X	X		
NRS	SS-04d	Ridolfi	Soil	8/28/2002			2		2			2	2		X	X	X		
NRS	SS-05d	Ridolfi	Soil	8/28/2002			2		2	2		2	2		X	X	X		
NRS	SS-06d	Ridolfi	Soil	8/28/2002			2		2	2		2	2		X	X	X		
DCL	SS-07	Ridolfi	Soil	8/28/2002			1		1			1	1		X	X	X		
DCL	SS-08d	Ridolfi	Soil	8/28/2002			2		2			2	2		X	X	X		
DCL	SS-09d	Ridolfi	Soil	8/28/2002			2		2			2	2		X	X	X		
DCL	SS-10d	Ridolfi	Soil	8/28/2002			2		2	2		2	2		X	X	X		
DCL	SS-11d	Ridolfi	Soil	8/28/2002			2		2			2	2		X	X	X		
DCL	SS-13d	Ridolfi	Soil	8/28/2002			2		2			2	2		X	X	X		
AOC	SS-27	Ridolfi	Soil	8/28/2002			1		1	1		1	1		X	X	X		
PP	SS-34	Ridolfi	Soil	8/28/2002			1		1			1	1		X	X	X		
DCL	SS-12d	Ridolfi	Soil	8/29/2002			2		2			2	2		X	X	X		
DCL	SS-14d	Ridolfi	Soil	8/29/2002			2		2			2	2		X	X	X		
DCL	SS-15d	Ridolfi	Soil	8/29/2002			2		2			2	2		X	X	X		
DCL	SS-16d	Ridolfi	Soil	8/29/2002			2		2			2	2		X	X	X		
DCL	SS-17d	Ridolfi	Soil	8/29/2002			2		2			2	2		X	X	X		
DCL	SS-18d	Ridolfi	Soil	8/29/2002			2		2			2	2		X	X	X		
DCL	SS-19d	Ridolfi	Soil	8/29/2002			2		2			2	2		X	X	X		
DCL	SS-20d	Ridolfi	Soil	8/29/2002			2		2	2		2	2		X	X	X		
AOC	SS-25	Ridolfi	Soil	8/29/2002			1		1			1	1		X	X	X		
PP	SS-35	Ridolfi	Soil	8/29/2002			1		1	1		1	1		X	X	X		
DCL	SS-28d	Ridolfi	Soil	11/18/2002			2		2	2		2	2		X	X	X		
AOC	SS-29-01	Ridolfi	Soil	11/18/2002			3		3	3		3	3		X	X	X		
PP	SS-30	Ridolfi	Soil	11/26/2002			1	1	1	1		1	1		X	X	X		
PP	SS-31	Ridolfi	Soil	11/26/2002			1	1	1	1		1	1		X	X	X		
PP	SS-32	Ridolfi	Soil	11/26/2002			1	1	1	1		1	1		X	X	X		
AOC	Storm Drains	E&E	Storm Drain Sediment	8/11/2002			1	1	1						X				May not have originated onsite - for further evaluation during the RI
AOC	Storm Drains	E&E	Storm Drain Sediment	10/26/2002				3	2						X				May not have originated onsite - for further evaluation during the RI
AOC	Storm Drains	ENV	Storm Drain Sediment	12/16/1999		2		3	3						X		X		May not have originated onsite - for further evaluation during the RI
DCL	SW Culvert	RAI	Surface Water	7/31/2001			1	1					1		X				
AOC	SW-01	Ridolfi	Surface Water	11/25/2002			2	1	1	1		1	1		X				
AOC	SW-01	Ridolfi	Water	11/24/2002		3		1	2			2	1		X	X	X		
N/A	Unassigned	Brown	Soil	3/7/1997					2						X			X	Data Untraceable
DCL	Wetland Area #1	RAI	Soil	7/31/2001		4	6	2	6			4	6		X			X	Data locations are uncertain
DCL	Wetland Area #1	RAI	Soil	7/31/2001		1	1		1				1		X			X	Data locations are uncertain
DCL	Wetland Area #1	RAI	Soil	8/1/2001		3	4		4			3	4		X			X	Data locations are uncertain
DCL	Wetland Area #1	RAI	Surface Water	7/31/2001			7	7					7		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Groundwater	7/2/1997		1	1	1	1			1	2		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Groundwater	7/10/1997		1	2	1	1			1	3		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Groundwater	7/11/1997		1	1	1	1			1	2		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Groundwater	5/4/1999			1			1		1	1		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	ENV	Groundwater	12/16/1999			3								X		X		

Table 4-1
Summary of Existing Laboratory Analytical Data for Poplar Point RI/FS

Area	General Area/Station	Consulting Firm	Matrix	SampDate	CDD/CDF	Herbicides	Inorganics	Other	Pest/PCB	Petr _Dist	Physical Charact.	SVOCs	VOCs	MC	Lab QA/QC Acceptable	Field QA/QC Acceptable	Prev. Validation Confirmed	DATA REJECTED	Comments
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	6/24/1997		1	7	8	1			1	8		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	7/1/1997		1	4	5	1			1	5		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	7/2/1997		1	1	2	1			1	4		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	7/8/1997		1	1	2	1	1		1	2		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	7/9/1997			1	2	1			1	2		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	7/10/1997		1	4	5	1			1	5		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	7/11/1997			2	3	1			1	3		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Soil	7/14/1997			3	4	1			1	4		X				
DCL	Wetland Areas #1 and #4 and Drum Storage	E&E	Soil	8/11/2002			3	3	3						X				
DCL	Wetland Areas #1 and #4 and Drum Storage	ENV	Soil	12/14/1999		2		3	3						X		X		
DCL	Wetland Areas #1 and #4 and Drum Storage	ENV	Soil	12/15/1999		3		5	5						X		X		
DCL	Wetland Areas #1 and #4 and Drum Storage	Brown	Surface Water	6/30/1997		1	1	1	1			1	2		X				
				Total Samples:	**2**	**243**	**383**	**380**	**461**	**105**	**73**	**335**	**383**	**82**					

PREPARED BY/DATE: EFB 12/22/09
CHECKED BY/DATE: CHW 3/11/11

Analysis Performed Key

CDD/CDF = Chlorinated dibenzo-p-dioxins and dibenzofurans
Inorganics = Metals (including arsenic), Cyanide, Flouride
Pest/PCB. = Pesticides and Poly Chorlinated Biphenyls
Petr. Dist = Petroleum distillates (Gasoline Range Organics, Diesel Range Organics)
Phys = Moisture Content
SVOCs = Semivolatile Organic Compounds, including PAHs
VOCs = Volatile Organics Compounds
WQ = Water Quality Parameters
MC = Munitions constituents using HPLC method

Geographic Subregion Key

AOC = Architect of the Capitol Area
DCL = DC Lanham Tree Nursery Area
NRS = Naval Receiving Station Area
PP = Perimeter Properties Area

Consultant Key

ANS = Academy of Natural Sciences
Brown = Thomas L. Brown
E&E = Ecology and Environment
ENV = Environ
RAI = Resource Applications Inc.

Note: The Academy of Natural Sciences (ANS) collected six cores from the Anacostia River in 2003 (ANS 2004). The samples were analyzed at laboratories at the Texas A&M, the Horn Point Environmental Laboratory, and ANS.

Table 4-2
Laboratory Analytical Data Not for Use in the Poplar Point RI/FS

Station ID	Consulting Firm	Area	General Area	Sample Matrix	Sample Date	Herbicides	Inorganics	Other	Pest/PCB	Petr_Dist	SVOCs	VOCs	Comments
HR-GR-11	E&E	AOC	Central Greenhouses	Planting Medium	8/11/1998			2	1				Not Environmental Media
HR-GR-12	E&E	AOC	Central Greenhouses	Planting Medium	8/11/1998			2	1				Not Environmental Media
HR-GR-09	E&E	AOC	Central Greenhouses	Planting Medium	10/26/1998		1	1	1				Not Environmental Media
HR-GR-09A	E&E	AOC	Central Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-11	E&E	AOC	Central Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-11A	E&E	AOC	Central Greenhouses	Planting Medium	10/26/1998		1	1	1				Not Environmental Media
HR-GR-12	E&E	AOC	Central Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
SO-4	RAI	AOC	General AOC	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
SO-5	RAI	AOC	General AOC	Soil	7/30/2001		1		1		1	1	Data Locations are Uncertain
SO-5D	RAI	AOC	General AOC	Soil	7/30/2001		1		1		1	1	Data Locations are Uncertain
SO-7	RAI	AOC	General AOC	Soil	7/31/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-8s	RAI	AOC	General AOC	Soil	7/31/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-6d	RAI	AOC	General AOC	Soil	8/1/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-6dD	RAI	AOC	General AOC	Soil	8/1/2001	1	1		1		1	1	Data Locations are Uncertain
SO-8d	RAI	AOC	General AOC	Soil	8/1/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-10	RAI	DCL	General DCL	Soil	7/31/2001	1	1	1	1			1	Data Locations are Uncertain
SO-9	RAI	DCL	General DCL	Soil	7/31/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-17	RAI	NRS	General NRS	Soil	7/31/2001		1				1	1	Data Locations are Uncertain
SO-18	RAI	NRS	General NRS	Soil	7/31/2001	1	1		1		1	1	Data Locations are Uncertain
SO-11s	RAI	PP	General PP	Soil	7/31/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-12s	RAI	PP	General PP	Soil	7/31/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-13	RAI	PP	General PP	Soil	7/31/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-13D	RAI	PP	General PP	Soil	7/31/2001	1	1	1	1		1	1	Data Locations are Uncertain
SO-1Bs	RAI	PP	General PP	Soil	7/31/2001	1	1		1		1	1	Data Locations are Uncertain
SO-2Bs	RAI	PP	General PP	Soil	7/31/2001	1	1		1		1	1	Data Locations are Uncertain
SO-3Bs	RAI	PP	General PP	Soil	7/31/2001	1	1		1		1	1	Data Locations are Uncertain
SO-11d	RAI	PP	General PP	Soil	8/1/2001	1	1				1	1	Data Locations are Uncertain
SO-12d	RAI	PP	General PP	Soil	8/1/2001	1	1				1	1	Data Locations are Uncertain
SO-1Bd	RAI	PP	General PP	Soil	8/1/2001	1	1	1			1	1	Data Locations are Uncertain
SO-2Bd	RAI	PP	General PP	Soil	8/1/2001	1	1	1			1	1	Data Locations are Uncertain
SO-3Bd	RAI	PP	General PP	Soil	8/1/2001	1	1					1	Data Locations are Uncertain
GS-1	RAI	AOC	Greenhouse Area	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
GS-2	RAI	AOC	Greenhouse Area	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
GS-3	RAI	AOC	Greenhouse Area	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
GS-4	RAI	AOC	Greenhouse Area	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
GS-5	RAI	AOC	Greenhouse Area	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
GS-5D	RAI	AOC	Greenhouse Area	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
FD-1	RAI	AOC	Greenhouse Floor Drain	Soil	7/30/2001	1	1		1		1	1	Not Environmental Media
SU-01	RAI	AOC	Greenhouse Office Area	Soil	7/30/2001	1	1	1	1		1	1	Data Locations are Uncertain
OF-1	RAI	AOC	Greenhouse Office Area	Soil	7/31/2001	1	1		1		1	1	Data Locations are Uncertain
PA-1	RAI	AOC	Planting Area	Soil	7/30/2001	1	1		1		1	1	Data Locations are Uncertain
PA-2	RAI	AOC	Planting Area	Soil	7/30/2001		1	1			1	1	Data Locations are Uncertain
PA-3	RAI	AOC	Planting Area	Soil	7/30/2001		1	1	1			1	Data Locations are Uncertain
PA-5	RAI	AOC	Planting Area	Soil	7/30/2001		1	1	1		1	1	Data Locations are Uncertain
PA-4	RAI	AOC	Planting Area	Soil	7/31/2001		1	1	1		1	1	Data Locations are Uncertain
PA-4D	RAI	AOC	Planting Area	Soil	7/31/2001		1	1	1		1	1	Data Locations are Uncertain
HR-GR-01	E&E	AOC	Southern Greenhouses	Planting Medium	8/11/1998		1	1	1				Not Environmental Media
HR-GR-02	E&E	AOC	Southern Greenhouses	Planting Medium	8/11/1998			2	1				Not Environmental Media
HR-GR-03	E&E	AOC	Southern Greenhouses	Planting Medium	8/11/1998			2	1				Not Environmental Media
HR-GR-04	E&E	AOC	Southern Greenhouses	Planting Medium	8/11/1998		1	1	1				Not Environmental Media

Table 4-2
Laboratory Analytical Data Not for Use in the Poplar Point RI/FS

Station ID	Consulting Firm	Area	General Area	Sample Matrix	Sample Date	Herbicides	Inorganics	Other	Pest/PCB	Petr_Dist	SVOCs	VOCs	Comments
HR-GR-07	E&E	AOC	Southern Greenhouses	Planting Medium	8/11/1998			2	1				Not Environmental Media
HR-GR-08	E&E	AOC	Southern Greenhouses	Planting Medium	8/11/1998			2	1				Not Environmental Media
HR-GR-01	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998		1	1	1				Not Environmental Media
HR-GR-01A	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-02	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-02A	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998		1	1	1				Not Environmental Media
HR-GR-03	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-03A	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-04	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-04A	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998		1	1	1				Not Environmental Media
HR-GR-06	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-07	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998			2	1				Not Environmental Media
HR-GR-07A	E&E	AOC	Southern Greenhouses	Planting Medium	10/26/1998		1	1	1				Not Environmental Media
BAG7	Brown	N/A	Unassigned	Soil	3/7/1997				1				Data Locations are Uncertain
BAG8	Brown	N/A	Unassigned	Soil	3/7/1997				1				Data Locations are Uncertain
SD-1/1s	RAI	DCL	Wetland Area #1	Soil	7/31/2001	1	1		1			1	Data Locations are Uncertain
SD-1/2D	RAI	DCL	Wetland Area #1	Soil	7/31/2001	1	1		1			1	Data Locations are Uncertain
SD-1/2s	RAI	DCL	Wetland Area #1	Soil	7/31/2001		1	1	1		1	1	Data Locations are Uncertain
SD-1/3s	RAI	DCL	Wetland Area #1	Soil	7/31/2001		1	1	1		1	1	Data Locations are Uncertain
SD-1/4s	RAI	DCL	Wetland Area #1	Soil	7/31/2001	1	1		1		1	1	Data Locations are Uncertain
SD-1/5s	RAI	DCL	Wetland Area #1	Soil	7/31/2001	1	1		1		1	1	Data Locations are Uncertain
SD-1/2d	RAI	DCL	Wetland Area #1	Soil	8/1/2001		1		1		1	1	Data Locations are Uncertain
SD-1/3d	RAI	DCL	Wetland Area #1	Soil	8/1/2001	1	1		1		1	1	Data Locations are Uncertain
SD-1/4d	RAI	DCL	Wetland Area #1	Soil	8/1/2001	1	1		1			1	Data Locations are Uncertain
SD-1/5d	RAI	DCL	Wetland Area #1	Soil	8/1/2001	1	1		1		1	1	Data Locations are Uncertain
SD-1/6s	RAI	DCL	Wetland Area #2	Soil	7/31/2001	1	1		1			1	Data Locations are Uncertain
					Total Samples Rejected:	**32**	**58**	**67**	**69**	**0**	**43**	**50**	

PREPARED BY/DATE: EFB 12/22/09
CHECKED BY/DATE: BRC 12/22/09

Notes:

Analysis Performed Key

CDD/CDF = Chlorinated dibenzo-p-dioxins and dibenzofurans
Inorganics = Metals (including arsenic), Cyanide, Flouride
Pest/PCB. = Pesticides and Poly Chorlinated Biphenyls
Petr. Dist = Petroleum distillates (Gasoline Range Organics, Diesel Range Organics)
Phys = Moisture Content
SVOCs = Semivolatile Organic Compounds, including PAHs
VOCs = Volatile Organics Compounds
WQ = Water Quality Parameters

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Table 5-1
Surface Soil Analytical Results for Petroleum Hydrocarbons that Exceed Screening Levels

Parameter Group					Total Petroleum Hydrocarbons (mg/kg)	
Analyte					Diesel Range	Motor Oil Range
D.C. Soil Quality Standard for Petroleum-Contaminated Soil					960	960 (1)
Sampler	Station ID	Sample ID	Sample Depth (ft.)			
Ridolfi	SS-20	470E-SS-20s	0	0.25	3,500 J	1,600 J
Ridolfi	SS-20	470E-SS-35 (2)	0	0.25	3,600 J	1,700 J
Ridolfi	SS-20	470E-SS-20d	0.25	0.5	2,300 J	710 J

Notes:

(1) = No screening level was available for motor oil-range hydrocarbons. A screening value of 960 mg/kg was used for comparison purposes.
(2) = Soil sample 470E-SS-35 was a field duplicate of 470E-SS-20s.
D.C.= District of Columbia.
J = Value is an estimate.
mg/kg = milligrams per kilogram or parts per million (ppm).
NA = Not available.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "surface soil" if all or a portion of the sample was collected between 0 and 2 feet below ground surface.

Table 5-2
Surface Soil Analytical Results for Pesticides and PCBs that Exceed Screening Levels

Parameter Group					Pesticides/PCBs (µg/kg)										
Analyte					DDD	DDE	DDT	Diazinon	Dieldrin	gamma-BHC (Lindane)	Heptachlor Epoxide	Methoxychlor	Aroclor 1248	Aroclor 1260	Total PCBs (4)
Region III BTAG Screening Level for Soil (Flora)					100	100	100	NA	100	100	100	100	NA	NA	100
Region III BTAG Screening Level for Soil (Fauna)					100	100	100	NA	100	100	100	100	NA	NA	NA
D.C. Risk-Based Screening Level (Residential Soil)					3,200	2,260	4.07	4,570	47.8	NA	84.2	NA	NA	NA	NA
U.S. EPA Region III RBC for Residential Soil					2,700	1,900	1,900	70,000	40	490	70	390,000	320	320	320
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					560	1,800	58	21	0.11	0.22	1.2	15,000	NA	NA	21
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					11,000	35,000	1,200	430	2.2	4.3	25	310,000	NA	NA	410
Sampler	Station ID	Sample ID	Sample Depth (ft.)												
Environ	FDS01	NA	0	0.5	2000	1,200	6,050					5,600			
Environ	FDS02	NA	0	0.5	220		150								
Environ	GH14	NA	0	0.5				130							
E&E	HR-DT-02		0	0.5			4.85								
E&E	HR-DT-03	NA	0	0.5			72								
Brown	MW02	NA	0	4		270	1,600					14,200			
Brown	MW07	NA	0	4	177	148	713								
Brown	SB-5	NA	0	2	1050	430	200								
Brown	SB06	NA	0	2	106		99								
Brown	SB07	NA	0	2	2580	2,610	2,330								
Brown	SB09	NA	0	2	1540	400	360								
Brown	SB14	NA	0	2	119	311	117								
Brown	SB15	NA	0	2	443	571	68								
Brown	SB19	NA	0	2		302	265								
Brown	SB21	NA	0	2	2400	990									
Brown	SB27	NA	0	4.5		305									
Brown	SB28	NA	0	2		218									
Brown	SB30	NA	0	2		143	40								
Brown	SB36	NA	0	2			27								
Brown	SB40	NA	0	2										3,380	3,380
Ridolfi	SS-01	470E-SS-01s	0	0.25			32								180
Ridolfi	SS-01	470E-SS-01d	0.25	0.5											163
Ridolfi	SS-02	470E-SS-02s	0	0.25											162
Ridolfi	SS-02	470E-SS-02d	0.25	0.5					4.9						162
Ridolfi	SS-03	470E-SS-03s	0	0.25											140
Ridolfi	SS-07	470E-SS-07	0	0.25	110000	1,600	64,000								
Ridolfi	SS-08	470E-SS-08s	0	0.25	33,000 JN	4,600	5,200								
Ridolfi	SS-08	470E-SS-34 (1)	0	0.25	31000	3,600	4,500						2800		7,500
Ridolfi	SS-08	470E-SS-08d	0.25	0.5	93000	8,700	130,000								
Ridolfi	SS-09	470E-SS-09s	0	0.25	770	1,000	280								
Ridolfi	SS-09	470E-SS-09d	0.25	0.5	680	740	180								
Ridolfi	SS-10	470E-SS-10s	0	0.25		330	72								428
Ridolfi	SS-10	470E-SS-10d	0.25	0.5	120	290	120								386
Ridolfi	SS-11	470E-SS-11s	0	0.25	110	250	110								280
Ridolfi	SS-11	470E-SS-11d	0.25	0.5	360	480	190								244
Ridolfi	SS-12	470E-SS-12s	0	0.25	1000	540	400						340		920
Ridolfi	SS-12	470E-SS-12d	0.25	0.5	460	480	55 J								685
Ridolfi	SS-13	470E-SS-13s	0	0.25	1300	2,300	420					110			424
Ridolfi	SS-13	470E-SS-13d	0.25	0.5	3900	2,600	1,300								412
Ridolfi	SS-14	470E-SS-14s	0	0.25	660 JN	1,300	1,700								
Ridolfi	SS-14	470E-SS-14d	0.25	0.5	220	920	1,100								
Ridolfi	SS-15	470E-SS-15s	0	0.25	260 J	570 J	250 J					260 J			
Ridolfi	SS-15	470E-SS-15d	0.25	0.5	260	560	1,000					290			
Ridolfi	SS-16	470E-SS-16s	0	0.25		190	280								210
Ridolfi	SS-16	470E-SS-16d	0.25	0.5			33								
Ridolfi	SS-17	470E-SS-17s	0	0.25			56								168
Ridolfi	SS-17	470E-SS-17d	0.25	0.5			54 J								166
Ridolfi	SS-18	470E-SS-18s	0	0.25			52								
Ridolfi	SS-18	470E-SS-18d	0.25	0.5			50								
Ridolfi	SS-19	470E-SS-19s	0	0.25		210	350		6.3 J						305
Ridolfi	SS-19	470E-SS-19d	0.25	0.5		480	190								281
Ridolfi	SS-20	470E-SS-20s	0	0.25			31 J								
Ridolfi	SS-20	470E-SS-35	0	0.25			380								
Ridolfi	SS-20	470E-SS-20d	0.25	0.5	510		120				5.4 J			490 J	869
Ridolfi	SS-21	470E-SS-21s	0	0.25		260	160								189
Ridolfi	SS-21	470E-SS-21d	0.25	0.5		300	180								193
Ridolfi	SS-22	470E-SS-22s	0	0.25		370 J	1,700			14					
Ridolfi	SS-22	470E-SS-36 (2)	0	0.25		380	1,500			17					
Ridolfi	SS-22	470E-SS-22d	0.25	0.5	120	500	2,000			11					

Table 5-2
Surface Soil Analytical Results for Pesticides and PCBs that Exceed Screening Levels

Parameter Group					Pesticides/PCBs (µg/kg)										
Analyte					DDD	DDE	DDT	Diazinon	Dieldrin	gamma-BHC (Lindane)	Heptachlor Epoxide	Methoxychlor	Aroclor 1248	Aroclor 1260	Total PCBs (4)
Region III BTAG Screening Level for Soil (Flora)					100	100	100	NA	100	100	100	100	NA	NA	100
Region III BTAG Screening Level for Soil (Fauna)					100	100	100	NA	100	100	100	100	NA	NA	NA
D.C. Risk-Based Screening Level (Residential Soil)					3,200	2,260	4.07	4,570	47.8	NA	84.2	NA	NA	NA	NA
U.S. EPA Region III RBC for Residential Soil					2,700	1,900	1,900	70,000	40	490	70	390,000	320	320	320
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					560	1,800	58	21	0.11	0.22	1.2	15,000	NA	NA	21
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					11,000	35,000	1,200	430	2.2	4.3	25	310,000	NA	NA	410
Sampler	Station ID	Sample ID	Sample Depth (ft.)												
Ridolfi	SS-23	470E-SS-23s	0	0.25		100	160								
Ridolfi	SS-23	470E-SS-23d	0.25	0.5			140								
Ridolfi	SS-24	470E-SS-24s	0	0.25	260	270	76 J								333
Ridolfi	SS-24	470E-SS-24d	0.25	0.5	240	320	100								322
Ridolfi	SS-25	470E-SS-25	0	0.25			76 J								404
Ridolfi	SS-26	470E-SS-26s	0	0.25											176
Ridolfi	SS-26	470E-SS-26d	0.25	0.5											154
Ridolfi	SS-28	470E-SS-28s	0	0.25		430	39 J								308
Ridolfi	SS-28	470E-SS-28d	0.25	0.5		640	51 J								310
Ridolfi	SS-29	470E-SS-29-01	0	0.25			41 J								168
Ridolfi	SS-29	470E-SS-29-02	0.25	0.5			17 J								
Ridolfi	SS-30	470E-SS-30	0	0.25			4.9								
Ridolfi	SS-31	470E-SS-31	0	0.25			11		4.5						
Ridolfi	SS-32	470E-SS-32	0	0.25			65		24						465
Brown	WL01	NA	0	0.5	7530	3,530	2,330		9 J						
Brown	WL02	NA	0	0.5	330	145									
Brown	WL03	NA	0	0.5	176	236									
Brown	WL03	NA	0	2	490	522	57								
Brown	WL05	NA	0	1.5	1510	6,300			50						

Notes:

(1) = Soil sample 470E-SS-34 was a field duplicate of 470E-SS-08s.
(2) = Soil sample 470E-SS-36 was a field duplicate of 470E-SS-22s.
(3) = For PCBs that were not detected at or above the laboratory detection limit, 1/2 of the detection limit was used for total PCBs. If no single PCB was detected in a particular sample, total PCBs were not calculated for that sample.
Brown = Thomas L. Brown Associates.
BTAG = Biological Technical Assessment Group.
DAF = Dilution Attenuation Factor.
D.C. = District of Columbia.
E = Indicates the value was above the linear range of the detector. Dilution was required.
E&E = Ecology and Environment.
Environ = Environ Corporation.
J = Value is an estimate.
JN = The analysis indicates the presence of an analyte that has been 'tentatively identified' and the associated numerical value represents its approximate concentration.
mg/kg = micrograms per kilogram or parts per billion (ppb).
NA = Not available.
RBC = Risk-Based Concentration.
SSL = Soil screening level.
PCBs = Polychlorinated biphenyls.
U.S. EPA = United States Environmental Protection Agency.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "surface soil" if all or a portion of the sample was collected between 0 and 2 feet below ground surface.
Alpha chlordane, gamma chlordane, beta-BHC, delta BHC, endosulfan sulfate, endrin aldehyde, endrin ketone, and gamma chlordane were detected in some samples. No screening levels are available for these parameters.

Table 5-3
Surface Soil Analytical Results for Metals and Metalloids that Exceed Screening Levels

Parameter Group					Inorganics (mg/kg)																			
Analyte					Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Cyanide	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Region III BTAG Screening Level for Soil (Flora)					1	0.48	328	440	0.02	2.5	0.02	15	NA	3,260	2	4,400	330	0.058	2	18	0.0000098	0.001	0.5	10
Region III BTAG Screening Level for Soil (Fauna)					NA	NA	NA	440	NA	NA	0.0075	NA	0.005	12	0.01	4,400	330	0.058	NA	18	NA	NA	58	NA
D.C. Risk-Based Screening Level (Residential Soil)					NA	NA	0.101	NA	NA	0.3	0.0461	2,630	1,320	NA	NA	NA	NA	NA	NA	329	329	NA	461	19,800
U.S. EPA Region III RBC for Residential Soil					78,000	31	0.43	5,500	160	39	230	3,100	1,600	23,000	NA	NA	11,000	NA	1,600	390	390	5.5	550	23,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					NA	0.66	0.0013	110	58	1.4	2.1	530	7.4	NA	NA	NA	330	NA	NA	0.95	1.6	0.18	260	680
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					NA	13	0.026	2,100	1,200	27	42	11,000	150	NA	NA	NA	6,700	NA	NA	19	31	3.6	5,100	14,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																					
E&E	HR-DR-01	NA	0	0.5			18																	
E&E	HR-DT-01	NA	0	0.5			3.4																	
E&E	HR-DT-02	NA	0	0.5			5																	
E&E	HR-DT-03	NA	0	0.5			3.1																	
E&E	HR-TP-01	NA	0	0.5			4.5																	
E&E	HR-TP-03	NA	0	0.5			3.8																	
E&E	HR-TP-10	NA	0	0.5			3																	
Brown	MW01	NA	0	4			3.2		0.23	2.8	12.3				56.4				11.9					49
Brown	MW02	NA	0	4			4			1.5	14.5	19.5			100				20.2					99.4
Brown	MW04	NA	0	4.5			3.2		0.21	1.9	15.2				84.7				31.6					116
Brown	MW05	NA	0	2			4.6		0.5	2.3	29.7				55.1			0.54	12.7					66.5
Brown	MW06	NA	0	4.5			4.3		0.31	1.9	17.3				81.5				9.3					67.8
Environ	SB01	NA	0	0.5			3.3																	
Brown	SB-4	NA	0	2			11.6		0.55	1.6	11				51			0.22	8.8					66.4
Brown	SB-5	NA	0	2			16.8		0.74	1.4	14.7				52.6				21.4					61.1
Brown	SB06	NA	0	2			56		1.6	4	33.5	33.8			62.6			0.39	29.1			0.26		118
Brown	SB07	NA	0	2			22.8		0.7	1.6	16.5				64.8				17.7					59.3
Brown	SB08	NA	0	2			13.5		0.26	0.72	7.4				42.9				15.2					57.3
Brown	SB09	NA	0	2			12.3		0.51	1.4	11.8				61.1				8.2					50.9
Brown	SB14	NA	0	2			44		0.83	2.5	21.7	46.9			230				16.5			0.27		306
Brown	SB15	NA	0	2			22.4		0.46	2.1	22.7	26.1			174				20.6					209
Brown	SB19	NA	0	2			42.7		1	3	21.3	18.3			47				24.8					83.2
Brown	SB20	NA	0	2			39.9		0.98	2.8	41				39.2				10.3					57.3
Brown	SB21	NA	0	2			22.4		0.49	1.6	11.6				41.6			0.22	9.4					50.1
Brown	SB23	NA	0	2			19		0.49	1.3	17.1				94.4			0.25	7.7					71.5
Brown	SB24	NA	0.5	2.5			37.5		0.68	2.4	18	19.8			160				13.7					82.6
Brown	SB25	NA	0	3.5			15		0.4	1.8	13.6				49.6				7.4					43
Brown	SB26	NA	0	2					0.56	1.3	11.2				84.2				9.6			0.22		52.9
Brown	SB27	NA	0	4.5			7.1		0.43	1.9	18.8				26.2				8.1					41.2
Brown	SB28	NA	0	2			6.3		0.18	0.89	10.1				25.8				6.4					223
Brown	SB30	NA	0	2					0.62	1.7	27.2				49.6				8.8					58.3
Brown	SB31	NA	0	2			5.4		0.79	2.8	47.3				12.8				6.3					30.8
Brown	SB32	NA	0	2					0.41	1.5	16.7				27.2				7.8					29.8
Brown	SB33	NA	0	2			10.2		0.42	1.2	6.8				158				7.8					132
Brown	SB36	NA	0	2			20.8		0.56	1.8	21.6	15.3			83				15.3					124
Brown	SB37	NA	0	2					0.49	1.3	8.4				54.5				11					57.6
Brown	SB40	NA	0	2			17.1		0.54	2	13.8	21.1			284			0.36	14.6			0.22		128
Brown	SB42	NA	0	4.5					0.35	1.2	14.1				64.9				11					49.7
Brown	SB45	NA	0	2			5.6		0.4	1.4	13.8				29.3				8.7					36.2
Ridolfi	SS-01	470E-SS-01s	0	0.25	17,100		4.4		0.9		31	21.8		24,900	25			0.06	23			0.4	41.6	108
Ridolfi	SS-01	470E-SS-01d	0.25	0.5	11,100		2.6		0.9		18.7			18,900	11.3			0.07	22			0.2	23.2	60.1
Ridolfi	SS-02	470E-SS-02s	0	0.25	7,070		2.4		0.4		20.8			12,700	11.1				28			0.2	22.1	35.2
Ridolfi	SS-02	470E-SS-02d	0.25	0.5	6,870		3.4		0.4		17.9			12,100	11.4				19			0.2	19.9	30.2
Ridolfi	SS-03	470E-SS-03s	0	0.25	18,100		3		0.4		19.6			18,400	14.5				8			0.3	31	30
Ridolfi	SS-03	470E-SS-03d	0.25	0.5	16,800		2.7		0.3		19.3			18,400	16.5				7			0.3	30.5	26
Ridolfi	SS-04	470E-SS-04s	0	0.25	13,000		3.4		0.4		19.4			19,000	15.1				7			0.2	28.9	31.7
Ridolfi	SS-04	470E-SS-04d	0.25	0.5	12,000		3.2		0.3		16.9			15,900	12.5				6			0.2	24.9	20
Ridolfi	SS-05	470E-SS-05s	0	0.25	5,920		1.7		0.3		12.1			7,710	7.6				7			0.1	14.7	21.8
Ridolfi	SS-05	470E-SS-05d	0.25	0.5	4,640		1.5		0.3		10.9			6,070	5.9				8			0.1	12.3	18.5

Table 5-3
Surface Soil Analytical Results for Metals and Metalloids that Exceed Screening Levels

Parameter Group					Inorganics (mg/kg)																			
Analyte					Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Cyanide	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Region III BTAG Screening Level for Soil (Flora)					1	0.48	328	440	0.02	2.5	0.02	15	NA	3,260	2	4,400	330	0.058	2	18	0.0000098	0.001	0.5	10
Region III BTAG Screening Level for Soil (Fauna)					NA	NA	NA	440	NA	NA	0.0075	NA	0.005	12	0.01	4,400	330	0.058	NA	18	NA	NA	58	NA
D.C. Risk-Based Screening Level (Residential Soil)					NA	NA	0.101	NA	NA	0.3	0.0461	2,630	1,320	NA	NA	NA	NA	NA	NA	329	329	NA	461	19,800
U.S. EPA Region III RBC for Residential Soil					78,000	31	0.43	5,500	160	39	230	3,100	1,600	23,000	NA	NA	11,000	NA	1,600	390	390	5.5	550	23,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					NA	0.66	0.0013	110	58	1.4	2.1	530	7.4	NA	NA	NA	330	NA	NA	0.95	1.6	0.18	260	680
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					NA	13	0.026	2,100	1,200	27	42	11,000	150	NA	NA	NA	6,700	NA	NA	19	31	3.6	5,100	14,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																					
Ridolfi	SS-06	470E-SS-06s	0	0.25	12,400		1.8		0.6		19.3	17.4		20,600	12.2				11			0.2	33.6	40
Ridolfi	SS-06	470E-SS-06d	0.25	0.5	10,400		0.7		0.7		16.5	24.8		25,700	8.2				9			0.2	44.5	27
Ridolfi	SS-07	470E-SS-07	0	0.25	18,000		63	149	0.7	4.5	70.3	103		32,800	95	7,160	417	0.42	70	1		0.4	71.2	803
Ridolfi	SS-08	470E-SS-08s	0	0.25	21,300		88	220	0.9	2.4	95	71.5		42,400	240	9,950	655	0.3	83		1.1	0.6	59	536
Ridolfi	SS-08	470E-SS-34 (1)	0	0.25	20,400		81 J	206	0.9	2.3	91	69.5		41,200	259	9,560	648	0.3	86				56.1	565
Ridolfi	SS-08	470E-SS-08d	0.25	0.5	12,800		80	152	0.7	1.9	59.4	52.2		43,100	187	7,800	653	0.27	60			0.2	37.9	510
Ridolfi	SS-09	470E-SS-09s	0	0.25	10,300		4.7		0.9		32.7	16.2		13,100	77	6,120	366	0.09	40				28	52.5
Ridolfi	SS-09	470E-SS-09d	0.25	0.5	9,210		4.9	585	0.8		19.7	16		12,100	56			0.09	22			0.1	24.5	40.6
Ridolfi	SS-10	470E-SS-10s	0	0.25	14,000		4.6		0.6		25.4	22.5		18,100	80			0.21	18			0.1	33.1	96.9
Ridolfi	SS-10	470E-SS-10d	0.25	0.5	17,000		5.1	121	0.7	0.4	34.1	30.7		19,400	82			0.23	27			0.1	39.4	141
Ridolfi	SS-11	470E-SS-11s	0	0.25	13,600		8.7	131	1	0.4	27.8	29.5		24,100	113		508 J	0.44	23				37.2	122
Ridolfi	SS-11	470E-SS-11d	0.25	0.5	15,900		8.1	171	1.1	0.5	28.4	30.3		26,400	103		746 J	0.52	23			0.4	37.7	112
Ridolfi	SS-12	470E-SS-12s	0	0.25	24,200		37	156	1	1	35.8	47.6		40,400	158		399 J	0.39	30	1 J			52.4	211
Ridolfi	SS-12	470E-SS-12d	0.25	0.5	24,700		39	149	1.1	0.8	36.5	44.5		39,700	133		411 J	0.43	31				53.9	180
Ridolfi	SS-13	470E-SS-13s	0	0.25	11,800		50	203	0.6	0.9	27.5	54.4		26,400	300		1,270 J	0.35	24	1.1			39.5	336
Ridolfi	SS-13	470E-SS-13d	0.25	0.5	11,400		29	150	0.6	0.8	25.8	45.6		19,200	260		471 J	0.23	22		0.4		35.7	219
Ridolfi	SS-14	470E-SS-14s	0	0.25	13,500		7.4	116	1	0.4	31	28.8		25,100	99		918 J	0.27	23			0.2	34.3	114
Ridolfi	SS-14	470E-SS-14d	0.25	0.5	14,400		6.8	131	1.1	0.3	30.1	27.8		25,700	96		762 J	0.31	22			0.2	34.7	126
Ridolfi	SS-15	470E-SS-15s	0	0.25	10,100		5.8	112	0.6	0.8	27.1	30.5		16,400	220			0.2	24			0.2	26.5	201
Ridolfi	SS-15	470E-SS-15d	0.25	0.5	11,500		5.2	145	0.6	0.5	24.7	32.7		14,800	220			0.16	23				26	169
Ridolfi	SS-16	470E-SS-16s	0	0.25	13,400		6.1		0.4		27	23.5		35,500	63			0.22	8			0.2	42.4	83
Ridolfi	SS-16	470E-SS-16d	0.25	0.5	13,200		7.1				24	17.2		41,500	22			0.07	3			0.1	40.7	23
Ridolfi	SS-17	470E-SS-17s	0	0.25	13,400		3.2	121	0.9	0.5	22	26.8		18,800	77		455 J	0.36	22			0.1	30.2	101
Ridolfi	SS-17	470E-SS-17d	0.25	0.5	14,000		4.3	133	0.9	0.4	22.7	24.7		23,700	80		576 J	0.4	22			0.2	31	89.4
Ridolfi	SS-18	470E-SS-18s	0	0.25	14,200		3.4	129	0.9		21.7	21.8		23,700	59		652 J	0.23	19				29.8	74.1
Ridolfi	SS-18	470E-SS-18d	0.25	0.5	13,800		3.2	129	0.9		21.1	21.6		23,600	58		735 J	0.24	19			0.1	28.6	73.3
Ridolfi	SS-19	470E-SS-19s	0	0.25	9,080		6.8		0.6	0.5	33.3	35.1		17,800	79			0.17	26				29.4	126
Ridolfi	SS-19	470E-SS-19d	0.25	0.5	8,230		6		0.5	0.5	24.5	28		13,800	96		376 J	0.15	24				24.8	116
Ridolfi	SS-20	470E-SS-20s	0	0.25	10,800		3.2		0.5	4.8	47.2	63.1		14,900	240	5,020		0.19	33				28.3	908
Ridolfi	SS-20	470E-SS-35 (2)	0	0.25	9,950		3.3 J		0.4	4.7	46	67.2		12,000	241			0.16	33				26.9	786
Ridolfi	SS-20	470E-SS-20d	0.25	0.5	7,340		46		0.8	2.4	23.7	51.5		19,900	240			0.22	22			0.2	26.9	402
Ridolfi	SS-21	470E-SS-21s	0	0.25	9,420		4.6 J		0.5	0.4	20.5	33.8		15,700	109			0.22	13		0.3	0.2	32.2	92.4
Ridolfi	SS-21	470E-SS-21d	0.25	0.5	8,900		4.9 J		0.5	0.4	19.4	33.3		14,900	113			0.26	12				31.5	88.4
Ridolfi	SS-22	470E-SS-22s	0	0.25	7,240		33 J	123	0.7	1.1	25	35.9		16,200	248			0.45	23	1	0.4	0.1	41.5	350
Ridolfi	SS-22	470E-SS-36 (3)	0	0.25	8,280		37 J	144	0.8	1.2	27.5	40.5		16,000	278		355	0.49	23			0.2	47	385
Ridolfi	SS-22	470E-SS-22d	0.25	0.5	7,430		41 J	154	0.8	1.1	26	36.7		15,300	285			0.43	22		0.5	0.3	42.5	385
Ridolfi	SS-23	470E-SS-23s	0	0.25	9,230		6.5 J		0.6	0.6	24.5	26.4		16,000	329			0.22	18		0.9		42.3	238
Ridolfi	SS-23	470E-SS-23d	0.25	0.5	8,320		6.2 J		0.49	0.4	18.3	20.8		14,200	191			0.2	15.3		0.7		42.2	132
Ridolfi	SS-24	470E-SS-24s	0	0.25	10800		3.9 J		0.5	0.7	52.2	43.6		15,600	124	6,550		0.2	60				34.8	136
Ridolfi	SS-24	470E-SS-24d	0.25	0.5	9,990		3.5 J		0.5	0.5	42.4	40.6		14,700	142	6,180		0.2	49				32.8	116
Ridolfi	SS-25	470E-SS-25	0	0.25	8,640		19 J		0.3	1.5	40	71.8		20,200	155	6,660		0.1	47				38.2	1,270
Ridolfi	SS-26	470E-SS-26s	0	0.25	14,800		2.5 J		0.6	0.3	22.6	28.3		17,000	48			0.09	13			0.2	36.4	108
Ridolfi	SS-26	470E-SS-26d	0.25	0.5	8,470		2 J		1		16.3	16.4		19,100	31				9				25.4	107
Ridolfi	SS-27	470E-SS-27	0	0.25	3,010		1.3 J		0.1		23.5	16.8		11,000	34	12,000			58				13.1	29.9
Ridolfi	SS-28	470E-SS-28s	0	0.25	6,890		4.3		0.5	0.4	14.1	34		10,300	111		387	0.26	12				21.6	113
Ridolfi	SS-28	470E-SS-28d	0.25	0.5	6,030		4.1		0.4		12.3	24.8		10,300	109			0.27	16				19.2	89
Ridolfi	SS-29	470E-SS-29-01	0	0.25	6,200		3		0.4	0.4	27	24.7		13,900	80	34,300		0.09	28				15.8	74
Ridolfi	SS-29	470E-SS-29-02	0.25	0.5	3,200		2.2		0.3		13			7,750	39	72,300			10				9.3	38
Ridolfi	SS-30	470E-SS-30	0	0.25	27,500		0.6	173	0.9		219	44.5		36,800	19	15,300	806		72				79.2	55
Ridolfi	SS-31	470E-SS-31	0	0.25	12,900		1.7		0.6		45	22		27,400	57			0.11	17				58.1	81
Ridolfi	SS-32	470E-SS-32	0	0.25	10,100		3.8	132	0.7	1.9	32.3	60.7		20,200	220			0.97	18		8.9		42.2	321

Table 5-3
Surface Soil Analytical Results for Metals and Metalloids that Exceed Screening Levels

Parameter Group					Inorganics (mg/kg)																			
Analyte					Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Cyanide	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Region III BTAG Screening Level for Soil (Flora)					1	0.48	328	440	0.02	2.5	0.02	15	NA	3,260	2	4,400	330	0.058	2	18	0.0000098	0.001	0.5	10
Region III BTAG Screening Level for Soil (Fauna)					NA	NA	NA	440	NA	NA	0.0075	NA	0.005	12	0.01	4,400	330	0.058	NA	18	NA	NA	58	NA
D.C. Risk-Based Screening Level (Residential Soil)					NA	NA	0.101	NA	NA	0.3	0.0461	2,630	1,320	NA	NA	NA	NA	NA	NA	329	329	NA	461	19,800
U.S. EPA Region III RBC for Residential Soil					78,000	31	0.43	5,500	160	39	230	3,100	1,600	23,000	NA	NA	11,000	NA	1,600	390	390	5.5	550	23,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					NA	0.66	0.0013	110	58	1.4	2.1	530	7.4	NA	NA	NA	330	NA	NA	0.95	1.6	0.18	260	680
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					NA	13	0.026	2,100	1,200	27	42	11,000	150	NA	NA	NA	6,700	NA	NA	19	31	3.6	5,100	14,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																					
Brown	WL01	NA	0	0.5					0.52	1.4	20.3	15.7			103				42.5					62.1
Brown	WL02	NA	0	0.5					0.38	1.9	17.4				88.1				24.8					46.7
Brown	WL03	NA	0	0.5					0.38	1.6	19	43.2			315				26.4					191
Brown	WL03	NA	0	2					0.8	2.1	20.6	23.8			102			0.26	19.3					97.9
Brown	WL05	NA	0	1.5			9.2		0.52	2.9	21.4	60.6			219				22.1					462

Notes:

(1) = Soil sample 470E-SS-34 was a field duplicate of 470E-SS-08s.
(2) = Soil sample 470E-SS-35 was a field duplicate of 470E-SS-20s.
(3) = Soil sample 470E-SS-36 was a field duplicate of 470E-SS-22s.
B = Indicates the parameter was also detected in the method blank.
Brown = Thomas L. Brown Associates.
BTAG = Biological Technical Assessment Group.
DAF = Dilution Attenuation Factor.
D.C. = District of Columbia.
E&E = Ecology and Environment.
Environ = Environ Corporation.

J = Value is an estimate.
K = This qualifier was not explained in the RAI report.
L = This qualifier was not explained in the RAI report.
mg/kg = milligrams per kilogram or parts per million (ppm).
NA = Not available.
RBC = Risk-Based Concentration.
SSL = Soil screening level.
U.S. EPA = United States Environmental Protection Agency.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "surface soil" if all or a portion of the sample was collected between 0 and 2 feet below ground surface.
Calcium, potassium, and sodium were detected in some samples. No screening levels are available for these parameters.

Table 5-4
Surface Soil Analytical Results for VOCs that Exceed Screening Levels

Parameter Group					Volatile Organic Compounds (µg/kg)		
Analyte					1,4-Dichlorobenzene	Methylene Chloride	Toluene
Region III BTAG Screening Level for Soil (Flora)					NA	300	100
Region III BTAG Screening Level for Soil (Fauna)					NA	300	100
D.C. Soil Quality Standards for Petroleum-Contaminated Soil					NA	NA	125,000
D.C. Risk-Based Screening Level (Residential Soil)					5,060	1,900	125,000
U.S. EPA Region III RBC for Residential Soil					27,000	85,000	16,000,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					0.36	0.95	440
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					7.1	19	8,800
Sampler	Station ID	Sample ID	Sample Depth (ft.)				
Brown	MW07	NA	0	4		7.7	
Brown	SB14	NA	0	2		6.3	
Brown	SB24	NA	0.5	2.5		6.7	
Ridolfi	SS-32	470E-SS-32	0	0.25		2.7 J	

Notes:
B = Indicates the parameter was also detected in the method blank.
BTAG = Biological Technical Assessment Group.
DAF = Dilution Attenuation Factor.
D.C. = District of Columbia.
J = Value is an estimate.
mg/kg = micrograms per kilogram or parts per billion (ppb).
NA = Not available.
RBC = Risk-Based Concentration.
SSL = Soil screening level.
VOCs = Volatile organic compounds.
U.S. EPA = United States Environmental Protection Agency.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "surface soil" if all or a portion of the sample was collected between 0 and 2 feet below ground surface.
2-Butanone was detected in some samples. No screening levels are available for this parameter.

Table 5-5
Surface Soil Analytical Results for SVOCs that Exceed Screening Levels

Parameter Group					Semivolatile Organic Compounds (µg/kg)																					
Analyte					Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)Anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Carbazole	Chrysene	Dibenzo(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	4-Methylphenol	Naphthalene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
Region III BTAG Screening Level for Soil (Flora)					100	100	100	100	NA	100	100	100	NA	100	100	NA	100	100	100	NA	100	100	100	100	100	100
Region III BTAG Screening Level for Soil (Fauna)					100	100	100	100	100	100	100	100	NA	100	100	NA	100	100	100	NA	100	100	100	100	100	100
D.C. Risk-Based Screening Level (Residential Soil)					196,000	NA	8,080	1,050	105	1,050	4,170	8,160	NA	3,920	NA	233,000	101,000	145,000	NA	NA	NA	NA	6,400	140,000	33,000,000	87,200
D.C. Soil Quality Standards for Petroleum-Contaminated Soil					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	706,000	NA	NA	NA	NA
U.S. EPA Region III RBC for Residential Soil					4,700,000	NA	23,000,000	870	87	870	NA	8,700	32,000	87,000	87	310,000	3,100,000	3,100,000	870	1,600,000	390,000	1,600,000	5,300	NA	23,000,000	2,300,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					5,200	NA	23,000	73	19	230	NA	2,300	23	7,300	70	380	310,000	6,800	640	1,000	NA	7.7	NA	NA	3,300	34,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					100,000	NA	470,000	1,500	370	4,500	NA	45,000	470	150,000	1,400	7,700	6,300,000	140,000	13,000	22,000	NA	150	NA	NA	67,000	680,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																							
Brown	MW01	NA	0	4						231 J				174 J			242 J									181 J
Brown	MW04	NA	0	4.5			2,050 J	7,690	6,460	12,900	2,250 J			7,920			15,500		2,340 J					9,310		11500
Brown	MW06	NA	0	4.5				250 J	230 J	391	215 J			245 J			297 J		185 J					270 J		353 J
Brown	MW07	NA	0	4		269 J		611	643	1,230	554			667	161 J		715	385 J	460	2,580		2,580		774		1000
Environ	SB01	NA	0	0.5				190 E	230 E	210 E		230 E		230 E			330 E							110 E		310 E
Brown	SB-4	NA	0	2				291 J	356	619				276 J			716							421		471
Brown	SB-5	NA	0	2						202 J																
Environ	SB05	NA	0	0.5													360 E									330 E
Brown	SB07	NA	0	2		405	197 J	820	1,590	2,590	1,050			958	197 J		1,950		598					453		903
Brown	SB08	NA	0	2		4,690 J	8,960	47,100	65,100	101,000	26,800			45,500	7,810 J		133,000		19,900					28,600		62900
Brown	SB09	NA	0	2				192 J	258 J	472				263 J			470							244 J		242 J
Brown	SB14	NA	0	2							168 J															
Brown	SB15	NA	0	2				767	743	1,430	188 J			638			985		195 J							723
Brown	SB19	NA	0	2				158 J	206 J	422				161 J			242 J									
Brown	SB20	NA	0	2					166 J	218 J																148 J
Brown	SB21	NA	0	2				176 J	324 J	483				218 J			330 J									206 J
Brown	SB23	NA	0	2					181 J	239 J																
Brown	SB24	NA	0.5	2.5						194 J				222 J			180 J							153 J		178 J
Brown	SB25	NA	0	3.5					199 J	294 J							238 J									170
Brown	SB27	NA	0	4.5				188 J		257 J				182 J			291 J							190 J		216 J
Brown	SB28	NA	0	2					164 J	266 J																
Brown	SB30	NA	0	2						256 J							258 J							248 J		168 J
Brown	SB33	NA	0	2						239 J																
Brown	SB36	NA	0	2				1,87 J	227 J	316 J				181 J			294 J							228 J		233 J
Brown	SB37	NA	0	2	194 J		444	1,590	1,420	2,570	456			1550	242 J		3,880	180 J	480					1,910		2010
Brown	SB40	NA	0	2				516	473	897	407			501			1,910		350 J					624		860
Brown	SB42	NA	0	4.5			206 J	507	577	953	198 J			574			1,470		170 J					784		753
Brown	SB45	NA	0	2			444	805	755	1,510	215 J			717			2,320	157 J	190 J					1,720		1200
Ridolfi	SS-01	470E-SS-01s	0	0.25					64 J								120 J									130 J
Ridolfi	SS-04	470E-SS-04s	0	0.25																						
Ridolfi	SS-07	470E-SS-07	0	0.25			140 J	410 J	360 J	650 J	180 J	420 J		510 J			660 J		170 J			52 J		360 J		750 J
Ridolfi	SS-08	470E-SS-08s	0	0.25		160 J	140 J	450 J	410 J	800 J	220 J	710 J		630 J	70 J		870 J		230 J			70 J		240 J		820 J
Ridolfi	SS-08	470E-SS-34 (1)	0	0.25		100 J		280 J	270 J	600 J		410J		370 J			550J							140 J		550 J
Ridolfi	SS-08	470E-SS-08d	0.25	0.5				170 J	150 J	290 J		240 J		240 J			340 J					33 J		120 J		280 J
Ridolfi	SS-09	470E-SS-09s	0	0.25				100 J	96 J	100 J		100 J		140 J			170 J							120 J		150 J
Ridolfi	SS-09	470E-SS-09d	0.25	0.5				110 J	78 J					130 J			290 J							300 J		210 J
Ridolfi	SS-10	470E-SS-10s	0	0.25					81 J					100 J			120 J									110 J
Ridolfi	SS-10	470E-SS-10d	0.25	0.5				99 J	76 J					120 J			200 J							110 J		160 J
Ridolfi	SS-11	470E-SS-11s	0	0.25				150 J	130 J	120 J		150 J		190 J			330 J		100 J					160 J		290 J
Ridolfi	SS-11	470E-SS-11d	0.25	0.5				120 J	130 J	140 J		140 J		150 J			210 J							130 J		180 J
Ridolfi	SS-12	470E-SS-12s	0	0.25				88 J	82 J			100 J		130 J			160 J									150 J
Ridolfi	SS-12	470E-SS-12d	0.25	0.5				110 J	100 J	120 J		130 J		150 J			210 J							110 J		180 J
Ridolfi	SS-13	470E-SS-13s	0	0.25				220 J	210 J	250 J	130 J	220 J		270 J			390 J		160 J					260 J		360 J
Ridolfi	SS-13	470E-SS-13d	0.25	0.5				180 J	180 J	220 J	100 J	230 J		250 J			340 J		120 J			52 J		230 J		260 J
Ridolfi	SS-14	470E-SS-14s	0	0.25				110 J	110 J	130 J		140 J		140 J			240 J							120 J		190 J
Ridolfi	SS-14	470E-SS-14d	0.25	0.5				110 J	120 J	160 J		130 J		150 J			190 J							120 J		210 J
Ridolfi	SS-15	470E-SS-15s	0	0.25				160 J	170 J	210 J		190 J		210 J			330 J		100 J					210 J		290 J
Ridolfi	SS-15	470E-SS-15d	0.25	0.5				260 J	310 J	380 J	150 J	300 J	43 J	310 J			490 J		160 J			48 J		350 J		430 J
Ridolfi	SS-16	470E-SS-16s	0	0.25					52 J								120 J									110 J

Table 5-5
Surface Soil Analytical Results for SVOCs that Exceed Screening Levels

Parameter Group					Semivolatile Organic Compounds (µg/kg)																					
Analyte					Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)Anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Carbazole	Chrysene	Dibenzo(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	4-Methylphenol	Naphthalene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
Region III BTAG Screening Level for Soil (Flora)					100	100	100	100	NA	100	100	100	NA	100	100	NA	100	100	100	NA	100	100	100	100	100	100
Region III BTAG Screening Level for Soil (Fauna)					100	100	100	100	100	100	100	100	NA	100	100	NA	100	100	100	NA	100	100	100	100	100	100
D.C. Risk-Based Screening Level (Residential Soil)					196,000	NA	8,080	1,050	105	1,050	4,170	8,160	NA	3,920	NA	233,000	101,000	145,000	NA	NA	NA	NA	6,400	140,000	33,000,000	87,200
D.C. Soil Quality Standards for Petroleum-Contaminated Soil					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	706,000	NA	NA	NA	NA
U.S. EPA Region III RBC for Residential Soil					4,700,000	NA	23,000,000	870	87	870	NA	8,700	32,000	87,000	87	310,000	3,100,000	3,100,000	870	1,600,000	390,000	1,600,000	5,300	NA	23,000,000	2,300,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					5,200	NA	23,000	73	19	230	NA	2,300	23	7,300	70	380	310,000	6,800	640	1,000	NA	7.7	NA	NA	3,300	34,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					100,000	NA	470,000	1,500	370	4,500	NA	45,000	470	150,000	1,400	7,700	6,300,000	140,000	13,000	22,000	NA	150	NA	NA	67,000	680,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																							
Ridolfi	SS-17	470E-SS-17s	0	0.25				110 J	96 J	140 J		120 J		140 J			210 J							110 J		210 J
Ridolfi	SS-17	470E-SS-17d	0.25	0.5				85 J	100 J	110 J		110 J		150 J			160 J		100 J							180 J
Ridolfi	SS-18	470E-SS-18s	0	0.25				91 J	89 J	120 J		100 J		120 J			170 J									170 J
Ridolfi	SS-18	470E-SS-18d	0.25	0.5				94 J	86 J			110 J		120 J			190 J									180 J
Ridolfi	SS-19	470E-SS-19s	0	0.25		210 J	270 J	720 J	460 J	900 J	210 J	830 J	83 J	880 J	84 J		860 J		230 J					170 J		1,600 J
Ridolfi	SS-19	470E-SS-19d	0.25	0.5			210 J	410 J	450 J	700 J	300 J	640 J	56 J	770 J	97 J		530 J		310 J					140 J		540 J
Ridolfi	SS-20	470E-SS-20s	0	0.25			230 J				210 J											180 J		160 J		120 J
Ridolfi	SS-20	470E-SS-35 $^{(2)}$	0	0.25			210 J																			
Ridolfi	SS-20	470E-SS-20d	0.25	0.5					38 J					130 J						1,500 J	340 J	680 J		330 J		180 J
Ridolfi	SS-21	470E-SS-21s	0	0.25				95 J	96 J	110 J				120 J			160 J									190 J
Ridolfi	SS-21	470E-SS-21d	0.25	0.5				150 J	150 J	160 J	100 J	130 J		170 J			270 J							130 J		270 J
Ridolfi	SS-22	470E-SS-22s	0	0.25		100 J	150 J	420 J	460 J	1,200 J	170 J	770 J	130 J	960 J	100 J		990 J		220 J			97 J		450 J		880 J
Ridolfi	SS-22	470E-SS-36 $^{(3)}$	0	0.25		110 J	160 J	430 J	410 J	980 J	300 J	720 J	160 J	1,100 J	110 J		1,600 J		350 J			110 J		810 J		910 J
Ridolfi	SS-22	470E-SS-22d	0.25	0.5		140 J	240 J	1,400 J	1,900 J	3,100 J	640 J	3,100 J	250 J	2100 J	260 J		2,600 J		910 J			97 J	5,200 J	750 J		2,000 J
Ridolfi	SS-23	470E-SS-23s	0	0.25			160 J	380 J	340 J	380 J	100 J	450 J	90 J	380 J			940 J		140 J					620 J		700 J
Ridolfi	SS-23	470E-SS-23d	0.25	0.5			130 J	410 J	380 J	470 J	130 J	540 J	90 J	420 J			880 J		150 J					540 J		680 J
Ridolfi	SS-24	470E-SS-24s	0	0.25				170 J	170 J	230 J		140 J		190 J			260 J							140 J		290 J
Ridolfi	SS-24	470E-SS-24d	0.25	0.5				150 J	140 J	160 J		160 J		180 J			280 J							160 J		260 J
Ridolfi	SS-25	470E-SS-25	0	0.25				280 J	270 J	310 J	130 J	320 J		330 J			760 J		110 J					260 J		610 J
Ridolfi	SS-26	470E-SS-26s	0	0.25				74 J	57 J			100 J		100 J			160 J									170 J
Ridolfi	SS-27	470E-SS-27	0	0.25			240 J	820 J	740 J	800 J	190 J	770 J	110 J	830 J	86 J		1,700 J		210 J					920 J		1,500 J
Ridolfi	SS-28	470E-SS-28s	0	0.25				170	200	210	140	200		230			290		140					150		280
Ridolfi	SS-28	470E-SS-28d	0.25	0.5				230	260	310	130	230		290			360		140					180		360
Ridolfi	SS-29	470E-SS-29-01	0	0.25				400 J	420 J	440 J	150 J	420 J		430 J			710 J		180 J					350 J		630 J
Ridolfi	SS-29	470E-SS-29-02	0.25	0.5				240	240	220		260		260			460							280		400
Ridolfi	SS-30	470E-SS-30	0	0.25				340	330	300	220	310		340			720		220					370		540
Ridolfi	SS-31	470E-SS-31	0	0.25	110		430	1,500	1,500	1,500	980	1,200	230	1,500	270		3,400	120	980					1,700		2,400
Ridolfi	SS-32	470E-SS-32	0	0.25			120	670	740	1,000	630	650	100	800	150		1,400		630					540		1,000
Brown	WL01	NA	0	0.5				352 J	425	922	246 J			388 J			554		189 J					196 J		432
Brown	WL02	NA	0	0.5				350 J	524	571	205 J			383 J			673		161 J					332 J		462
Brown	WL03	NA	0	0.5				354 J	629	829				366 J			371 J									259 J
Brown	WL03	NA	0	2				246 J	268 J	495				273 J			608							224 J		291 J
Brown	WL05	NA	0	1.5				838 J	933	1,650				841 J			1,600							451 J		1,200

Notes:

(1) = Soil sample 470E-SS-34 was a field duplicate of 470E-SS-08s.
(2) = Soil sample 470E-SS-35 was a field duplicate of 470E-SS-20s.
(3) = Soil sample 470E-SS-36 was a field duplicate of 470E-SS-22s.
B = Indicates the parameter was also detected in the method blank.
Brown = Thomas L. Brown Associates.
BTAG = Biological Technical Assessment Group.
DAF = Dilution Attenuation Factor.
D.C. = District of Columbia.

E = Indicates the value was above the linear range of the detector. Dilution was required.
Environ = Environ Corporation.
J = Value is an estimate.
mg/kg = micrograms per kilogram or parts per billion (ppb).
NA = Not available.
RBC = Risk-Based Concentration.
SSL = Soil screening level.
SVOCs = Semivolatile organic compounds.
U.S. EPA = United States Environmental Protection Agency.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "surface soil" if all or a portion of the sample was collected between 0 and 2 feet below ground surface.
2-methylphenol was detected in some samples. No screening levels are available for this parameter.

Table 5-6
Surface Soil Chlorinated Dioxin/Furan Data
Summary for Sample BP01 (0.0' to 0.5')

Congener	TEF	Concentration (pg/g)	Detection Limit (pg/g)	TEQ (Detects Only)	TEQ (Non-Detects = 1/2 DL*)	Total TEQ (pg/g)
2,3,7,8-TCDD	1	U	0.27		0.135	0.135
1,2,3,7,8-PeCDD	0.5	2.5 I		1.250		1.250
1,2,3,4,7,8-HxCDD	0.1	4.6 I		0.460		0.460
1,2,3,6,7,8-HxCDD	0.1	5.7		0.570		0.570
1,2,3,7,8,9-HxCDD	0.1	4.2 I		0.420		0.420
1,2,3,4,6,7,8-HpCDD	0.01	150		1.500		1.500
OCDD	0.001	3,600		3.600		3.600
2,3,7,8-TCDF	0.1	2.7		0.270		0.270
1,2,3,7,8-PeCDF	0.05	7.6		0.380		0.380
2,3,4,7,8-PeCDF	0.5	4.1 J		2.050		2.050
1,2,3,4,7,8-HxCDF	0.1	2.1 I		0.210		0.210
1,2,3,6,7,8-HxCDF	0.1	42 E		4.200		4.200
2,3,4,6,7,8-HxCDF	0.1	3.5 I		0.350		0.350
1,2,3,7,8,9-HxCDF	0.1	U	0.53		0.027	0.027
1,2,3,4,6,7,8-HpCDF	0.01	20		0.200		0.200
1,2,3,4,7,8,9-HpCDF	0.01	1 I		0.010		0.010
OCDF	0.001	36		0.036		0.036
Total Toxic Equivalent (TEQ)				15.506	0.162	**15.668**
U.S. EPA Region III Biological Technical Assessment Group Soil Screening Level (Flora - 2,3,7,8-TCDD)						**NA**
U.S. EPA Region III Biological Technical Assessment Group Soil Screening Level (Fauna - 2,3,7,8-TCDD)						**10,000**
U.S. EPA Region III Residential Risk-Based Concentration for Dioxin (2,3,7,8-TCDD)						**4.3**

Notes:
1/2 DL* = For congeners that were not detected at or above the laboratory detection limit, 1/2 of the detection limit was used for TEQ.
E = Exceeds calibration.
I = Interference.
J = Value is an estimate.
NA = Not applicable.
pg/g = picograms per gram or parts per trillion.
TEF = Toxic equivalency factor (WHO 1998)
TEQ = Toxic Equivalent.
U = Analytical result not detected above the laboratory reporting limit.
U.S. EPA = United State Environmental Protection Agency.

Table 5-7
Surface Soil Chlorinated Dioxin/Furan Data
Summary for Sample BP01 (1.0' to 1.5')

Congener	TEF	Concentration (pg/g)	Detection Limit (pg/g)	TEQ (Detects Only)	TEQ (Non-Detects = 1/2 DL*)	Total TEQ (pg/g)
2,3,7,8-TCDD	1	U	0.26		0.130	0.130
1,2,3,7,8-PeCDD	0.5	U	0.72		0.180	0.180
1,2,3,4,7,8-HxCDD	0.1	0.78 I		0.078		0.078
1,2,3,6,7,8-HxCDD	0.1	3.5 J		0.350		0.350
1,2,3,7,8,9-HxCDD	0.1	2.3 J		0.230		0.230
1,2,3,4,6,7,8-HpCDD	0.01	70		0.700		0.700
OCDD	0.001	1,400		1.400		1.400
2,3,7,8-TCDF	0.1	7		0.700		0.700
1,2,3,7,8-PeCDF	0.05	15 E		0.750		0.750
2,3,4,7,8-PeCDF	0.5	4.8 J		2.400		2.400
1,2,3,4,7,8-HxCDF	0.1	3.4 J		0.340		0.340
1,2,3,6,7,8-HxCDF	0.1	4.5 E		0.450		0.450
2,3,4,6,7,8-HxCDF	0.1	1.7 BJ		0.170		0.170
1,2,3,7,8,9-HxCDF	0.1	U	0.53		0.027	0.027
1,2,3,4,6,7,8-HpCDF	0.01	8		0.080		0.080
1,2,3,4,7,8,9-HpCDF	0.01	0.79 I		0.008		0.008
OCDF	0.001	20		0.020		0.020
Total Toxic Equivalent (TEQ)				7.676	0.337	**8.012**
U.S. EPA Region III Biological Technical Assessment Group Soil Screening Level (Flora - 2,3,7,8-TCDD						**NA**
U.S. EPA Region III Biological Technical Assessment Group Soil Screening Level (Fauna - 2,3,7,8-TCDD						**10,000**
U.S. EPA Region III Residential Risk-Based Concentration for Dioxin (2,3,7,8-TCDD)						**4.3**

Notes:
1/2 DL* = For congeners that were not detected at or above the laboratory detection limit, 1/2 of the detection limit was used for TEQ.
B = Less than 10x higher than the method blank level.
E = Exceeds calibration.
I = Interference.
J = Value is an estimate.
NA = Not applicable.
pg/g = picograms per gram or parts per trillion.
TEF = Toxic equivalency factor (WHO 1998)
TEQ = Toxic Equivalent.
U = Analytical result not detected above the laboratory reporting limit.
U.S. EPA = United State Environmental Protection Agency.

Table 5-8
Sediment Analytical Results for Pesticides and PCBs that Exceed Screening Levels

Parameter Group					Pesticides/PCBs (µg/kg)				
Analyte					DDD	DDE	DDT	Dieldrin	Total PCBs (2)
Region III BTAG Screening Level for Sediment (Flora)					NA	2.2	1.58	NA	22.7
Region III BTAG Screening Level for Sediment (Fauna)					16	2.2	1.58	NA	22.7
NOAA SQRT Threshold Effects Level					3.54	1.42	NA	2.85	34.1
NOAA SQRT Probable Effects Level					8.51	6.75	NA	6.67	277
Sampler	Station ID	Sample ID	Sample Depth (ft.)						
Brown	SB14	NA	0	2	**119**	**311**	117		125
Ridolfi	SS-01	470E-SS-01s	0	0.25	4.1		32		180
Ridolfi	SS-01	470E-SS-01d	0.25	0.5					163
Ridolfi	SS-02	470E-SS-02s	0	0.25					162
Ridolfi	SS-02	470E-SS-02d	0.25	0.5				4.9	162
Ridolfi	SS-03	470E-SS-03s	0	0.25					140
Ridolfi	SS-03	470E-SS-03d	0.25	0.5					144
Ridolfi	SS-04	470E-SS-04s	0	0.25					152
Ridolfi	SS-04	470E-SS-04d	0.25	0.5					148
Ridolfi	SS-07	470E-SS-07	0	0.25	**110,000**	**1,600**	64,000		**1,610**
Ridolfi	SS-08	470E-SS-08s	0	0.25	**33,000 JN**	**4,600**	5,200		**3,013**
Ridolfi	SS-08	470E-SS-34 (2)	0	0.25	**31,000**	**3,600**	4,500		**3,013**
Ridolfi	SS-08	470E-SS-08d	0.25	0.5	**93,000**	**8,700**	130,000		**5,730**
Ridolfi	SS-09	470E-SS-09s	0	0.25	**770**	**1,000**	280		203
Ridolfi	SS-09	470E-SS-09d	0.25	0.5	**680**	**740**	180		167
Ridolfi	SS-10	470E-SS-10s	0	0.25	**67**	**330**	72		**428**
Ridolfi	SS-10	470E-SS-10d	0.25	0.5	**120**	**290**	120		**386**
Ridolfi	SS-12	470E-SS-12s	0	0.25	**1,000**	**540**	400		**920**
Ridolfi	SS-12	470E-SS-12d	0.25	0.5	**460**	**480**	55 J		**685**
Ridolfi	SS-13	470E-SS-13s	0	0.25	**1,300**	**2,300**	420		**424**
Ridolfi	SS-13	470E-SS-13d	0.25	0.5	**3,900**	**2,600**	1,300		**412**
Ridolfi	SS-14	470E-SS-14s	0	0.25	**660 JN**	**1,300**	1,700		218
Ridolfi	SS-14	470E-SS-14d	0.25	0.5	**220**	**920**	1,100		182

Table 5-8
Sediment Analytical Results for Pesticides and PCBs that Exceed Screening Levels

Parameter Group					Pesticides/PCBs (µg/kg)				
Analyte					DDD	DDE	DDT	Dieldrin	Total PCBs (2)
Region III BTAG Screening Level for Sediment (Flora)					NA	2.2	1.58	NA	22.7
Region III BTAG Screening Level for Sediment (Fauna)					16	2.2	1.58	NA	22.7
NOAA SQRT Threshold Effects Level					3.54	1.42	NA	2.85	34.1
NOAA SQRT Probable Effects Level					8.51	6.75	NA	6.67	277
Sampler	Station ID	Sample ID	Sample Depth (ft.)						
Ridolfi	SS-17	470E-SS-17s	0	0.25	**19**	**64**	56		168
Ridolfi	SS-17	470E-SS-17d	0.25	0.5	**29 J**	**92**	54 J		166
Brown	WL01	NA	0	0.5	**7,530**	**3,530**	2,330		**6,000**
Brown	WL02	NA	0	0.5	**330**	**145**			**475**
Brown	WL03	NA	0	0.5	**176**	**236**			
Brown	WL03	NA	0	2	**490**	**522**	57	**50**	

Notes:
(1) = Sample 470E-SS-34 was a field duplicate of 470E-SS-08s.
(2) = For PCBs that were not detected at or above the laboratory detection limit, 1/2 of the detection limit was used for total PCBs. If no single PCB was detected in a particular sample, total PCBs were not calculated for that sample.
BTAG = Biological Technical Assessment Group.
J = Value is an estimate.
JN = The analysis indicates the presence of an analyte that has been 'tentatively identified' and the associated numerical value represents its approximate concentration.
mg/kg = micrograms per kilogram or parts per billion (ppb).
NA = Not available.
NOAA = National Oceanic and Atmospheric Administration.
PCBs = Polychlorinated biphenyls.
SQRT = Screening Quick Reference Tables, dated September 1999.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
Bold font and underlining indicates the sample result exceeded the NOAA SQRT Probable Effects Level.
For the purpose of this table, a sample was considered "sediment" if the sample was collected from within a wetland area and all or a portion of the sample was collected between 0 and 2 feet below ground surface.
Alpha chlordane, Aroclor 1248, Aroclor 1260, gamma chlordane, beta-BHC, delta BHC, diazinon, endosulfan I, endosulfan sulfate, endrin aldehyde, heptaclor, and methoxychlor were detected in some samples. No screening levels are available for these parameters.

Table 5-9
Sediment Analytical Results for Metals and Metalloids that Exceed Screening Levels

Parameter Group					Inorganics (mg/kg)								
Analyte					Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc
Region III BTAG Screening Level for Sediment (Flora)					8.2	5.1	0.005	NA	NA	0.15	20.9	NA	NA
Region III BTAG Screening Level for Sediment (Fauna)					8.2	1.2	260	34	46.7	0.15	20.9	1	150
NOAA SQRT Threshold Effects Level					5.9	0.596	37.3	35.7	35	0.174	18	NA	123.1
NOAA SQRT Probable Effects Level					17	3.53	90	197	91.3	0.486	35.9	NA	315
Sampler	Station ID	Sample ID	Sample Depth (ft.)										
Brown	SB14	NA	0	2	**44**	2.5	21.7	46.9	**230**				306
Ridolfi	SS-01	470E-SS-01s	0	0.25			31				23		
Ridolfi	SS-01	470E-SS-01d	0.25	0.5			18.7				22		
Ridolfi	SS-02	470E-SS-02s	0	0.25			20.8				28		
Ridolfi	SS-02	470E-SS-02d	0.25	0.5			17.9				19		
Ridolfi	SS-03	470E-SS-03s	0	0.25			19.6						
Ridolfi	SS-03	470E-SS-03d	0.25	0.5			19.3						
Ridolfi	SS-04	470E-SS-04s	0	0.25			19.4						
Ridolfi	SS-04	470E-SS-04d	0.25	0.5			16.9						
Ridolfi	SS-07	470E-SS-07	0	0.25	**63**	**4.5**	70.3	103	**95**	0.42	**70**		**803**
Ridolfi	SS-08	470E-SS-08s	0	0.25	**88**	2.4	**95**	71.5	**240**	0.3	**83**	1.1	**536**
Ridolfi	SS-08	470E-SS-34 (1)	0	0.25	**81**	2.3	**91**	69.5	**259**	0.3	**86**		**565**
Ridolfi	SS-08	470E-SS-08d	0.25	0.5	**80**	1.9	59.4	52.2	**187**	0.27	**60**		**510**
Ridolfi	SS-09	470E-SS-09s	0	0.25			32.7		77		**40**		
Ridolfi	SS-09	470E-SS-09d	0.25	0.5			19.7		56		22		
Ridolfi	SS-10	470E-SS-10s	0	0.25			25.4		80	0.21	18		
Ridolfi	SS-10	470E-SS-10d	0.25	0.5			34.1		82	0.23	27		141
Ridolfi	SS-12	470E-SS-12s	0	0.25	**37**	1	35.8	47.6	**158**	0.39	30		211
Ridolfi	SS-12	470E-SS-12d	0.25	0.5	**39**	0.8	36.5	44.5	**133**	0.43	31		180

Table 5-9
Sediment Analytical Results for Metals and Metalloids that Exceed Screening Levels

Parameter Group					Inorganics (mg/kg)								
Analyte					Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc
Region III BTAG Screening Level for Sediment (Flora)					8.2	5.1	0.005	NA	NA	0.15	20.9	NA	NA
Region III BTAG Screening Level for Sediment (Fauna)					8.2	1.2	260	34	46.7	0.15	20.9	1	150
NOAA SQRT Threshold Effects Level					5.9	0.596	37.3	35.7	35	0.174	18	NA	123.1
NOAA SQRT Probable Effects Level					17	3.53	90	197	91.3	0.486	35.9	NA	315
Sampler	Station ID	Sample ID	Sample Depth (ft.)										
Ridolfi	SS-13	470E-SS-13s	0	0.25	**50**	0.9	27.5	54.4	**300**	0.35	24		**336**
Ridolfi	SS-13	470E-SS-13d	0.25	0.5	**29**	0.8	25.8	45.6	**260**	0.23	22		219
Ridolfi	SS-14	470E-SS-14s	0	0.25	7.4		31		**99**	0.27	23		
Ridolfi	SS-14	470E-SS-14d	0.25	0.5	6.8		30.1		**96**	0.31	22		126
Ridolfi	SS-17	470E-SS-17s	0	0.25			22		77	0.36	22		
Ridolfi	SS-17	470E-SS-17d	0.25	0.5			22.7		80	0.4	22		
Ridolfi	SS-27	470E-SS-27 (2)	0	0.25			23.5				**58**		
Brown	WL01	NA	0	0.5		1.4	20.3		**103**		**42.5**		
Brown	WL02	NA	0	0.5		1.9	17.4		88.1		24.8		
Brown	WL03	NA	0	0.5		1.6	19	43.2	**315**		26.4		191
Brown	WL03	NA	0	2		2.1	20.6		**102**	0.26	19.3		

Notes:
(1) = Soil sample 470E-SS-34 was a field duplicate of 470E-SS-08s.
(2) = Sample 470E-SS-27 was not collected from a Wetland Area. The sample was a sediment sample collected from Stickfoot Sewer.
Brown = Thomas L. Brown Associates.
BTAG = Biological Technical Assessment Group.
J = Value is an estimate.
K = This qualifier was not explained in the RAI report.
L = This qualifier was not explained in the RAI report.
mg/kg = milligrams per kilogram or parts per million (ppm).
NA = Not available.
NOAA = National Oceanic and Atmospheric Administration.
SQRT = Screening Quick Reference Tables, dated September 1999.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "sediment" if the sample was collected from within a wetland area and all or a portion of the sample was collected between 0 and 2 feet below ground surface.
Bold font and underlining indicates the analytical result exceeds the NOAA SQRT Probable Effects Level.
Aluminum, barium, beryllium, calcium, cobalt, cyanide, iron, magnesium, manganese, potassium, selenium, sodium, thallium, and vanadium were detected in some samples. No screening levels are available for these parameters.

Table 5-10
Sediment Analytical Results for SVOCs that Exceed Screening Levels

Parameter Group					Semivolatile Organic Compounds (µg/kg)																		
Analyte					Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Butylbenzylphthalate	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Di-n-butylphthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	4-Methylphenol	Phenanthrene	Pyrene
Region III BTAG Screening Level for Sediment (Flora)					16	44	NA	261	430	3,200	670	NA	384	63.4	540	NA	600	19	600	70	670	240	665
Region III BTAG Screening Level for Sediment (Fauna)					16	44	85.3	261	430	3,200	670	63	384	63.4	540	1,400	600	19	600	70	670	240	665
NOAA SQRT Threshold Effects Level					NA	NA	NA	31.7	31.9	NA	NA	NA	57.1	NA	NA	NA	111	NA	NA	NA	NA	41.9	53
NOAA SQRT Probable Effects Level					NA	NA	NA	385	782	NA	NA	NA	862	NA	NA	NA	2,355	NA	NA	NA	NA	515	875
Sampler	Station ID	Sample ID	Sample Depth (ft.)																				
Brown	SB14	NA	0	2												3,300 B							
Ridolfi	SS-01	470E-SS-01s	0	0.25				67 J	64 J				87 J				120 J					65 J	130 J
Ridolfi	SS-04	470E-SS-04s	0	0.25				36 J															75 J
Ridolfi	SS-07	470E-SS-07	0	0.25	37 J	62 J	140 J	**<u>410 J</u>**	360 J			200 J	510 J				660 J	52 J		93 J		360 J	750 J
Ridolfi	SS-08	470E-SS-08s	0	0.25	20 J	160 J	140 J	**<u>450 J</u>**	410 J				630 J	70 J			870 J			81 J		240 J	820 J
Ridolfi	SS-08	470E-SS-34 (1)	0	0.25		100 J		280 J	270 J				370 J				550 J					140 J	550 J
Ridolfi	SS-08	470E-SS-08d	0.25	0.5		47 J		170 J	150 J				240 J				340 J					120 J	280 J
Ridolfi	SS-09	470E-SS-09s	0	0.25				100 J	96 J				140 J				170 J					120 J	150 J
Ridolfi	SS-09	470E-SS-09d	0.25	0.5				110 J	78 J				130 J				290 J					300 J	210 J
Ridolfi	SS-10	470E-SS-10s	0	0.25				72 J	81 J				100 J				120 J					57 J	110 J
Ridolfi	SS-10	470E-SS-10d	0.25	0.5				99 J	76 J				120 J				200 J					110 J	160 J
Ridolfi	SS-12	470E-SS-12s	0	0.25				88 J	82 J				130 J				160 J					97 J	150 J
Ridolfi	SS-12	470E-SS-12d	0.25	0.5				110 J	100 J				150 J				210 J					110 J	180 J
Ridolfi	SS-13	470E-SS-13s	0	0.25				220 J	210 J				270 J				390 J					260 J	360 J
Ridolfi	SS-13	470E-SS-13d	0.25	0.5				180 J	180 J				250 J				340 J					230 J	260 J
Ridolfi	SS-14	470E-SS-14s	0	0.25				110 J	110 J				140 J				240 J					120 J	190 J
Ridolfi	SS-14	470E-SS-14d	0.25	0.5				110 J	120 J				150 J				190 J					120 J	210 J
Ridolfi	SS-17	470E-SS-17s	0	0.25				110 J	96 J				140 J				210 J					110 J	210 J
Ridolfi	SS-17	470E-SS-17d	0.25	0.5				85 J	100 J				150 J				160 J					86 J	180 J
Ridolfi	SS-27	470E-SS-27 (2)	0	0.25	57		240	**<u>820</u>**	740	800			830	86			1,700	66				**<u>920</u>**	**<u>1,500</u>**
Brown	WL01	NA	0	0.5				352 J	425				388 J				554					196 J	432
Brown	WL02	NA	0	0.5				350 J	524				383 J				673					332 J	462
Brown	WL03	NA	0	0.5				354 J	629				366 J			1,410 B	371 J						259 J
Brown	WL03	NA	0	2				246 J	268 J				273 J				608					224 J	291 J

Notes:

(1) = Soil sample 470E-SS-34 was a field duplicate of 470E-SS-08s.
(2) = Sample 470E-SS-27 was not collected from a Wetland Area. The sample was a sediment sample collected from Stickfoot Sewer.
B = Indicates the parameter was also detected in the method blank.
BTAG = Biological Technical Assessment Group.
Brown = Thomas L. Brown Associates.
J = Value is an estimate.

mg/kg = micrograms per kilogram or parts per billion (ppb).
NA = Not available.
NOAA = National Oceanic and Atmospheric Administration.
SQRT = Screening Quick Reference Tables, dated September 1999.
SVOCs = Semivolatile organic compounds.
U.S. EPA = United States Environmental Protection Agency.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "sediment" if the sample was collected from within a wetland area and all or a portion of the sample was collected between 0 and 2 feet below ground surface.
<u>Bold font and underlining</u> indicates the analytical result exceeds the NOAA SQRT Probable Effects Level.
2-methylphenol, 3-nitroaniline, benzaldehyde, benzo(k)fluoranthene, bis(2-Ethylhexyl)phthalate, carbazole, and phenol were detected in some samples. No screening levels are available for these parameters.

Table 5-11
Subsurface Soil Analytical Results for Petroleum Hydrocarbons that Exceed Screening Levels

Parameter Group					Total Petroleum Hydrocarbons (mg/kg)	
Analyte					Diesel Range	Motor Oil Range
D.C. Soil Quality Standard for Petroleum-Contaminated Soil					960	960 (1)
Sampler	Station ID	Sample ID	Sample Depth (ft.)			
Ridolfi	DCMW010-02	470E-SB35-01	3	5		970
Ridolfi	DCMW012-02	470E-SB39-01	2	4		1,100
Brown	SB37	NA	5	9	1,280	

Notes:
(1) = No screening level was available for motor-oil range hydrocarbons. A screening value of 960 mg/kg was used for comparison purposes.
Brown = Thomas L. Brown Associates.
D.C. = District of Columbia.
mg/kg = milligrams per kilogram or parts per million (ppm).
NA = Not available.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "subsurface soil" if the top portion of the sampling interval was greater than or equal to 2.0 feet below ground surface.

Table 5-12
Subsurface Soil Analytical Results for Pesticides and PCBs that Exceed Screening Levels

Parameter Group					Pesticides/Polychlorinated Biphenyls (µg/kg)					
Analyte					DDD	DDE	DDT	Methoxychlor	Aroclor 1260	Total PCBs (2)
Region III BTAG Screening Level for Soil (Flora)					100	100	100	100	NA	100
Region III BTAG Screening Level for Soil (Fauna)					100	100	100	100	NA	NA
D.C. Risk-Based Screening Level (Residential Soil)					3,200	2,260	4.07	NA	NA	NA
U.S. EPA Region III RBC for Residential Soil					2,700	1,900	1,900	390,000	320	320
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					560	1,800	58	15,000	NA	21
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					11,000	35,000	1,200	310,000	NA	410
Sampler	Station ID	Sample ID	Sample Depth (ft.)							
Ridolfi	DCMW006-02	470E-SB30-01	2.5	4		170	410		390 J	654.5
Ridolfi	DCMW006-02	470E-SB30-02	6	8			6.5			
Ridolfi	DCMW007-02	470E-SB31-01	4	6			4.5			
Ridolfi	DCMW007-02	470E-SB31-02	10	12			13			170.5
Ridolfi	DCMW008-02	470E-SB33-01	2	4		130	54			233
Ridolfi	DCMW010-02	470E-SB35-01	3	5	910	7,200	740			
Ridolfi	DCMW010-02	470E-SB35-02	6	8		140	26			
Brown	MW02	NA	7.5	9				278		
Brown	SB-2	NA	7.5	9	160	686				
Brown	SB-3	NA	4.5	5.5	217	342	92			
Brown	SB12	NA	7.5	9	1030	1,470				
Brown	SB38	NA	13.5	15	145					
Brown	SB43	NA	2.5	4.5	450	220	420			
Brown	SB44	NA	2.5	4.5		196	108			
Ridolfi	SB-101	470E-SB32-01	6	8						197
Ridolfi	SB-101	470E-SB32-03 (1)	6	8						186.5
Ridolfi	SB-103	470E-SB38-01	2	4						181.5
Ridolfi	SS-29	470E-SS-29-03	2	4			18			209
Brown	WL03	NA	2	4	208	130				

Notes:

(1) = Soil sample 470E-SB32-03 was a field duplicate of 470E-SB32-01.

(2) = For PCBs that were not detected at or above the laboratory detection limit, 1/2 of the detection limit was used for total PCBs. If no single PCB was detected in a particular sample, total PCBs were not calculated for that sample.

Brown = Thomas L. Brown Associates.

DAF = Dilution Attenuation Factor.

J = Value is an estimate.

mg/kg = micrograms per kilogram or parts per billion (ppb).

NA = Not available.

RBC = Risk-Based Concentration.

SSL = Soil screening level.

PCBs = Polychlorinated biphenyls.

U.S. EPA = United States Environmental Protection Agency.

BTAG = Biological Technical Assessment Group.

D.C. = District of Columbia.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "subsurface soil" if the top portion of the sampling interval was greater than or equal to 2.0 feet below ground surface.
Alpha chlordane, beta-BHC, endosulfan sulfate, endrin aldehyde, endrin ketone, and gamma chlordane were detected in some samples. No screening levels are available for these parameters.

Table 5-13
Subsurface Soil Analytical Results for Metals and Metalloids that Exceed Screening Levels

Parameter Group					Inorganics (mg/kg)																	
Analyte					Aluminum	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Region III BTAG Screening Level for Soil (Flora)					1	328	440	0.02	2.5	0.02	15	3,260	2	4,400	330	0.058	2	18	0.0000098	0.001	0.500	10
Region III BTAG Screening Level for Soil (Fauna)					NA	NA	440	NA	NA	0.0075	NA	12	0.01	4,400	330	0.058	NA	18	NA	NA	58	NA
D.C. Risk-Based Screening Level (Residential Soil)					NA	0.101	NA	NA	0.3	0.0461	2,630	NA	NA	NA	NA	NA	NA	329	329	NA	461	19,800
U.S. EPA Region III RBC for Residential Soil					78,000	0.43	5,500	160	39	230	3,100	23,000	NA	NA	11,000	NA	1,600	390	390	5.5	550	23,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					NA	0.0013	110	58	1.4	2.1	530	NA	NA	NA	330	NA	NA	0.95	1.6	0.18	260	680
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					NA	0.026	2,100	1,200	27	42	11,000	NA	NA	NA	6,700	NA	NA	19	31	3.6	5,100	14,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																			
Ridolfi	DCMW006-02	470E-SB30-01	2.5	4	11,100	7.5	172	0.9	0.6	24.5	25.6	18,500	170		347	0.21	22		1.1	0.2	39.6	187
Ridolfi	DCMW006-02	470E-SB30-02	6	8	13,600	3		0.8		23.2	17.5	19,200	32		405	0.22	19			0.2	28.1	64.2
Ridolfi	DCMW007-02	470E-SB31-01	4	6	15,400	3.4	142	0.9		26	19.9	26,000	61		388	0.1	12			0.3	44.5	75.1
Ridolfi	DCMW007-02	470E-SB31-02	10	12	14,200	3.7		0.6		21.1		20,500	17			0.14	12			0.2	32.3	42.4
Ridolfi	DCMW008-02	470E-SB33-01	2	4	10,700	7.4		0.6		25.8	33.2	26,500	160			0.28	12		0.7		32.6	112
Ridolfi	DCMW008-02	470E-SB33-02	12	14	20,500	2.9	151	1.6		30.8	33.9	33,600	60		442	0.63	32			0.2	40.2	126
Ridolfi	DCMW009-02	470E-SB34-01	6	8	7,520	2.9		0.4		15.4		14,400	70			0.18	9				20.8	57.4
Ridolfi	DCMW009-02	470E-SB34-02	12	14	12,300	2.7		0.9		20.7	19.5	22,200	37		533	0.28	20				27.4	72.4
Ridolfi	DCMW010-02	470E-SB35-01	3	5	11,000	7.8	121	0.6	0.5	22.5	48.2	15,200	290	18,400	432	0.13	17			0.2	39.5	247
Ridolfi	DCMW010-02	470E-SB35-02	6	8	12,800	8.2	313	0.6		22.4	42.7	18,600	440	12,200	912	0.12	13			0.2	64.9	421
Ridolfi	DCMW011-02	470E-SB37-01	6	8	18,500	3.5	149	1.4		28.5	29.3	32,000	42		1,060	0.42	28				35.9	110
Ridolfi	DCMW011-02	470E-SB37-02	12	14	14,800	3.2	113	1		23.7	24.8	19,000	56			0.7	22			0.2	31.5	80
Ridolfi	DCMW012-02	470E-SB39-01	2	4	7,750	3.9	111	0.5		17.5	31.6	16,400	310			0.55	17				26.3	169
Ridolfi	DCMW012-02	470E-SB39-02	8	11	10,800	2.6		0.5		18.3	64.2	18,600	280			0.13	16				25.9	66.4
Ridolfi	DCMW013-02	470E-SB40-01	2	4	22,800	6.6	200	1.4		32.2	33.6	33,400	72	8,360	734	0.27	28			0.4	42.8	110
Ridolfi	DCMW013-02	470E-SB40-02	6	8	25,500	3.5	212	1.7		34.5	27.9	36,900	22		1,260	0.24	30			0.4	49.4	96
Ridolfi	DCMW014-02	470E-SB41-01	2	4	26,700	2.6	200	1.9		39	40.3	34,300	55		423	0.5	33			0.5	50.9	139
Ridolfi	DCMW014-02	470E-SB41-02	6	8	27,400	2.1	238	2		37.2	30.4	37,800	30		790	0.2	34			0.4	49.7	111
Ridolfi	DCMW015-02	470E-SB42-01	4	6	19,000	4.5	156	1.3		29.2	28.4	31,200	34		642	0.27	30			0.3	38.3	102
Ridolfi	DCMW015-02	470E-SB42-02	13.5	16	29,400	4.4	201	1.7		39.5	38.2	37,400	57		535	0.84	33			0.4	59.9	127
Brown	MW01	NA	10	11.5		4.8		1	3.6	33.6	38.6		100			0.55	31.1			0.24		125
Brown	MW01	NA	25	26.5		3.5		0.82	2.6	24	19.6		32.3				30.6					79
Brown	MW01	NA	30	36.5		0.9			1.1	9.5							6.9					11.6
Brown	MW02	NA	7.5	9		0.97			0.61	8.5			13.5				7.1					16.9
Brown	MW02	NA	45	46.5		2.7			0.59	6.6			7				6					
Brown	MW04	NA	10	16.5		2.6		0.55	1.7	22.5			25.6				15.4					51.8
Brown	MW05	NA	5	7		4.6		0.49	2.3	12.3			31.2				12.2					39.9
Brown	MW05	NA	7.5	11		4.5			1.4	12.5			22.3				6.3					23.5
Brown	MW06	NA	5	7		4.2			1	6.9			25.8									26.1
Brown	MW07	NA	7.5	11.5		4.7		0.26	1.9	11.6			11				7.7					22.2
Brown	MW10	NA	2.5	9				0.55	1.2	41.8			6				5.4					11
Brown	MW10	NA	55	60				0.41	1.6	13.9			32.9				12.5					33.6
Environ	SB01	NA	8	8.5		3.1																
Brown	SB-1	NA	5	7		53.5		1.2	3.6	32.7	35.3		173				25.3			0.34		181
Brown	SB-2	NA	5	7		43.4		0.62	3.2	25	57.1		322				18.3		2.8			309
Brown	SB-2	NA	10	11.5		15		0.41	1.3	8.2			25.9				10.2					33.6
Brown	SB-3	NA	4.5	5.5		54.1		1.4	3.8	35	24.7		105			0.38	32.4			0.22		117
Brown	SB10	NA	5	7		60.5		1.8	4.1	28.9	20.2		42.4				35.5					115
Ridolfi	SB-101	470E-SB32-01	6	8	8,660	6.5		0.7		16.8	15.7	22,100	78		412	0.1	12				26.1	60
Ridolfi	SB-101	470E-SB32-02	15	17	20,000	2.3	145	1.3		29.3	32.5	31,700	58		703	0.51	25				42.8	102

Table 5-13
Subsurface Soil Analytical Results for Metals and Metalloids that Exceed Screening Levels

Parameter Group					Inorganics (mg/kg)																	
Analyte					Aluminum	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Region III BTAG Screening Level for Soil (Flora)					1	328	440	0.02	2.5	0.02	15	3,260	2	4,400	330	0.058	2	18	0.0000098	0.001	0.500	10
Region III BTAG Screening Level for Soil (Fauna)					NA	NA	440	NA	NA	0.0075	NA	12	0.01	4,400	330	0.058	NA	18	NA	NA	58	NA
D.C. Risk-Based Screening Level (Residential Soil)					NA	0.101	NA	NA	0.3	0.0461	2,630	NA	NA	NA	NA	NA	NA	329	329	NA	461	19,800
U.S. EPA Region III RBC for Residential Soil					78,000	0.43	5,500	160	39	230	3,100	23,000	NA	NA	11,000	NA	1,600	390	390	5.5	550	23,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					NA	0.0013	110	58	1.4	2.1	530	NA	NA	NA	330	NA	NA	0.95	1.6	0.18	260	680
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					NA	0.026	2,100	1,200	27	42	11,000	NA	NA	NA	6,700	NA	NA	19	31	3.6	5,100	14,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																			
Ridolfi	SB-101	470E-SB32-03 (1)	6	8	8,280	3.6		0.6		13.4		15,300	37		411	0.1	11				20.4	41.7
Ridolfi	SB-102	470E-SB36-01	6	8	24,400	4.9	135	1.1		35	27	37,000	53		531	0.25	24			0.5	45	95
Ridolfi	SB-102	470E-SB36-02	10	12	29,100	3.5	232	1.9		38.6	30.7	43,800	32		1,350	0.23	34			0.5	46.5	120
Ridolfi	SB-102	470E-SB36-03 (2)	6	8	28,700	4.2	195	1.7		39	36.2	42,800	48		1,060	0.41	34			0.3 J	48	132
Ridolfi	SB-103	470E-SB38-01	2	4	13,300	2.3		0.5		19.7	22.2	23,000	61			0.23	12		0.8	0.1	40.8	56.1
Ridolfi	SB-103	470E-SB38-02	6	8	11,100	1.2	129	0.7		16.6		17,800	14				18				22.2	53.1
Brown	SB11	NA	7.5	9		29.5		0.66	2.5	21.4			92.3				27.6					73.8
Brown	SB12	NA	7.5	9		118		1.7	5.1	40.2	35.1		133				34.3					180
Brown	SB13	NA	5	6		15.8		0.37	1.1	9.3			39.4				9.7					38.6
Brown	SB16	NA	5	7		23.2		0.65	1.8	13.1			58.7				12.9					60.5
Brown	SB17	NA	2.5	4.5		44		0.45	2.8	20.1			33.6				7.4			0.24		51.8
Brown	SB18	NA	5	7		40.2		1	2.7	28	16.5		38.6				20					64.3
Brown	SB22	NA	2.5	4.5				0.39	0.95	11.1	16.4		32.3				9.7					47.2
Brown	SB27	NA	13.5	15				0.42	1.2	9.6			31.6				11.9					45.9
Brown	SB28	NA	10	11.5		13.9		0.54	2.5	16.9			28.8				11					61
Brown	SB29	NA	2.5	4.5		4.9		0.32	1.6	10.8			14				9					23.7
Brown	SB34	NA	2.5	4.5		39.8		1.7	4.5	30	29.7		62.2			0.42	31.1			0.33		140
Brown	SB35	NA	2.5	7		29.6		1.3	3.6	24.4	18.7		29.7				39					81.3
Brown	SB38	NA	5	7		24.5		0.6	1.8	17.8	223		155				13.8		1.3			356
Brown	SB41	NA	2.5	4.5		78.4		1.4	3.5	15.6	39.4		151				13.1			0.52		264
Brown	SB43	NA	2.5	4.5		22.7		0.35	1.8	119	34.2		120				250					75.1
Brown	SB44	NA	2.5	4.5		46.2		1.3	3.2	26.1	16.4		35.2				29					81
Ridolfi	SS-29	470E-SS-29-03	2	4	9,820	6	139	0.8		22.2	23.7	23,700	151			0.33	15		1		24.7	142
Brown	WL03	NA	2	4				0.72	2.1	17.6	24.8		127			0.38	17.6					106
Brown	WL03	NA	4	6				1.1	2.4	22.3	25.9		58.6			0.6	22.6					94.7

Notes:

(1) = Soil sample 470E-SB32-03 was a field duplicate of 470E-SB32-01.
(2) = Soil sample 470E-SB36-03 was a field duplicate of 470E-SB36-01.
B = Indicates the parameter was also detected in the method blank.
Brown = Thomas L. Brown Associates.
BTAG = Biological Technical Assessment Group.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "subsurface soil" if the top portion of the sampling interval was greater than or equal to 2.0 feet below ground surface.
Calcium, potassium, and sodium were detected in some samples. No screening levels are available for these parameters.

DAF = Dilution Attenuation Factor.
D.C. = District of Columbia.
J = Value is an estimate.
K = This qualifier was not explained in the RAI report.
L = This qualifier was not explained in the RAI report
mg/kg = milligrams per kilogram or parts per million (ppm).
NA = Not available.
RBC = Risk-Based Concentration.
SSL = Soil screening level.
U.S. EPA = United States Environmental Protection Agency.

Table 5-14
Subsurface Soil Analytical Results for VOCs that Exceed Screening Levels

Parameter Group					Volatile Organic Compounds (µg/kg)						
Analyte					Acetone	Benzene	Ethyl Benzene	Methyl Tert-Butyl Ether	Methylene Chloride	Toluene	Xylenes (total)
Region III BTAG Screening Level for Soil (Flora)					NA	100	100	NA	300	100	100
Region III BTAG Screening Level for Soil (Fauna)					NA	100	100	NA	300	100	100
D.C. Soil Quality Standards for Petroleum-Contaminated Soil					NA	1,000	1,160,000	1,440,000	NA	125,000	504,000
D.C. Risk-Based Screening Level (Residential Soil)					6,590,000	157	1,160,000	1,440,000	1,900	125,000	504,000
U.S. EPA Region III RBC for Residential Soil					7,800,000	12,000	7,800,000	160,000	85,000	16,000,000	160,000,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					120	0.09	1.8	0.59	0.95	440	8,500
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					2,500	1.8	36	12	19	8,800	170,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)								
Brown	MW01	NA	25	26.5	127						
Brown	MW03	NA	5	6.5		81	138			3,380	631
Brown	MW03	NA	10	11.5				69			
Brown	MW03	NA	17.5	19				98			
Brown	MW07	NA	7.5	11.5					6.2		
Brown	MW10	NA	10	11.5				14			
Brown	SB16	NA	5	7					7		
Brown	SB18	NA	5	7	167						
Brown	SB21	NA	5	7					9.2		
Brown	SB37	NA	5	9		2.5	12				
Brown	SB38	NA	13.5	15				24			
Brown	WL03	NA	2	4					8.7		

Notes:

B = Indicates the parameter was also detected in the method blank.
Brown = Thomas L. Brown Associates.
DAF = Dilution Attenuation Factor.
mg/kg = micrograms per kilogram or parts per billion (ppb).

NA = Not available.
RBC = Risk-Based Concentration.
SSL = Soil screening level.
VOCs = Volatile organic compounds.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "subsurface soil" if the top portion of the sampling interval was greater than or equal to 2.0 feet below ground surface.
2-Butanone was detected in some samples. No screening levels are available for this parameter.

Table 5-15
Subsurface Soil Analytical Results for SVOCs that Exceed Screening Levels

Parameter Group								Semivolatile Organic Compounds (µg/kg)															
Analyte					Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Carbazole	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene
Region III BTAG Screening Level for Soil (Flora)					100	100	100	100	NA	100	100	100	NA	100	100	NA	100	100	100	NA	100	100	100
Region III BTAG Screening Level for Soil (Fauna)					100	100	100	100	100	100	100	100	NA	100	100	NA	100	100	100	NA	100	100	100
D.C. Risk-Based Screening Level (Residential Soil)					196,000	NA	8,080	1,050	105	1,050	4,170	8,160	NA	3,920	NA	233,000	101,000	145,000	NA	NA	NA	140,000	87,200
U.S. EPA Region III RBC for Residential Soil					4,700,000	NA	23,000,000	870	87	870	NA	8,700	32,000	87,000	87	310,000	3,100,000	3,100,000	870	1,600,000	1,600,000	NA	2,300,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 1					5,200	NA	23,000	73	19	230	NA	2,300	23	7,300	70	380	310,000	6,800	640	1,000	7.7	NA	34,000
U.S. EPA Region III SSL Soil for Groundwater Migration DAF 20					100,000	NA	470,000	1,500	370	4,500	NA	45,000	470	150,000	1,400	7,700	6,300,000	140,000	13,000	22,000	150	NA	680,000
Sampler	Station ID	Sample ID	Sample Depth (ft.)																				
Brown	MW01	NA	10	11.5													334 J						316 J
Brown	MW02	NA	7.5	9					197 J	337 J													
Brown	MW03	NA	10	11.5					612 J														
Brown	MW04	NA	10	16.5				223 J	177 J	308 J				229 J			267 J					199 J	433
Brown	MW05	NA	7.5	11				204 J	176 J	267 J				224 J			404 J					265 J	304 J
Brown	MW10	NA	2.5	9				795 J	1,040 J	1,560	614 J	1,510		721 J	465 J		1,410		605 J			786 J	860 J
Brown	SB-1	NA	5	7						226 J													
Environ	SB01	NA	10	10.5		19,000 E	6,000 E	19,000 E	32,000 E	22,000 E	14,000 E	25,000 E		25,000 E			21,000 E					18,000 E	31,000 E
Environ	SB02	NA	8	8.5				1,200 E	1,300 E	1,000 E		1,400 E		1,200 E			2,300 E					1,100 E	2,000 E
Brown	SB-3	NA	4.5	5.5				207 J	222 J	368	237 J			260 J			317 J		196 J			169 J	292 J
Environ	SB03	NA	4	4.5				460 E	410 E	370 E		370 E		910 E			890 E					670 E	1,200 E
Environ	SB04	NA	2	2.5				110 E	130 E	110 E		120 E		110 E			210 E					100 E	190 E
Brown	SB10	NA	5	7				275 J	266 J	323 J	218 J			252 J			238 J					196 J	332 J
Brown	SB11	NA	7.5	9						308 J				233 J									231 J
Brown	SB12	NA	7.5	9				207 J	204 J	307 J				223 J			327 J						380 J
Brown	SB16	NA	5	7				364 J	286 J	519	319 J			418 J			571		271 J			348 J	532
Brown	SB21	NA	5	7	3,780		12,300	17,800	13,000	24,300	3,910			15,900	1,290 J		46,600	7,360	3,740	1,760 J	3,480	43,800	31,900
Brown	SB27	NA	13.5	15				404 J	396 J	609	210 J			460 J			612				212 J	291 J	490 J
Brown	SB29	NA	2.5	4.5			169 J	623	458	884	161 J			752			1,220					712	916
Brown	SB34	NA	2.5	4.5						225 J													
Brown	SB37	NA	5	9																	53		
Brown	SB41	NA	2.5	4.5					206 J	315 J				166 J			260 J						192 J
Brown	SB43	NA	2.5	4.5					162 J	310 J							243 J						
Ridolfi	SB-102	470E-SB36-01	6	8			150	420	340	320	250	280		560			840		220		160	370	970
Ridolfi	SB-102	470E-SB36-02	10	12													130						150
Ridolfi	SB-102	470E-SB36-03 (1)	6	8				160	130	110		140		230			330					170	370
Ridolfi	SS-29	470E-SS-29-03	2	4	1,100	100	2,100	5,700	5,100	4,800	1,500	3,600	1,400	5,700	810	490	10,000	1,000	1,900		470	7,600	9,500
Brown	WL03	NA	2	4				396 J	321 J	563				378 J			775					581	518
Brown	WL03	NA	4	6				247 J	291 J	434 J				238 J			402 J					247 J	353 J

Notes:

(1) = Soil sample 470E-SB36-03 was a field duplicate of 470E-SB36-01.
B = Indicates the parameter was also detected in the method blank.
Brown = Thomas L. Brown Associates.

The analytical results summarized in the table are parameters with a concentration at or above a screening level.
For the purpose of this table, a sample was considered "subsurface soil" if the top portion of the sampling interval was greater than or equal to 2.0 feet below ground surface.
2-methylphenol was detected in some samples. No screening levels are available for this parameter.

BTAG = Biological Technical Assessment Group.
D.C. = District of Columbia.
DAF = Dilution Attenuation Factor.
E = The value was detected below the reporting limit.
Environ = Environ Corporation.

J = Value is an estimate.
mg/kg = micrograms per kilogram or parts per billion (ppb).
NA = Not available.
RBC = Risk-Based Concentration.
SSL = Soil screening level.
SVOCs = Semivolatile organic compounds.

Table 5-16
Groundwater Analytical Results for Petroleum Hydrocarbons that Exceed Groundwater Screening Levels

Parameter Group				Total Petroleum Hydrocarbons (mg/L)	
Analyte				Diesel Range	Gasoline Range
D.C. Cleanup Standard for Hydrocarbon Contaminated Groundwater				3.57	7.3
Sampler	Sample Date	Station ID	Sample ID		
Brown	5/4/1999	MW03	NA	**4.87**	
Ridolfi	11/19/2002	MW07	470E-MW07-01	**7.2**	

Notes:
Brown = Thomas L. Brown Associates.
D.C. = District of Columbia.
mg/L = milligrams per liter or parts per million (ppm).

Bold font with underlining indicates the analytical result exceeds the screening level.
The analytical results summarized in the table are parameters with a concentration at or above a screening level.

Table 5-17
Groundwater Analytical Results for Metals and Metalloids that Exceed Groundwater Screening Levels

Parameter Group				Total Inorganics (mg/L)										
Analyte				Aluminum	Arsenic	Barium	Beryllium	Cadmium	Chromium	Iron	Lead	Manganese	Thallium	Vanadium
U.S. EPA Safe Drinking Water Act MCL				NA	0.01	2.0	0.004	0.005	0.1	NA	0.015	NA	0.002	NA
D.C. Groundwater Criteria (Class G1)				NA	0.05	1.0	NA	0.005	0.1	0.3	0.05	0.05	NA	NA
D.C. Risk-Based Screening Level for Groundwater (Residential)				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
U.S. EPA Region III RBC for Tap Water				37	0.000045	2.6	0.073	0.018	0.11	11	NA	5.1	0.0026	0.26
Sampler	Sample Date	Station ID	Sample ID											
Ridolfi	12/21/2002	DCMW006-02	470E-MW30-01		**0.006**					**39.9**	**0.02**	**12.2**		
Ridolfi	12/22/2002	DCMW007-02	470E-MW31-01		**0.002**					**12.2**		**13.6**		
Ridolfi	12/18/2002	DCMW008-02	470E-MW33-01	**169**	**0.006**	**6.37**	**0.021**		**0.43**	**379**	**0.19**	**2.59**		**0.685**
Ridolfi	12/18/2002	DCMW009-02	470E-MW34-01		**0.003**					**78.5**		**0.882**		
Ridolfi	12/21/2002	DCMW010-02	470E-MW35-01		**0.044**					**62.7**		**2.68**		
Ridolfi	12/18/2002	DCMW011-02	470E-MW37-01		**0.004**					**26.9**		**3.33**		
Ridolfi	12/18/2002	DCMW012-02	470E-MW39-01		**0.006**					**16.9**	**0.48**	**1.33**		
Ridolfi	12/21/2002	DCMW013-02	470E-MW40-01		**0.003**					**37.2**		**3.96**		
Ridolfi	12/21/2002	DCMW013-02	470E-MW51-01 (1)		**0.003**					**36.5**		**3.77**		
Ridolfi	12/18/2002	DCMW014-02	470E-MW41-01		**0.004**					**8.66**		**2.58**		
Ridolfi	12/18/2002	DCMW014-02	470E-MW50-01 (2)		**0.004**					**8.49**		**2.55**		
Ridolfi	12/22/2002	DCMW015-02	470E-MW42-01		**0.006**		**0.002**			**62.7**	**0.029**	**1.54**		
Brown	7/11/1997	MW01	NA					**0.0071**			**0.0224**			
Brown	5/4/1999	MW01	NA		**0.009**			0.005 U			0.001 U			
Environ	12/16/1999	MW01	NA		**0.008**			0.005 U			0.005 U			
Brown	7/10/1997	MW02	NA		**0.409**		**0.02**	**0.0398**	**0.416**		**0.331**	NT		
Brown	5/4/1999	MW02	NA		0.005 U		0.001 U	0.005 U	0.01 U		0.001 U	NT		
Environ	12/16/1999	MW02	NA		0.005 U		0.005 U	0.005 U	NT		0.005 U	NT		
Ridolfi	11/25/2002	MW02	470E-MW02-01		**0.004**		0.001 U	0.002	0.005 U		0.001 UJ	**0.522**		
Brown	7/10/1997	MW02A	NA		**0.415**			**0.0089**				NT		
Brown	5/4/1999	MW02A	NA		**0.01**			**0.005**				NT		
Environ	12/16/1999	MW02A	NA		**0.018**			0.005 U				NT		
Ridolfi	11/25/2002	MW02A	470E-MW02A-01		**0.023**			0.002 U				**2.31**		
Brown	7/10/1997	MW03	NA		0.05 U						**0.0169**			
Brown	5/4/1999	MW03	NA		**0.008**						0.013			
Environ	12/15/1999	MW03	NA		**0.006**						0.005 U			
Ridolfi	11/20/2002	MW04	470E-MW04-01									**1.08**		
Brown	7/9/1997	MW05	NA								**0.037**			
Brown	5/4/1999	MW05	NA								0.001			
Environ	12/15/1999	MW05	NA								0.005 U			
Brown	7/9/1997	MW06	NA		**0.006**				**0.015**		**0.0259**			
Brown	5/4/1999	MW06	NA		**0.006**				0.01 U		0.001 U			
Environ	12/16/1999	MW06	NA		0.005 U				NT		0.005 U			

Table 5-17
Groundwater Analytical Results for Metals and Metalloids that Exceed Groundwater Screening Levels

Parameter Group				Total Inorganics (mg/L)										
Analyte				Aluminum	Arsenic	Barium	Beryllium	Cadmium	Chromium	Iron	Lead	Manganese	Thallium	Vanadium
U.S. EPA Safe Drinking Water Act MCL				NA	0.01	2.0	0.004	0.005	0.1	NA	0.015	NA	0.002	NA
D.C. Groundwater Criteria (Class G1)				NA	0.05	1.0	NA	0.005	0.1	0.3	0.05	0.05	NA	NA
D.C. Risk-Based Screening Level for Groundwater (Residential)				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
U.S. EPA Region III RBC for Tap Water				37	0.000045	2.6	0.073	0.018	0.11	11	NA	5.1	0.0026	0.26
Sampler	Sample Date	Station ID	Sample ID											
Brown	7/9/1997	MW07	NA		**0.206**		**0.0021**	**0.022**	**0.156**		**0.138**	NT		
Brown	5/4/1999	MW07	NA		0.005 U		0.001 U	0.005 U	0.01 U		0.001	NT		
Environ	12/16/1999	MW07	NA		0.005 U		0.005 U	0.005 U	NT		0.005 U	NT		
Ridolfi	11/19/2002	MW-07	470E-MW07-01		**0.003**		0.001 U	0.002 U	0.005 U		0.001 U	**1.92**		
Brown	5/4/1999	MW08	NA		**0.011**									
Brown	5/4/1999	MW09	NA		**0.016**									
Brown	5/4/1999	MW10	NA		**0.005**									
Brown	5/4/1999	MW10A	NA		**0.016**								**0.003**	
Brown	5/4/1999	MW21	NA								**0.191**			
Ridolfi	11/19/2002	PZ-1	470E-PZ1-01		**0.12**					**75.2**		**11.8**		
Ridolfi	11/25/2002	PZ-2	470E-PZ2-01		**0.027**					**62.2**		**2.17**		
Ridolfi	11/19/2002	PZ-3	470E-PZ3-01		**0.053**					**90.9**		**4.44**		
Ridolfi	11/22/2002	PZ-4	470E-PZ4-01		**0.03**					**37.9**		**3.05**		
Ridolfi	11/22/2002	PZ-5	470E-PZ5-01		**0.003**					**32.9**		**7.53**		
Ridolfi	11/22/2002	PZ-6	470E-PZ6-01		**0.002**					**0.2**		**0.434**		
Ridolfi	11/22/2002	PZ-7	470E-PZ7-01		**0.007**					**28.4**		**7.08**		
Ridolfi	11/25/2002	PZ-8	470E-PZ8-01		**0.002**					**39.4**		**3.11**		
Brown	7/2/1997	WL03*	NA		**0.0215**		**0.0104**	**0.0373**	**0.22**		**1.18**			

Notes:
(1) = Sample 470E-MW51-01 is a field duplicate of sample 470E-MW40-01.
(2) = Sample 470E-MW50-01 is a field duplicate of sample 470E-MW41-01.
Brown = Thomas L. Brown Associates.
D.C. = District of Columbia.
Environ = Environ Corporation.
J = Value is an estimate.
MCL = Maximum Contaminant Level.
mg/L = milligrams per liter or parts per million (ppm).
NA = Not available.
NT = The sample was not tested for the parameter.
RBC = Risk-Based Concentration.
U.S. EPA = United States Environmental Protection Agency.
U = Analytical result not detected above the laboratory detection limit.
WL03* was listed as a grab groundwater sample collected from a test pit.

Analytical results are for total metals.
Bold font indicates the analytical result exceeds a screening level.
Underline indicates the analytical result exceeds the U.S. EPA Safe Drinking Water Act MCL.
The analytical results summarized in the table are parameters with a concentration at or above a screening level.

Calcium, magnesium, potassium, and sodium were detected in some samples. No screening levels are available for these parameters.

Table 5-18
Groundwater Analytical Results for VOCs that Exceed Groundwater Screening Levels

Parameter Group				Volatile Organic Compounds (µg/L)				
Analyte				Benzene	1,2-Dichloroethane	Ethylbenzene	Methyl Tertiary-butyl Ether	Vinyl Chloride
U.S. EPA Safe Drinking Water Act MCL				5	5	700	NA	2
D.C. Groundwater Criteria (Class G1)				5	5.0	700	NA	2
D.C. Cleanup Standards for Hydrocarbon-Contaminated Groundwater				5	NA	700	NA	NA
D.C. Risk-Based Screening Level for Groundwater (Residential)				254	385	169,000	6,800,000	47.1
U.S. EPA Region III BTAG Screening Level				5,300	20,000	32,000	NA	11,600
U.S. EPA Region III RBC for Tap Water				0.32	0.12	3.3	2.6	0.015
U.S. EPA Advisory for MTBE in Drinking Water (1)							20 to 40	
Sampler	Sample Date	Station ID	Sample ID					
Ridolfi	12/18/2002	DCMW009-02	470E-MW34-01	**7.2**		**1.2**		
Brown	7/10/1997	MW03	NA	**254**	NT	**181**	**58**	
Brown	5/4/1999	MW03	NA	**102**	**2 J**	**49**	NT	
Brown	7/10/1997	MW10A	NA	**109**			**378**	
Brown	5/4/1999	MW10A	NA	**29**			NT	
Brown	8/6/1997	MW11	NA				**65**	
Brown	5/4/1999	MW20	NA				**120**	
Brown	5/4/1999	MW21	NA					**2.2 J**

Notes:

Brown = Thomas L. Brown Associates.
BTAG = Biological Technical Assessment Group.
D.C. = District of Columbia.
J = Value is an estimate.
MCL = Maximum Contaminant Level.
NA = Not available.
NT = The sample was not tested for the parameter.
mg/L = micrograms per liter or parts per billion (ppb).
RBC = Risk-Based Concentration.
VOCs = Volatile organic compounds.
U.S. EPA = United States Environmental Protection Agency.
(1) The MTBE advisory is based on taste and odor.

Bold font indicates the analytical result exceeds a screening level.
Underline indicates the analytical result exceeds the U.S. EPA Safe Drinking Water Act MCL.
The analytical results summarized in the table are parameters with a concentration at or above a screening level.

Table 5-19
Groundwater Analytical Results for SVOCs that Exceed Groundwater Screening Levels

Parameter Group				Semivolatile Organic Compounds (µg/L)	
Analyte				bis(2-Ethylhexyl)phthalate	Naphthalene
U.S. EPA Safe Drinking Water Act MCL				NA	NA
D.C. Groundwater Criteria (Class G1)				NA	NA
D.C. Risk-Based Screening Level for Groundwater (Residential)				NA	NA
U.S. EPA Region III RBC for Tap Water				4.8	6.5
Sampler	Sample Date	Station ID	Sample ID		
Brown	7/10/1997	MW03	NA		**32** ^{A}
Brown	7/10/1997	MW03	NA		**20** ^{B}
Brown	5/4/1999	MW03	NA		10 U
Brown	5/4/1999	MW10	NA	**13**	

Notes:

32 ^{A} = Sample result was obtained by analyzing the sample by Method 5030/8020.
20 ^{B} = Sample result was obtained by analyzing the sample by EPA Method 8270.
Brown = Thomas L. Brown Associates.
D.C. = District of Columbia.
MCL = Maximum Contaminant Level.
mg/L = micrograms per liter or parts per billion (ppb).
NA = Not available.
RBC = Risk-Based Concentration.
SVOCs = Semivolatile organic compounds.
U = Analytical result not detected above the laboratory reporting limit.
U.S. EPA = United States Environmental Protection Agency.

Bold font indicates the analytical result exceeds a screening level.
The analytical results summarized in the table are parameters with a concentration at or above a screening level.

Table 5-21
Groundwater Analytical Results from the NRS Parcel

		Petroleum Hydrocarbons by EPA Method 8015 (ug/L)		Munition Contaminants by HPLC (ug/L)			Dissolved Metals by EPA Method 6010B or 7470/7471A (mg/L)			
		TPH-DRO	TPH-GRO	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	Perchlorate	Remaining Explosives	Arsenic	Barium	Mercury	Remaining Metals
U.S. EPA Safe Drinking Water Act MCL		NA	NA	NA	NA	NA	0.01	2.0	0.002	NA
D.C. Groundwater Criteria (Class G1)		3570	7300	NA	NA	NA	0.05	1.0	0.002	NA
D.C. Risk-Based Screening Level for Groundwater (Residential)		3570	7300	NA	NA	NA	NA	NA	NA	NA
D.C. Cleanup Standard for Hydrocarbon Contaminated Groundwater		3.57	7.3	NA	NA	NA	NA	NA	NA	NA
U.S. EPA Region III RBC for Tap Water		NA	NA	0.61	26	NA	0.000045	2.6	NA	NA
Field Sample ID	Sample Date									
NRS-1	1/23/2008				2.3			0.0691		
NRS-2	1/23/2008	**192**	**100**		0.54			0.197		
NRS-3	1/23/2008	**453**		**1.65**			**0.02**	0.338	**0.0042**	

Notes:
Table includes detected constituents only and not all analyzed parameters. See lab data reports for a summary of all parameters analyzed which were not detected.

Abbreviations:
D.C. = District of Columbia.
EPA = Environmental Protection Agency
HPLC = High Pressure Liquid Chromatography
MCL = Maximum Contaminant Level
NA = Not Available
NRS = Naval Receiving Station
SVOCs = Semi-Volatile Organic Compounds. Analyzed using EPA Method 8270C. Only detected analytes are listed.
TPH-DRO = Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO = Total Petroleum Hydrocarbons - Gasoline Range Organics
VOCs = Volatile Organic Compounds. Analyzed using EPA Method 8260B. Only detected analytes are listed.
ug/L = micrograms per Liter
mg/L = milligrams per Liter
Bold font indicates the analytical result exceeds a screening level.
Underline indicates the analytical result exceeds the U.S. EPA Safe Drinking Water Act MCL.

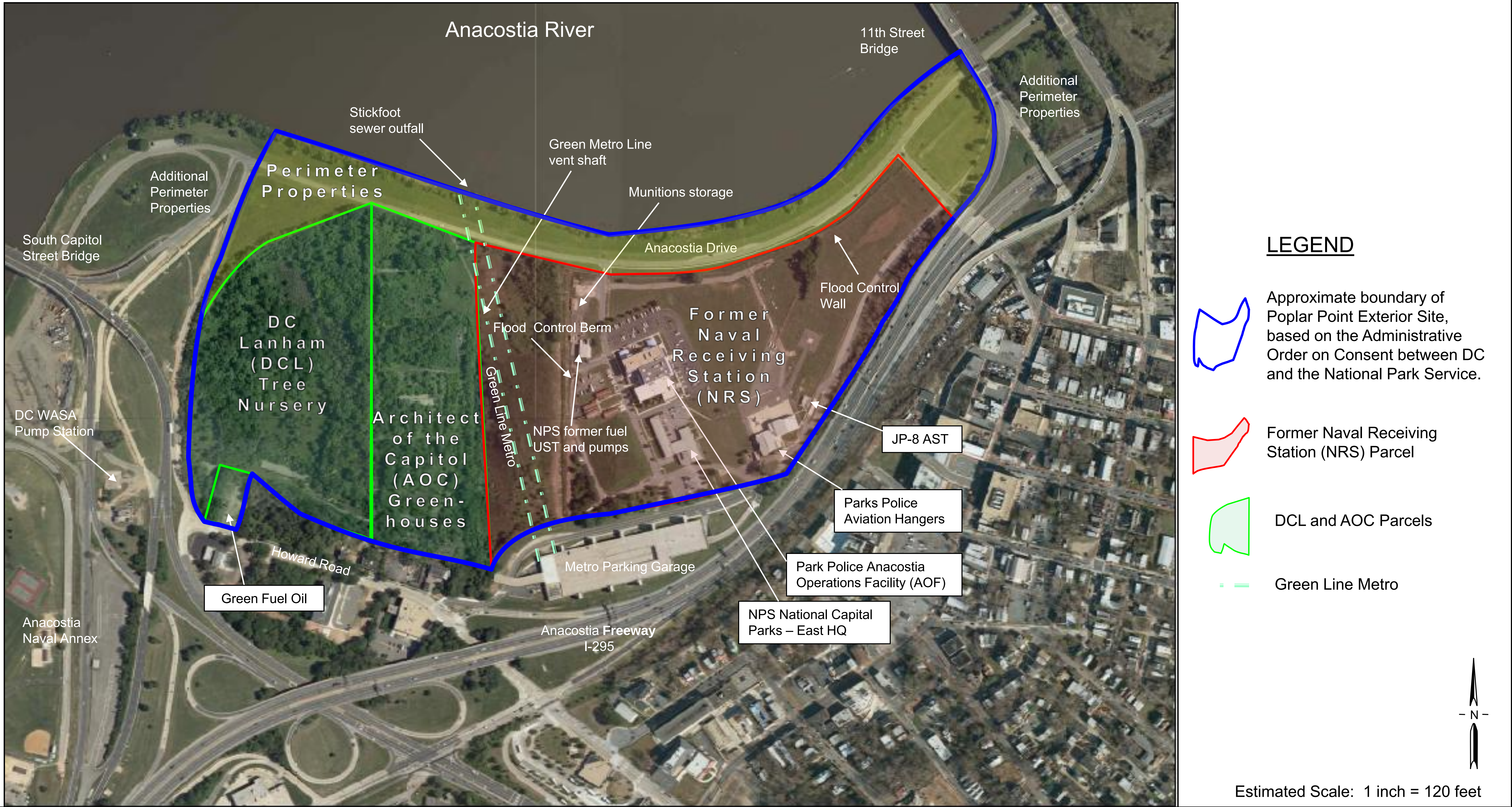

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Figure 1-1

Current (2008) Aerial Photograph with
Four Areas-Parcels of Investigation
Project 3552-10-1353.02

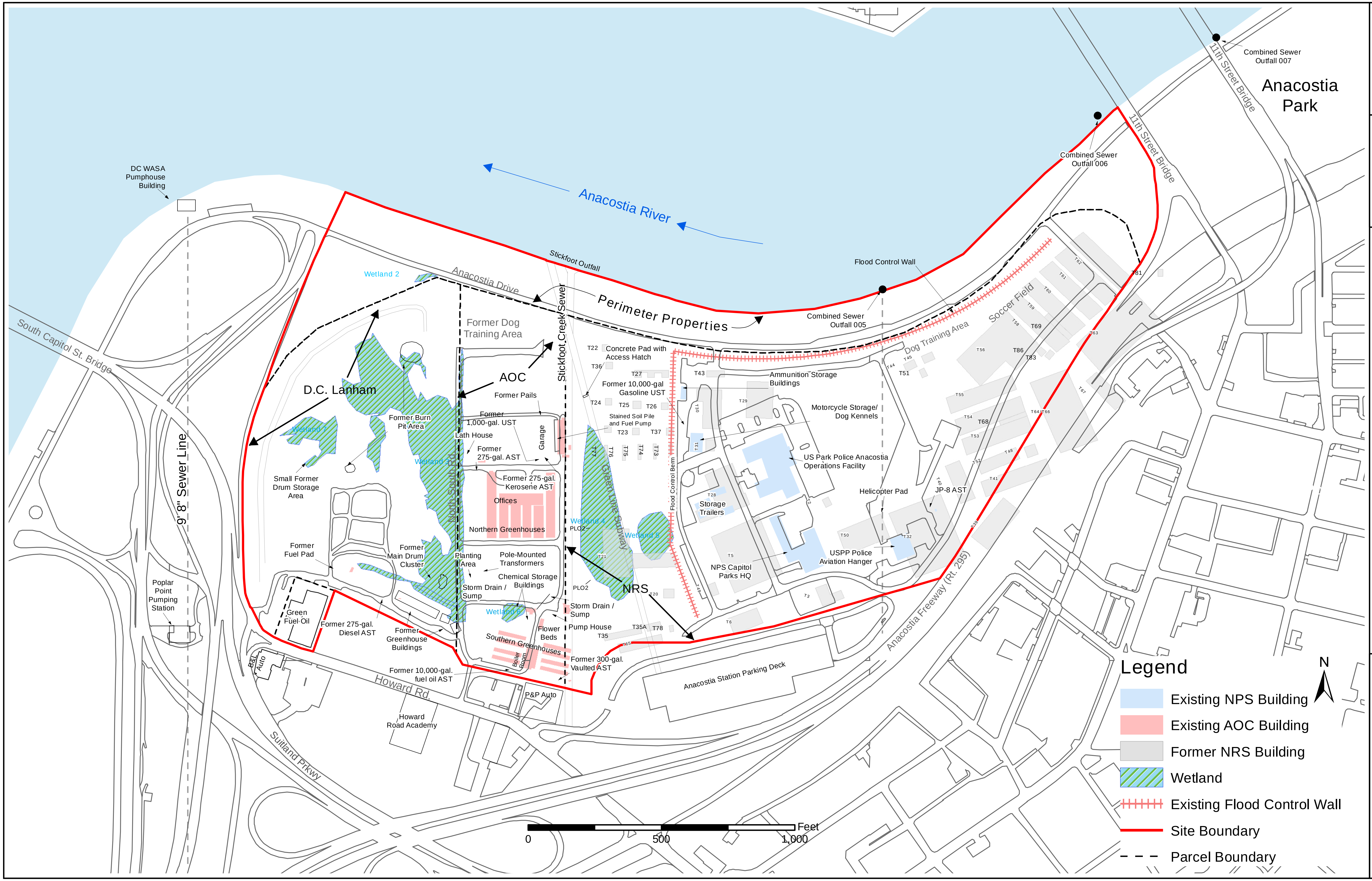

Figure 1-2

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Significant Buildings, Structures and Areas of Interest

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Source: EDR Aerial Photo Decade Package. Aerial photograph dated 1957.

Figure 2-3

January 2013

1957 Aerial Photograph
Project 3552-10-1353.02

POPLAR POINT, WASHINGTON, D.C.

LEGEND

⬜	Approximate location of former NRS buildings, demolished from 1960's to 1980's
🟧	Approximate location of former NRS building with suspected munitions constituents (MC) source areas
🟨	Approximate location of former NRS building with potential environmental concern (dry cleaning, USTs, hazardous materials, etc.
T21	Former NRS building number
⊕	Existing groundwater monitoring well
– · –	Green Line Metro
—	Parcel Boundaries

N

Estimated Scale: 1 inch = 185 feet

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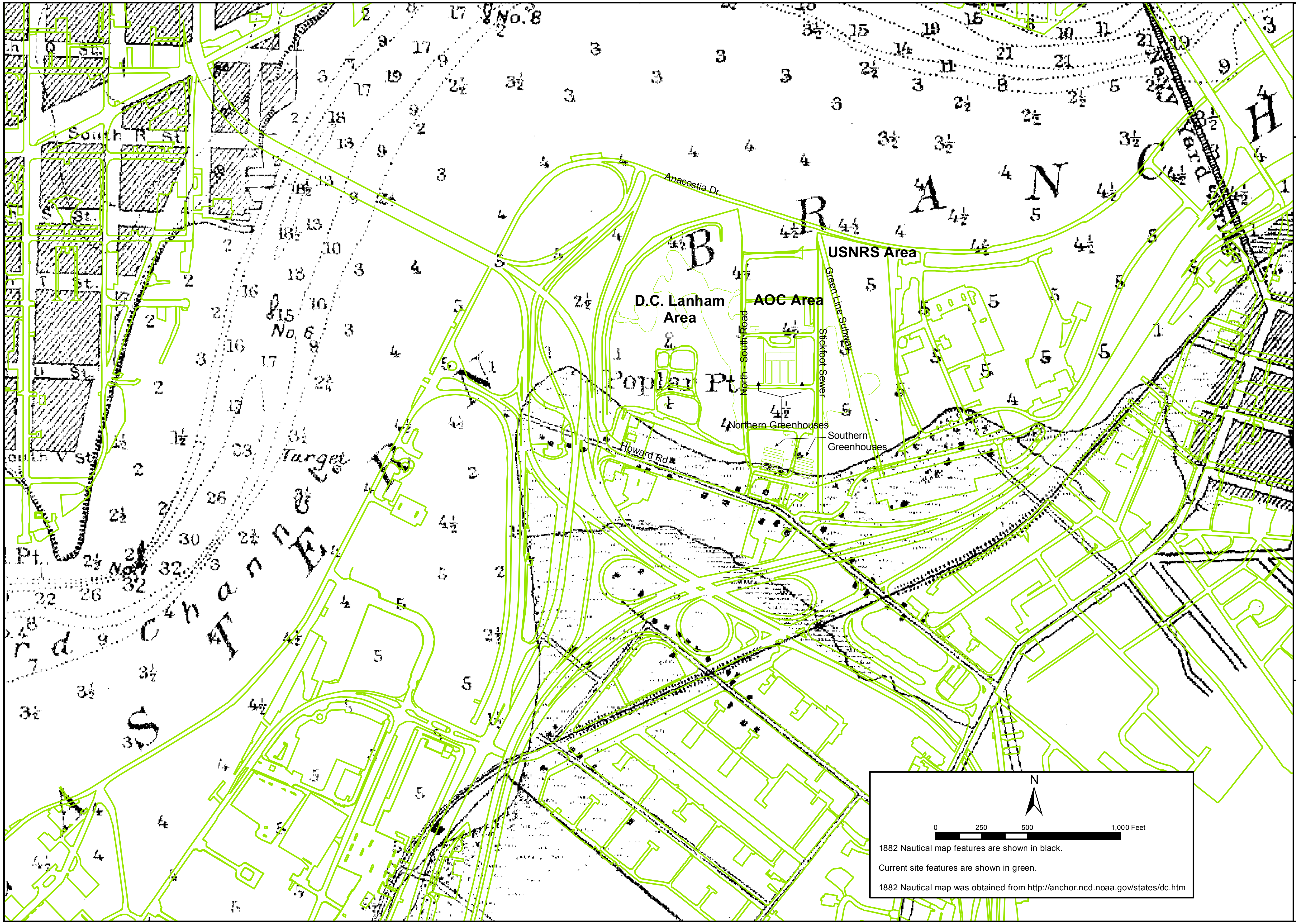
Figure 2-4

Former NRS Building Locations
(NRS Area Only)
Project 3552-10-1353



1882 Nautical map features are shown in black.

Current site features are shown in green.

1882 Nautical map was obtained from http://anchor.ncd.noaa.gov/states/dc.htm

Figure 2-5

January 2013

Overlay of 1882 Nautical Map and Current Site Features Diagram

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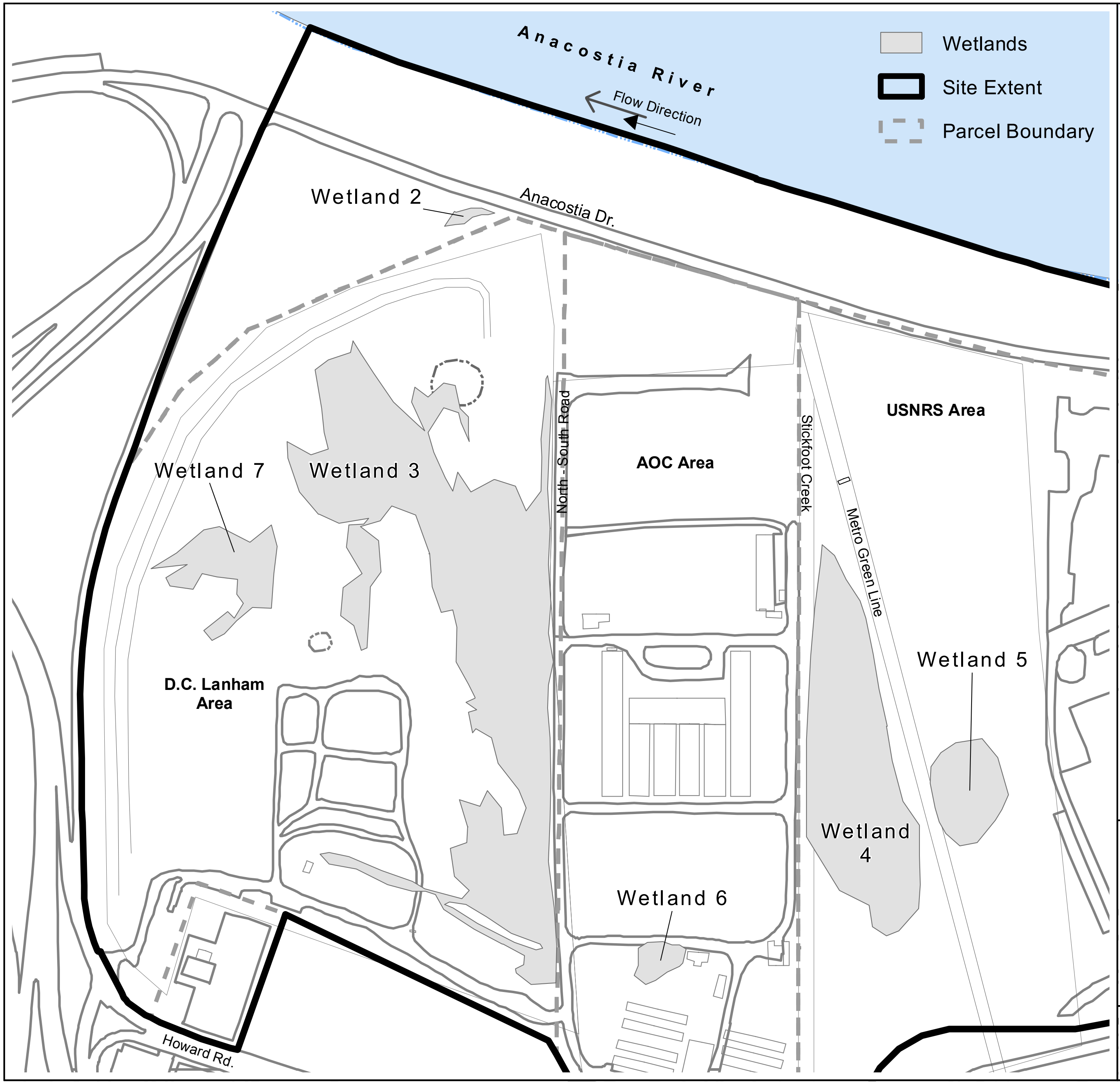

Identification	Area (acres)
Wetland 2	0.03
Wetland 3	4.15
Wetland 4	1.75
Wetland 5	0.4
Wetland 6	0.1
Wetland 7	0.4

Notes:

1. Wetland delineation by Coastal Resources Inc. 2005.
2. Significant portions of the site were flooded during the 2005 delineation because of a broken water main. The excess water made the delineation of the boundaries of wetlands 4 and 5 very difficult.
3. The U.S. Army Corps of Engineers considers Wetlands 2 and 3 to be jurisdictional and Wetlands 4, 5, 6, and 7 to be "effectively isolated" and therefore not regulated by the USACE.
4. The District of Columbia considers all of these wetlands to be under its jurisdiction except Wetland 6 because that wetland is created by a leaking pipe.
5. Wetland 1 is not on the site or in the map area.

Figure 2-6
Existing Wetland Areas

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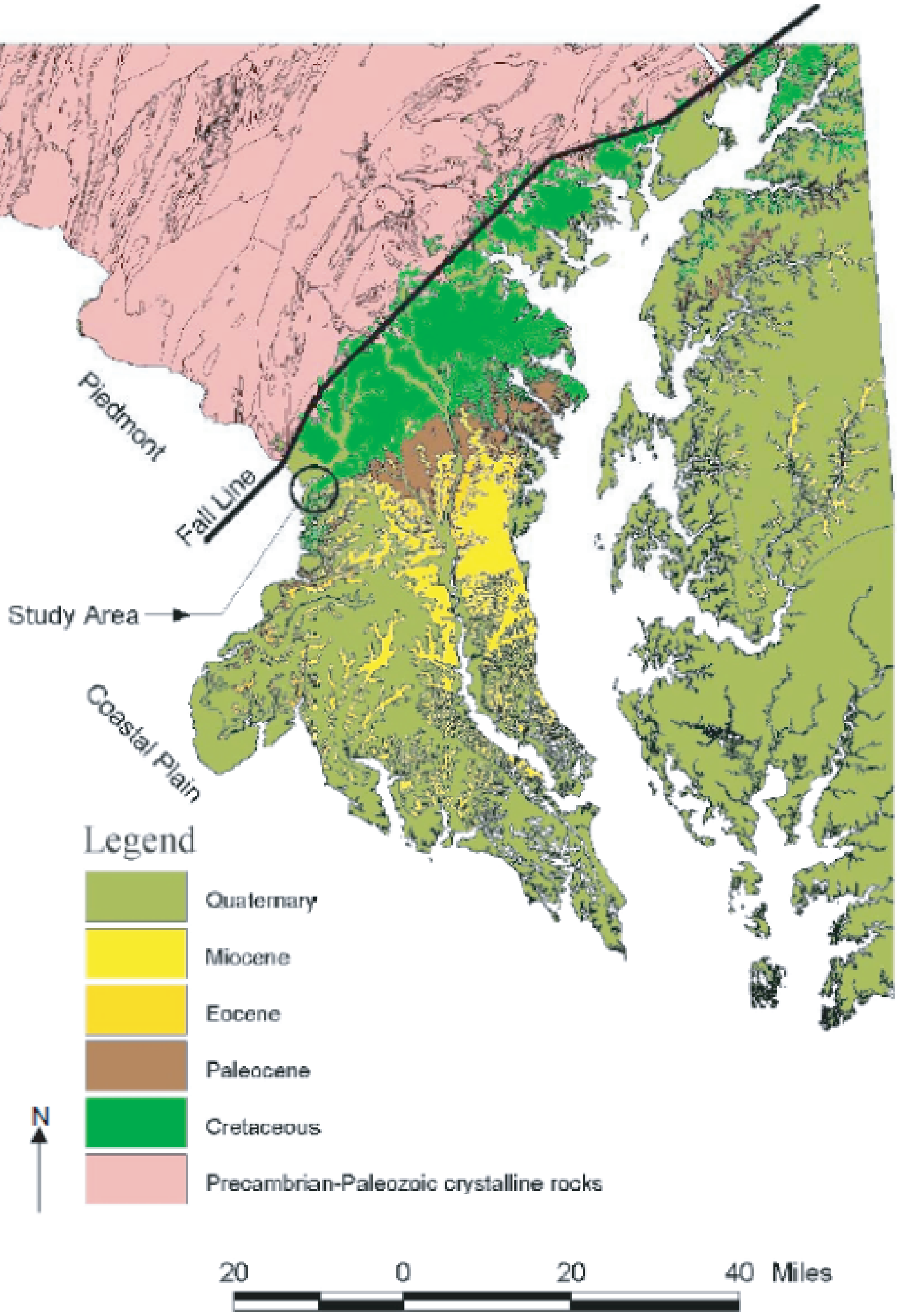

From RPI, 2002 after Cleaves, et al. 1968.

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Fig. 3-1

Geologic Map

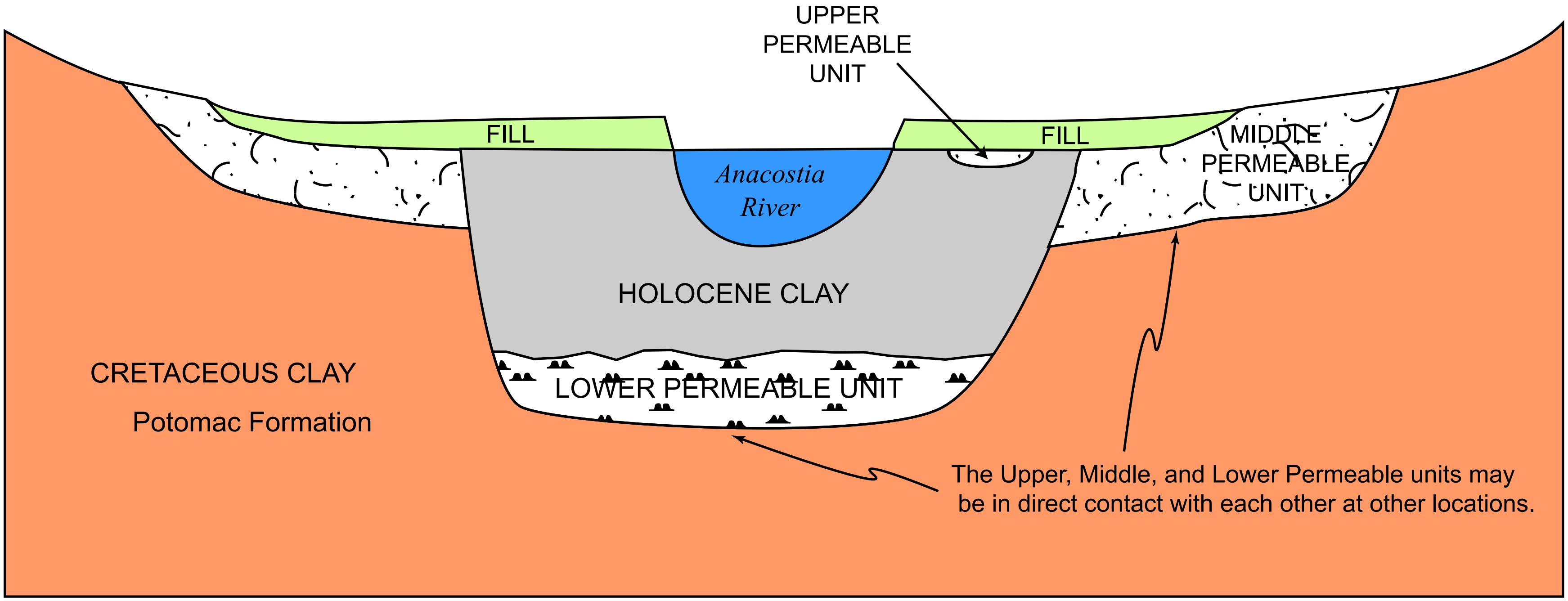

Figure 3-2. Typical cross section across the Anacostia River. Note that the cross section is generalized and specific cross-cutting relationships may vary over the larger site.

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Fig. 3-2

Generalized Geologic
Cross Section

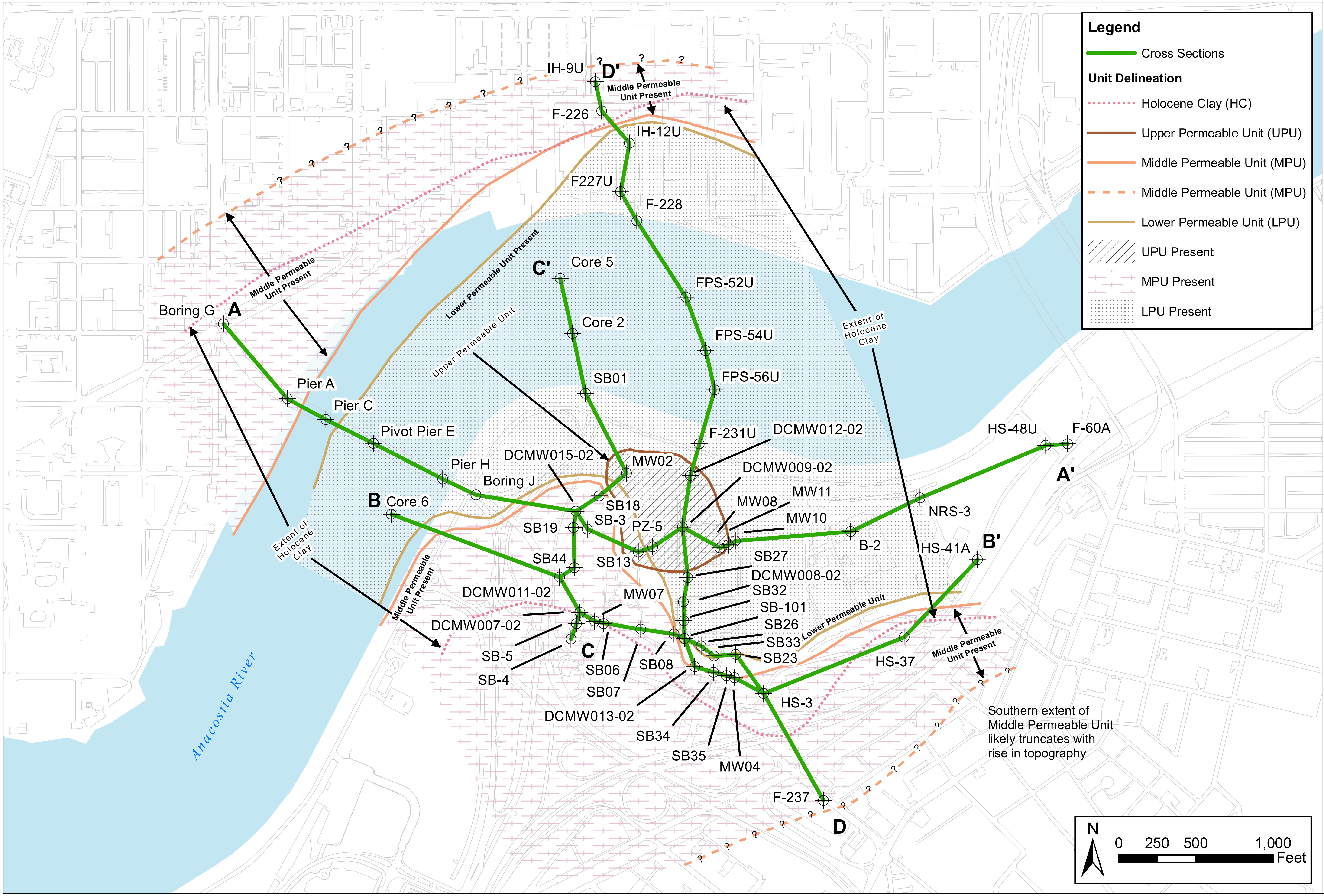

Figure 3-3

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Monitoring Wells, Soil Borings, and Cross Section Locations

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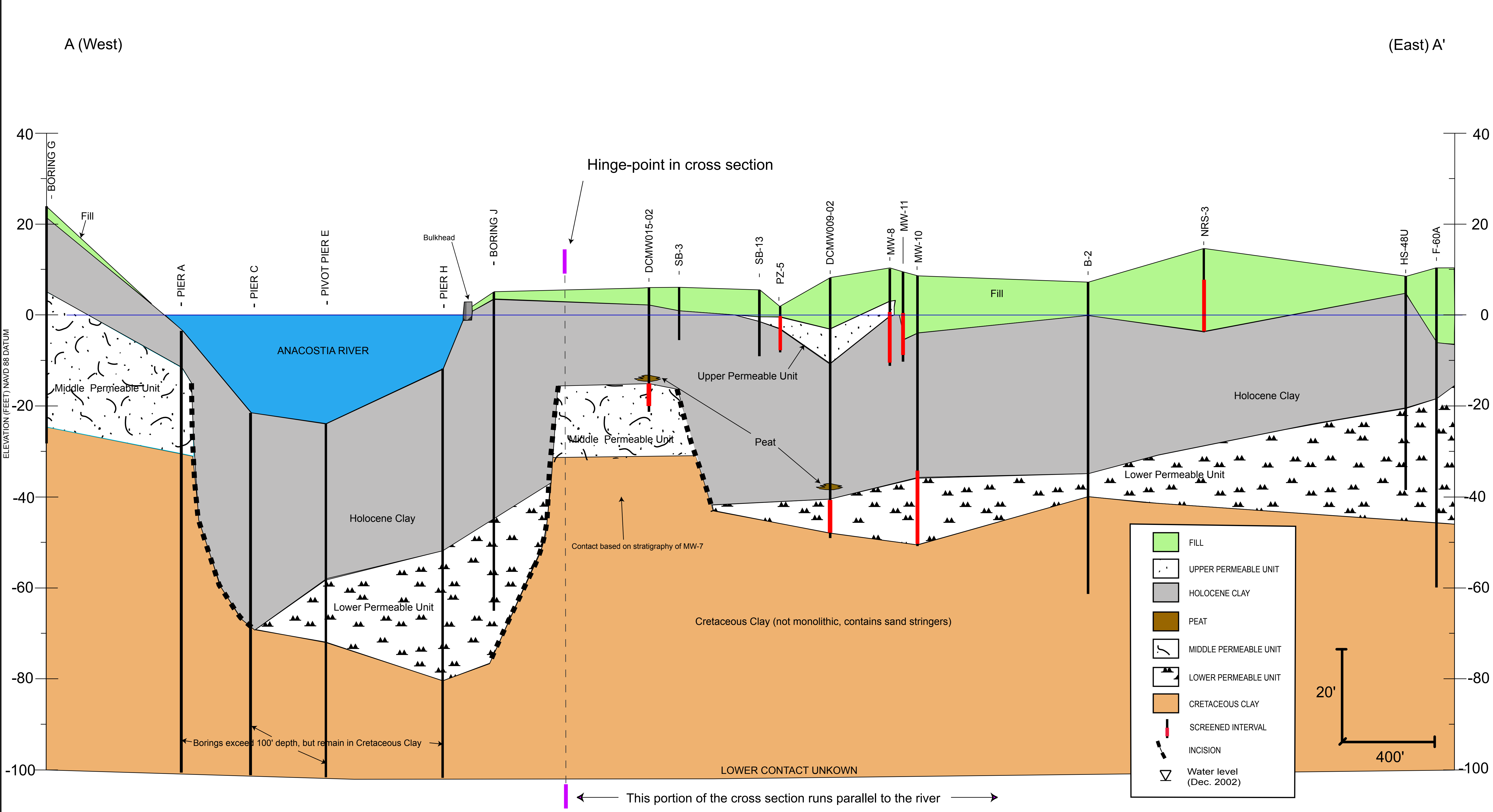

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Figure 3-4

CROSS SECTION A - A'

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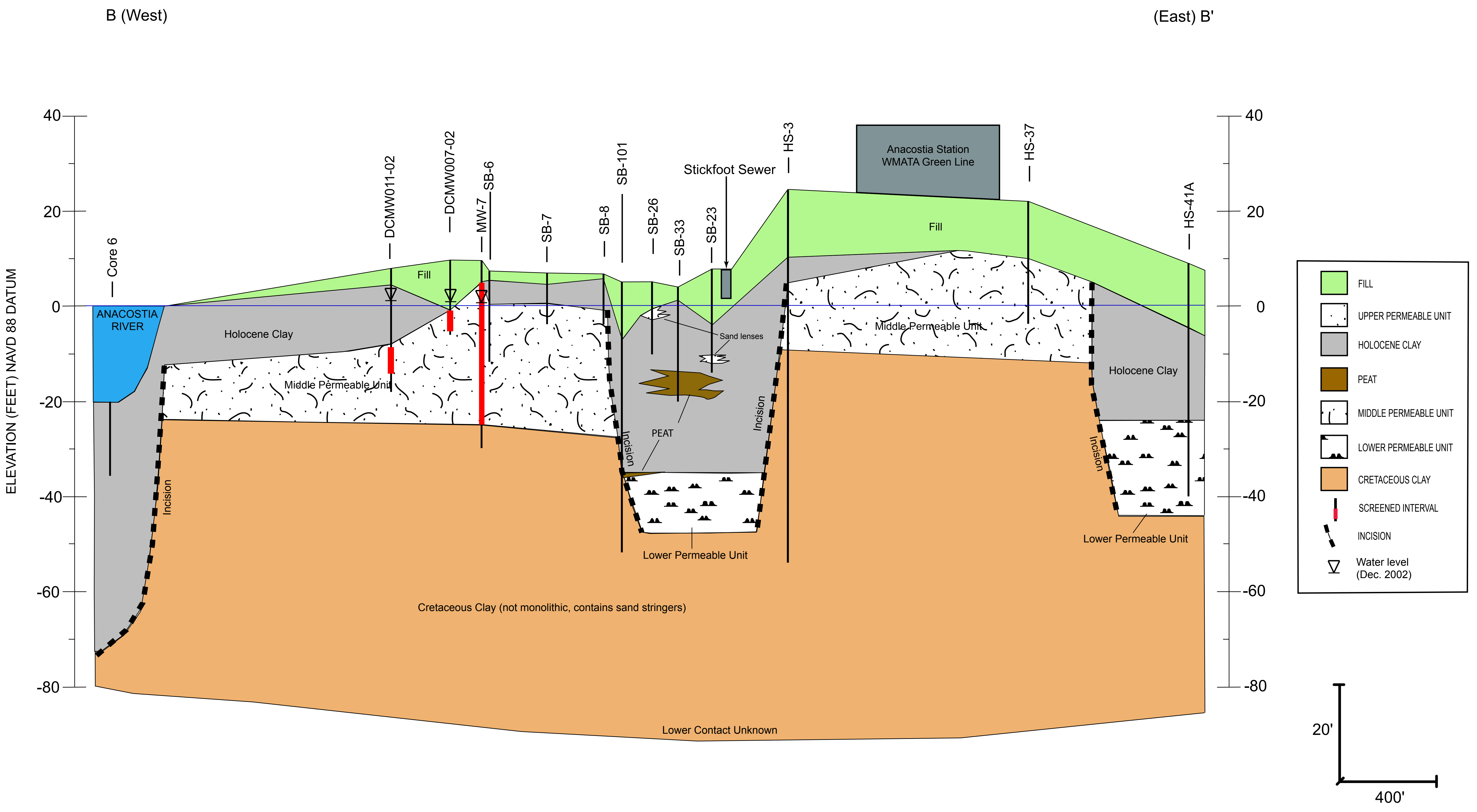

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Figure 3-5

CROSS SECTION B - B'

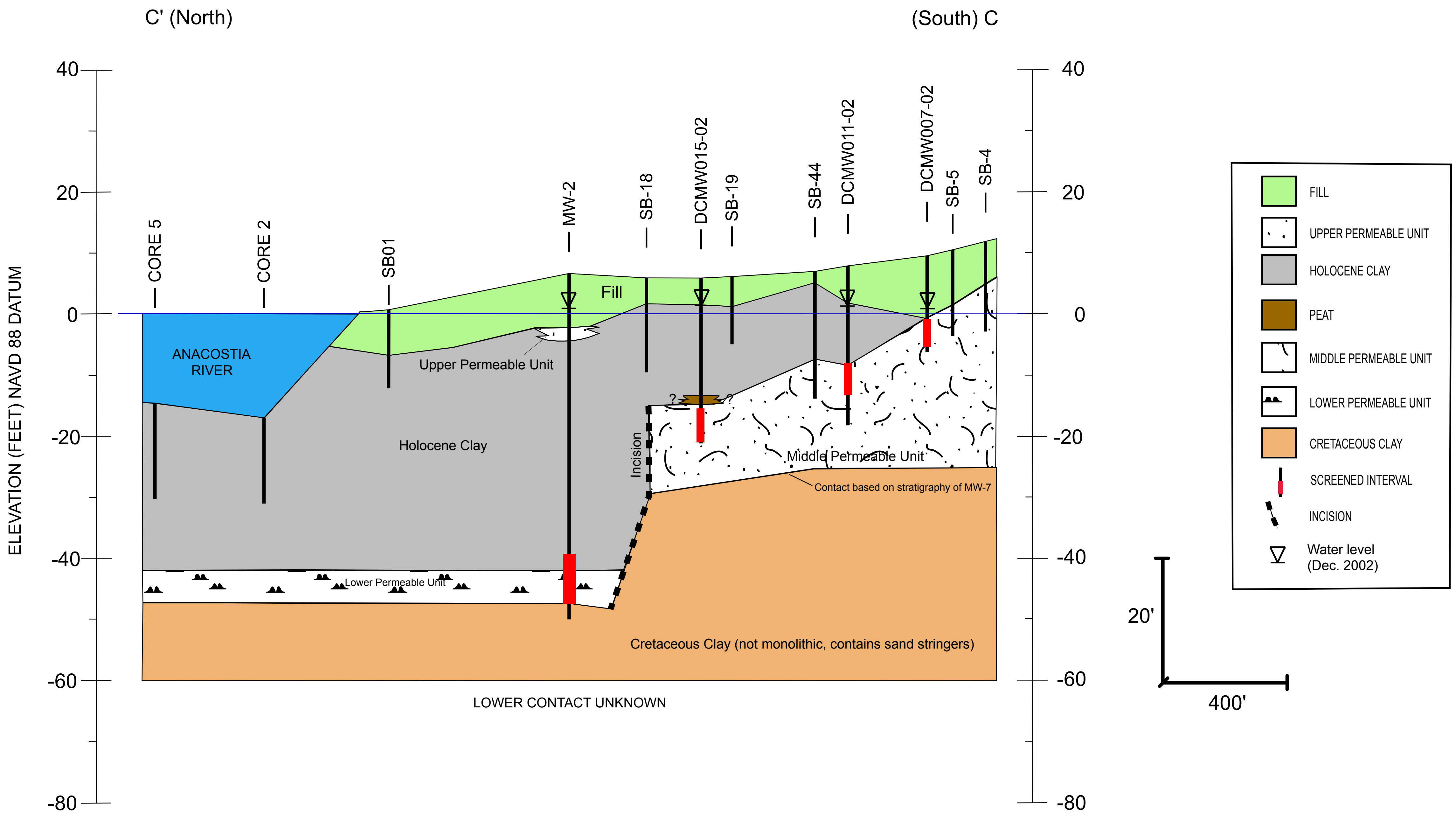

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Figure 3-6

CROSS SECTION C' - C

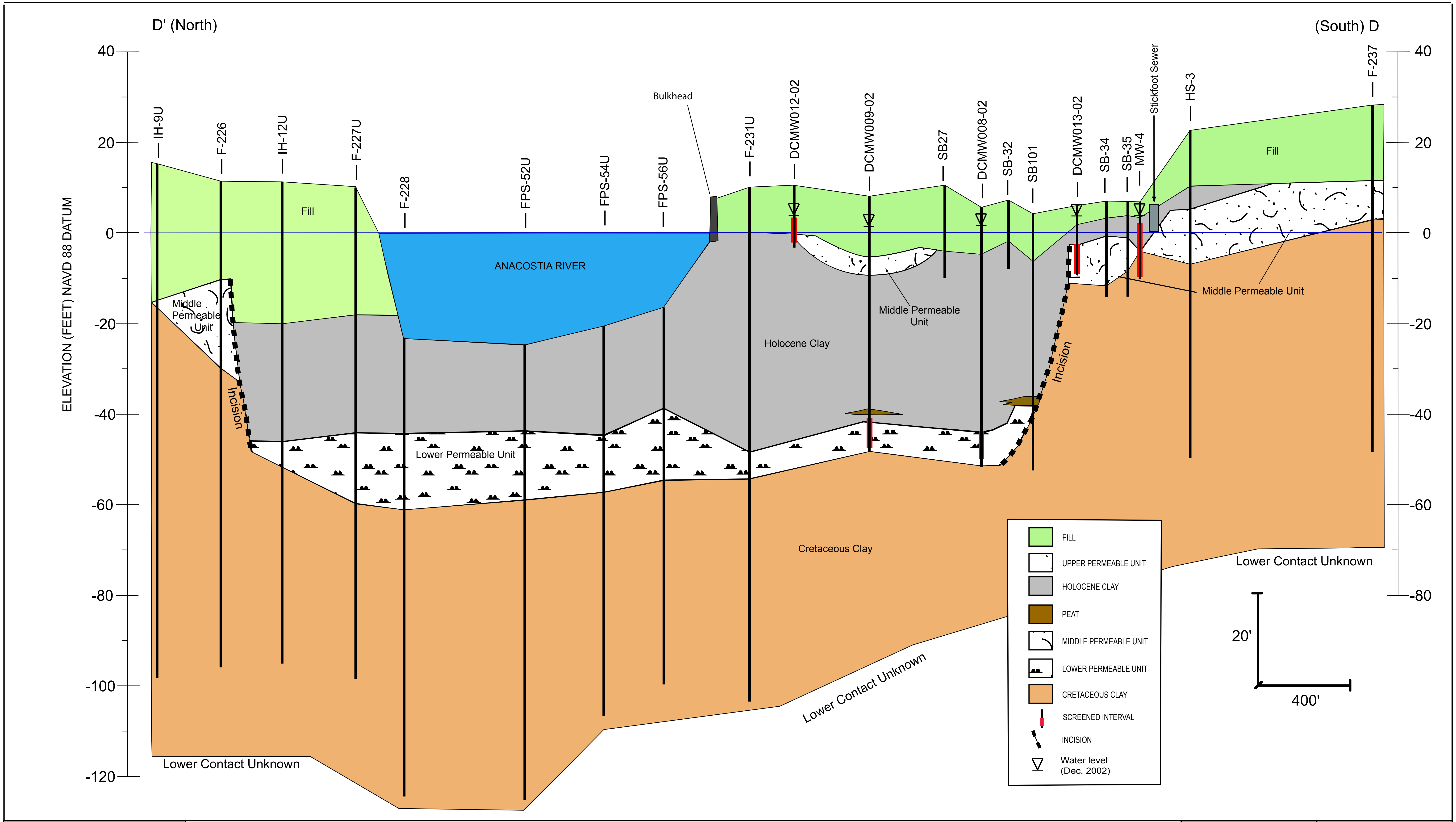

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Figure 3-7

CROSS SECTION D' - D

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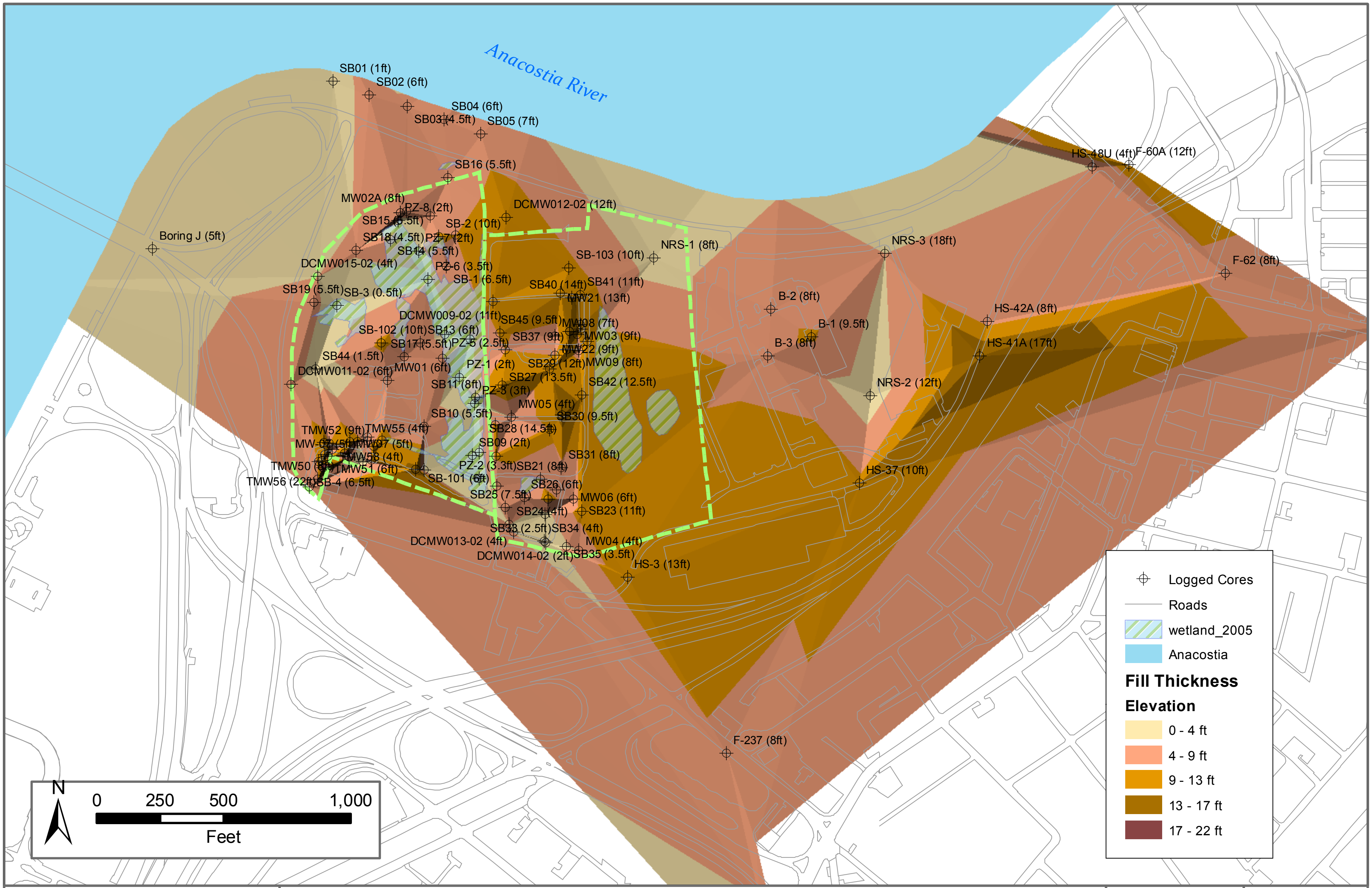

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Figure 3-8

Isopach of Fill Thickness

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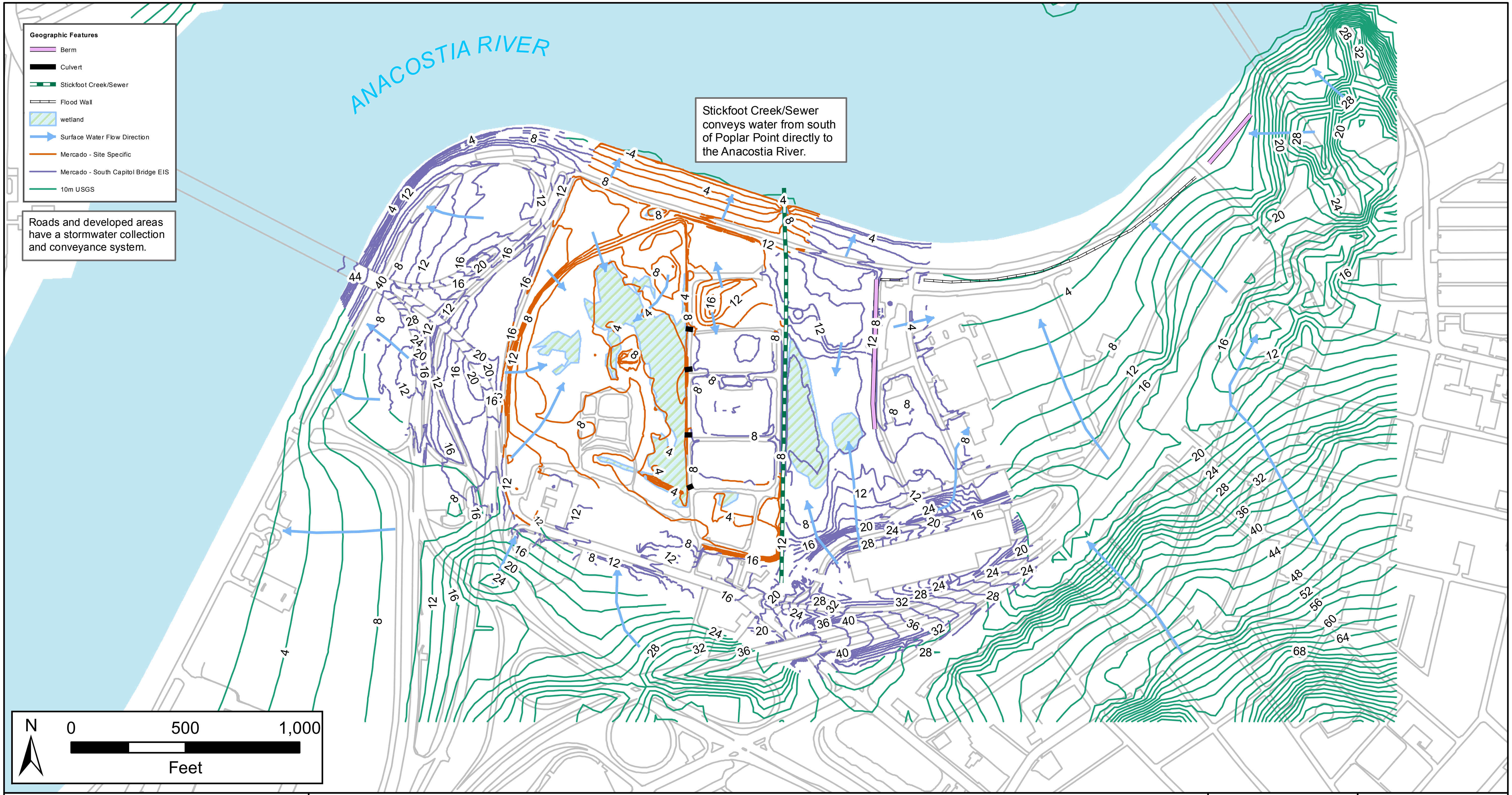

Roads and developed areas have a stormwater collection and conveyance system.

Stickfoot Creek/Sewer conveys water from south of Poplar Point directly to the Anacostia River.

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Figure 3-9

Topography at Poplar Point

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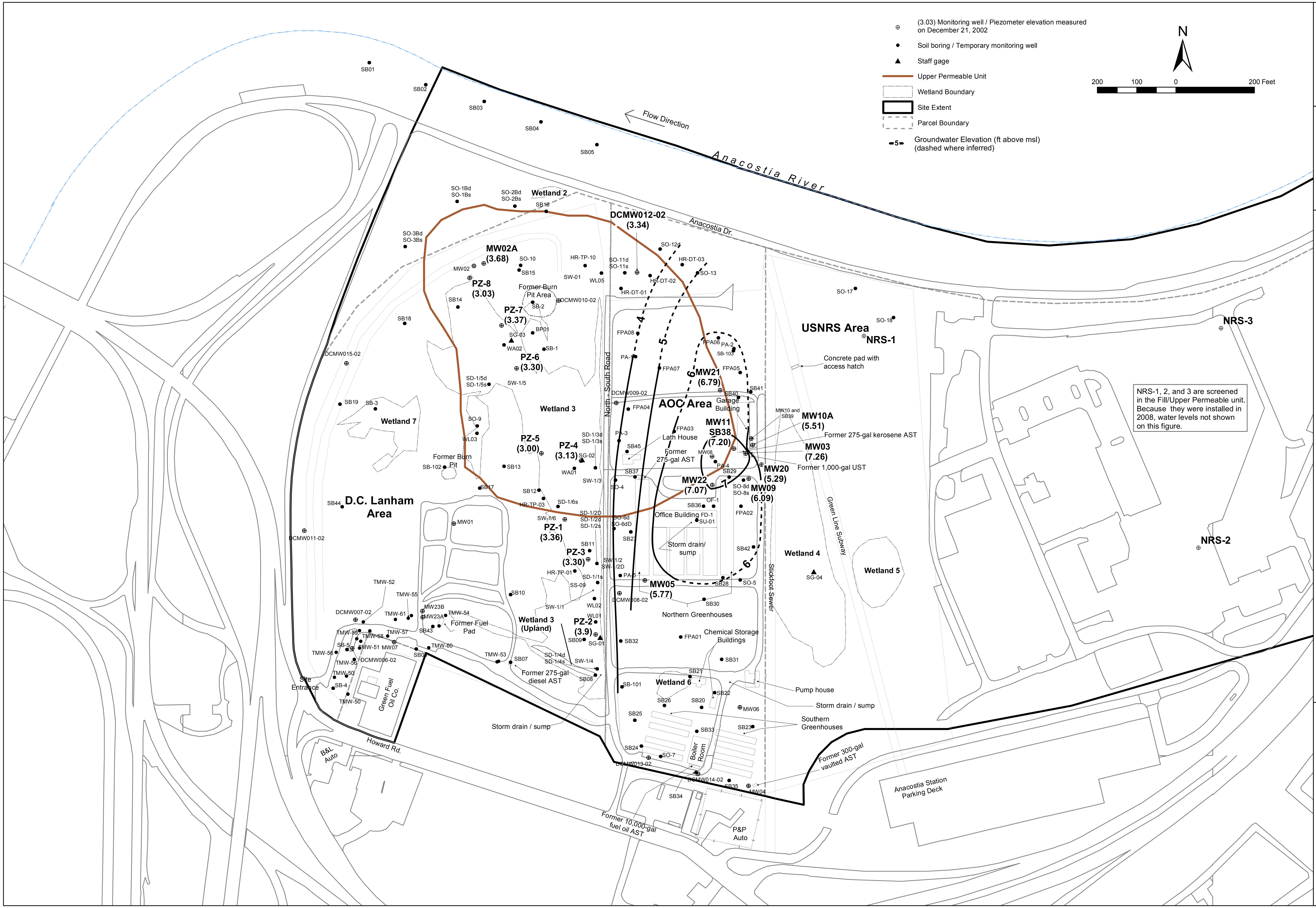

NRS-1, 2, and 3 are screened in the Fill/Upper Permeable unit. Because they were installed in 2008, water levels not shown on this figure.

Figure 3-10

January 2013

Fill/Upper Permeable Unit
Groundwater Elevation

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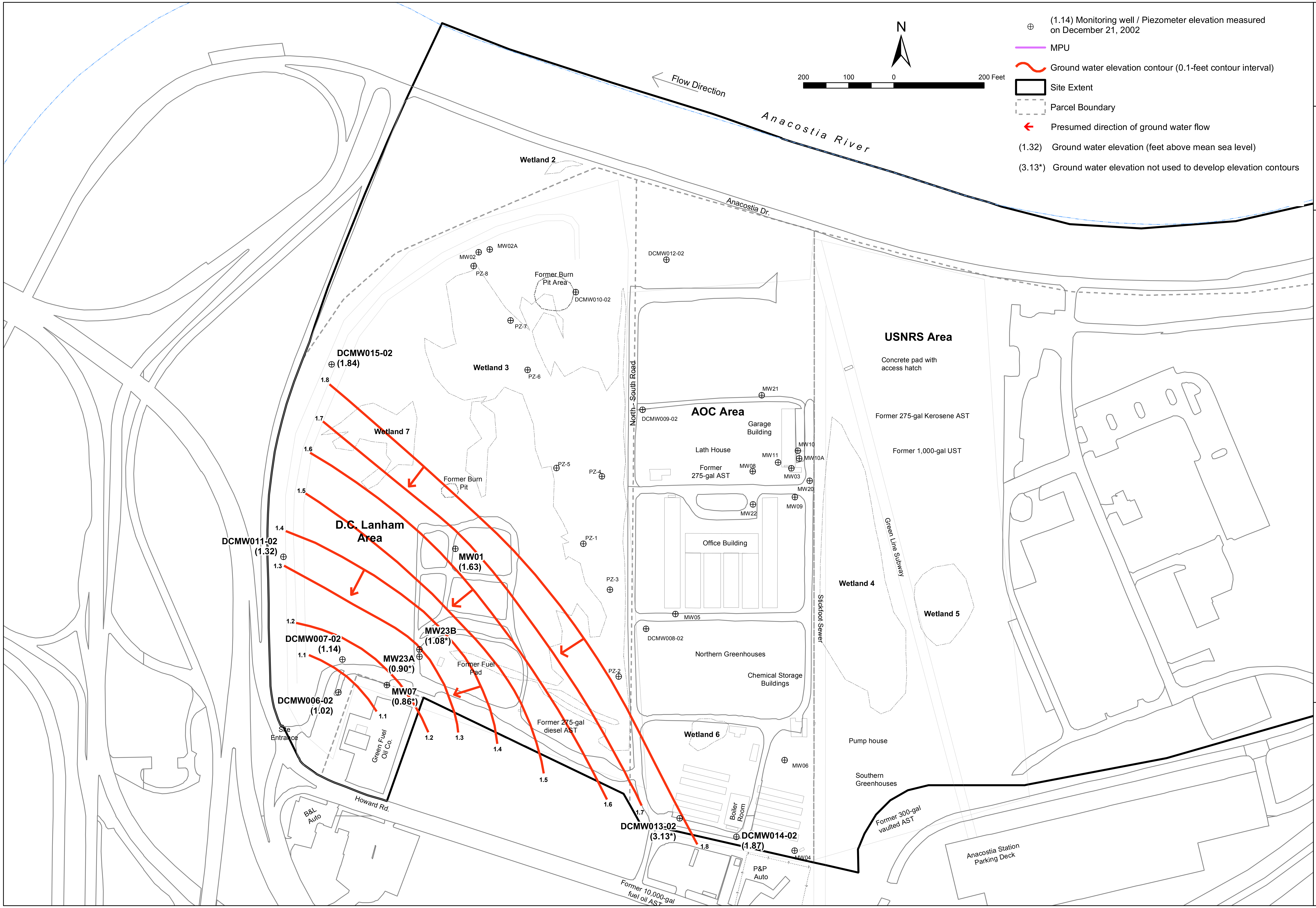

Figure 3-11

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Middle Permeable Unit
Groundwater Elevation

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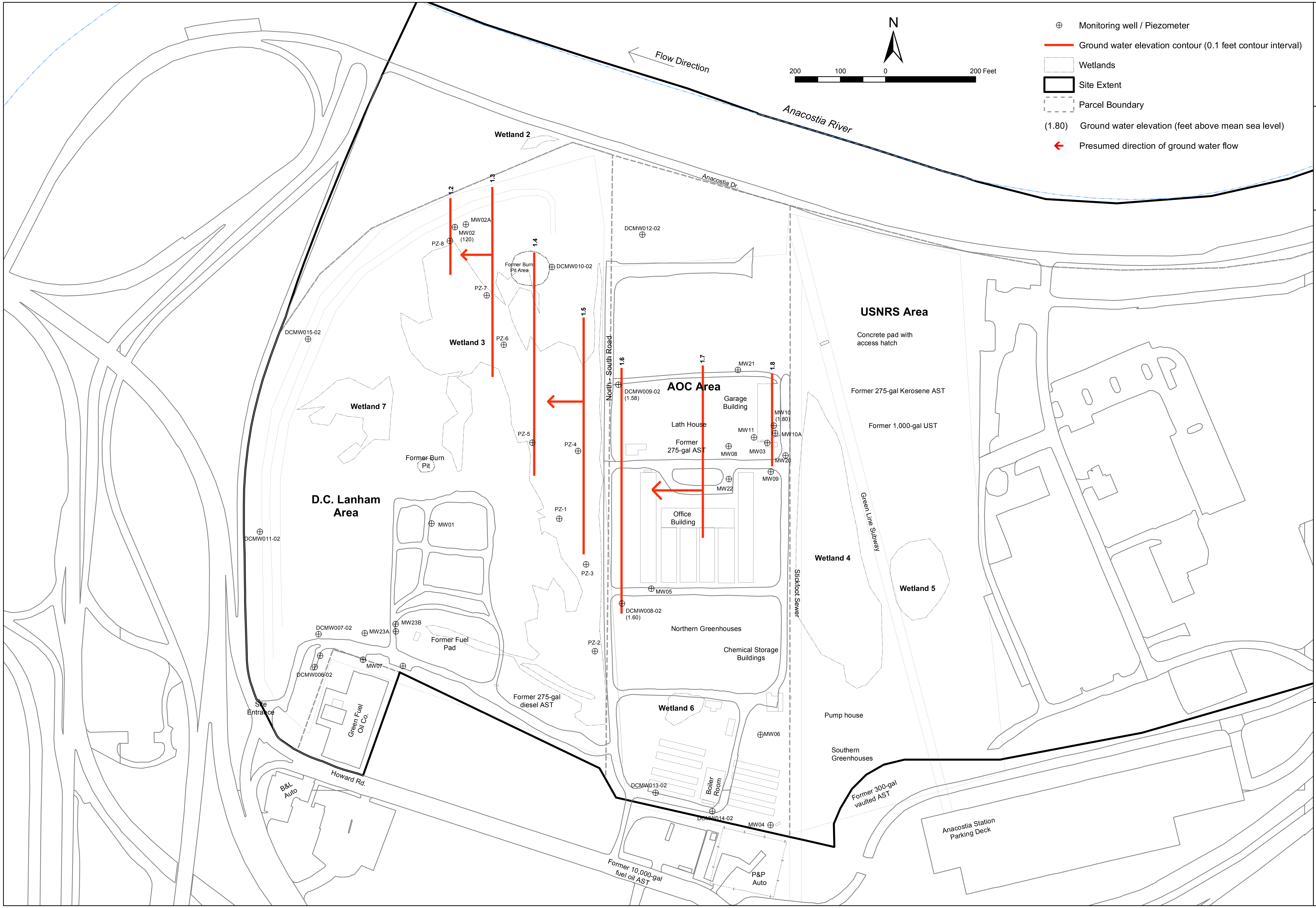

Figure 3-12

January 2013

Lower Permeable Unit
Groundwater Elevation

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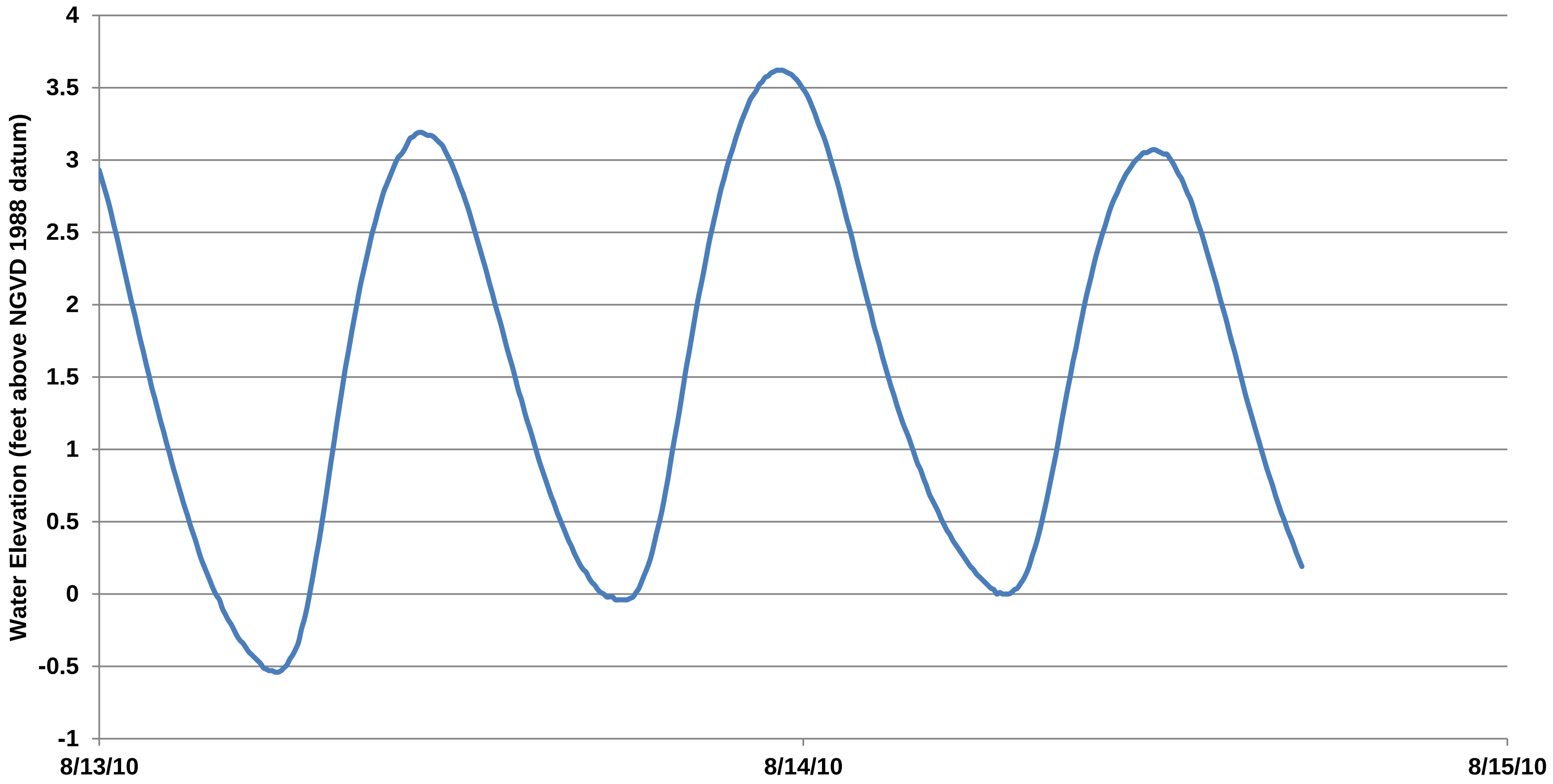

Data Retrieved on August 14, 2010 from http://tidesandcurrents.noaa.gov/geo.shtml?location=8594900

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Place
Chantilly, VA 20151

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Figure 3-13

Daily Tidal Elevations in the Potomac River

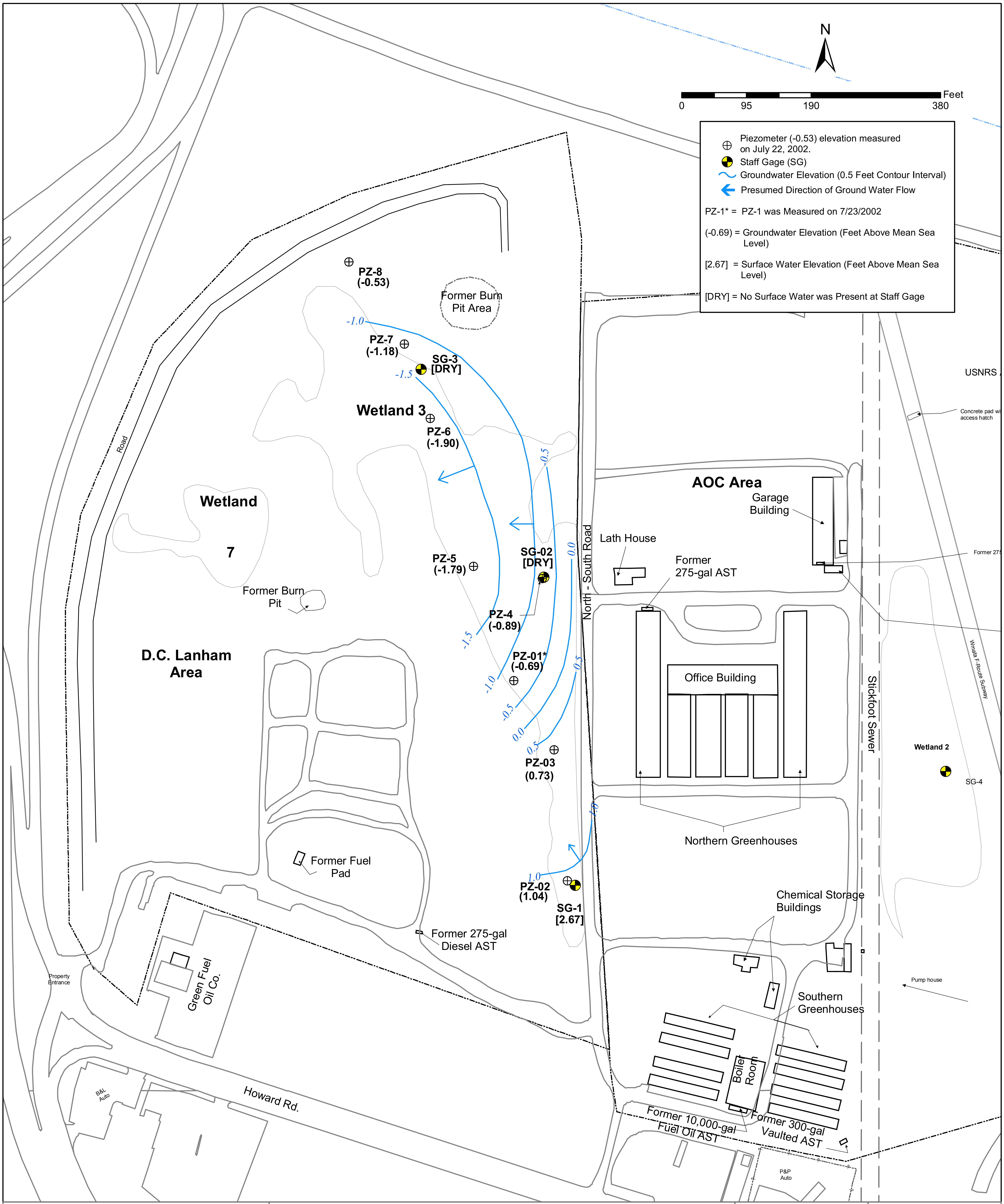

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Figure 3-14

Wetland Area 3
Groundwater and Surface Water
Elevations

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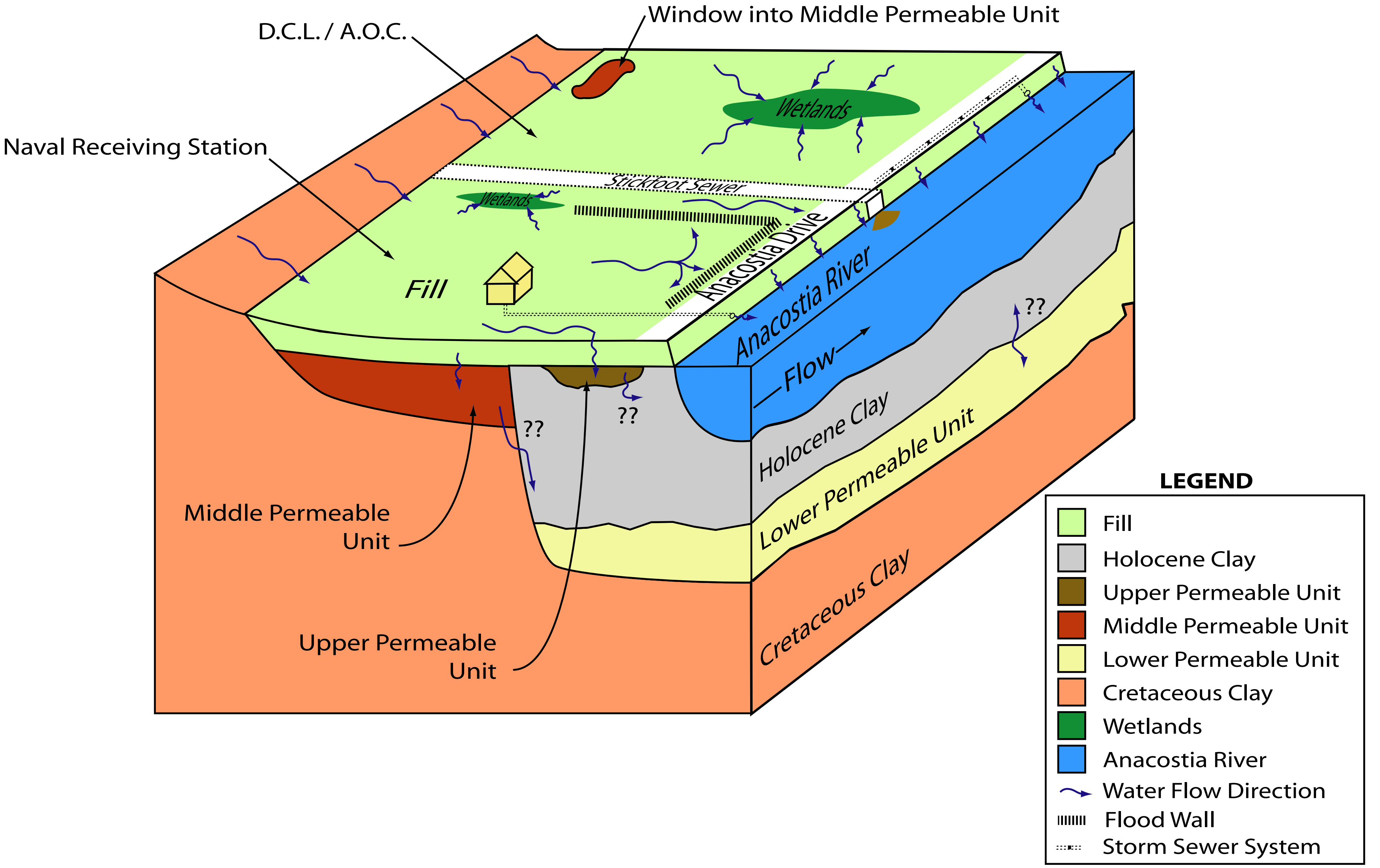

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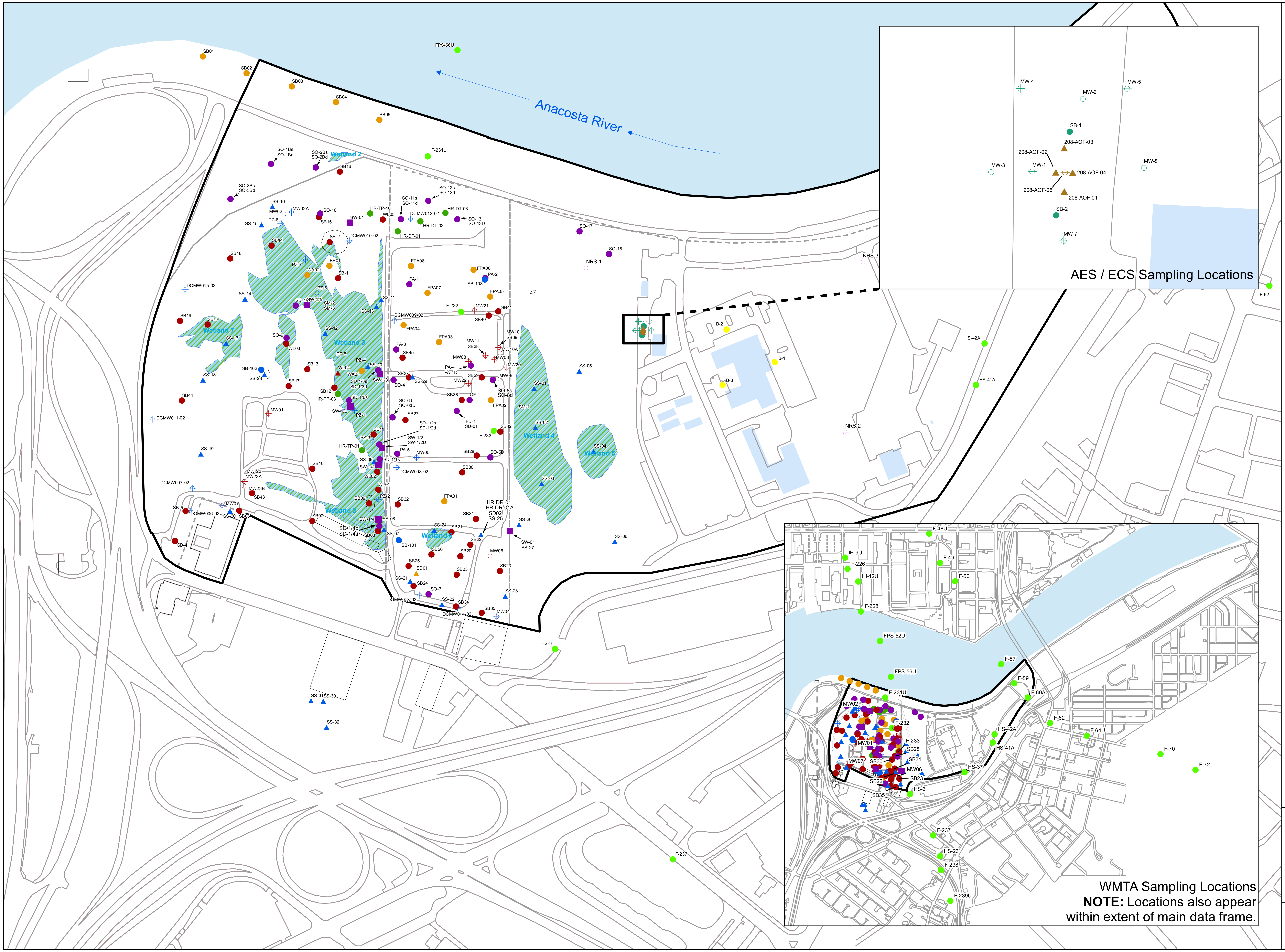
Fig. 3-15

Conceptual Site Model



AES / ECS Sampling Locations

WMTA Sampling Locations

NOTE: Locations also appear within extent of main data frame.

Legend

Contractor

🟫	AES
🟥	Thomas L. Brown and Associates
🟩	Ecology and Environment, Inc.
🟩	Engineering Consulting Services
🟧	ENVIRON
🟪	MACTEC
🟪	Resource Applications, Inc.
🟦	RIDOLFI, Inc.
🟨	Schnabel
🟩	Prepared for WMTA

Sample Type

⌖	Monitoring Well / Piezometer
●	Soil Boring
▲	Surface Soil
■	Surface Water
🟦	NPS Building
▨	Wetland
☐	Site Extent
⬚	Parcel Boundary

N

0 100 200 300 400 500

Feet

Figure 4-1
Sample Investigations by
Contractor and Media

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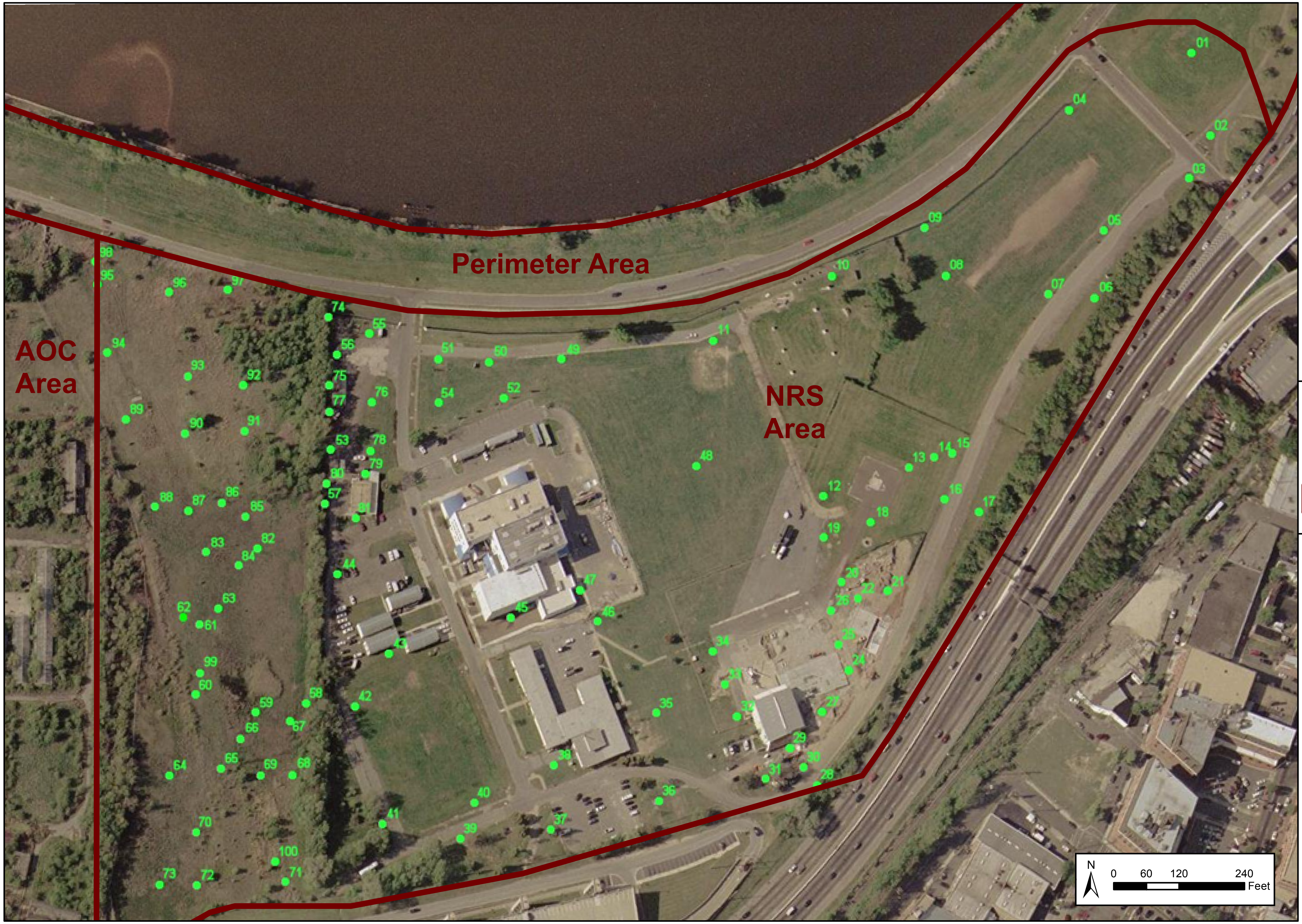

Source: Aerial photograph digital download from http://www.globexplorer.com. Aerial photograph dated April 2002.
Former NRS building locations based on 1957 aerial photograph

Legend

- ● Passive Soil Gas Point Location
- ▭ Parcel Boundary

Figure 4-2

January 2013

NRS - Passive Soil Gas Locations
Project 3552-10-1353.02

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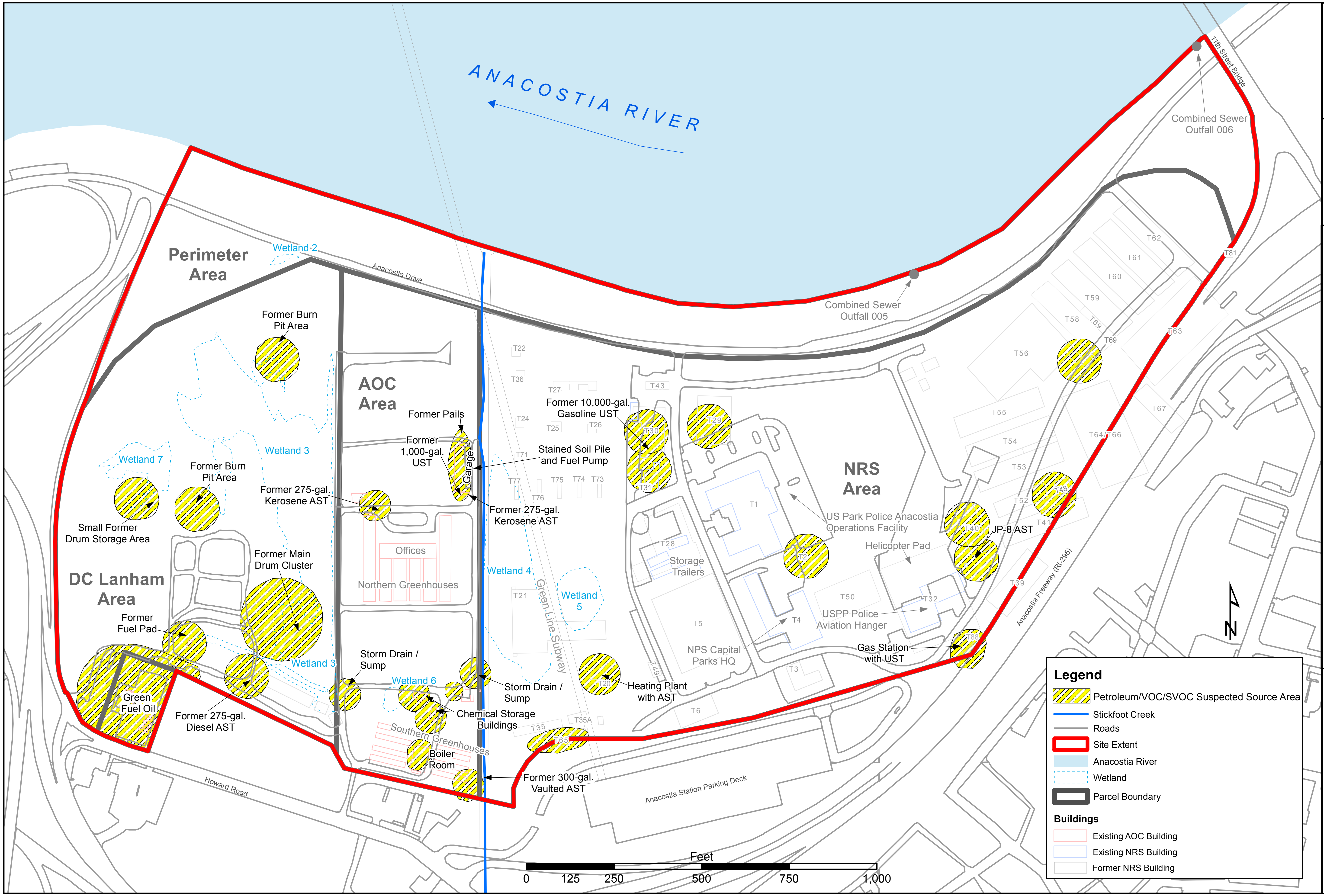

Figure 5-1

January 2013

Known or Suspected Petroleum Hydrocarbon, VOC, or SVOC Source Areas

POPLAR POINT, WASHINGTON, D.C.

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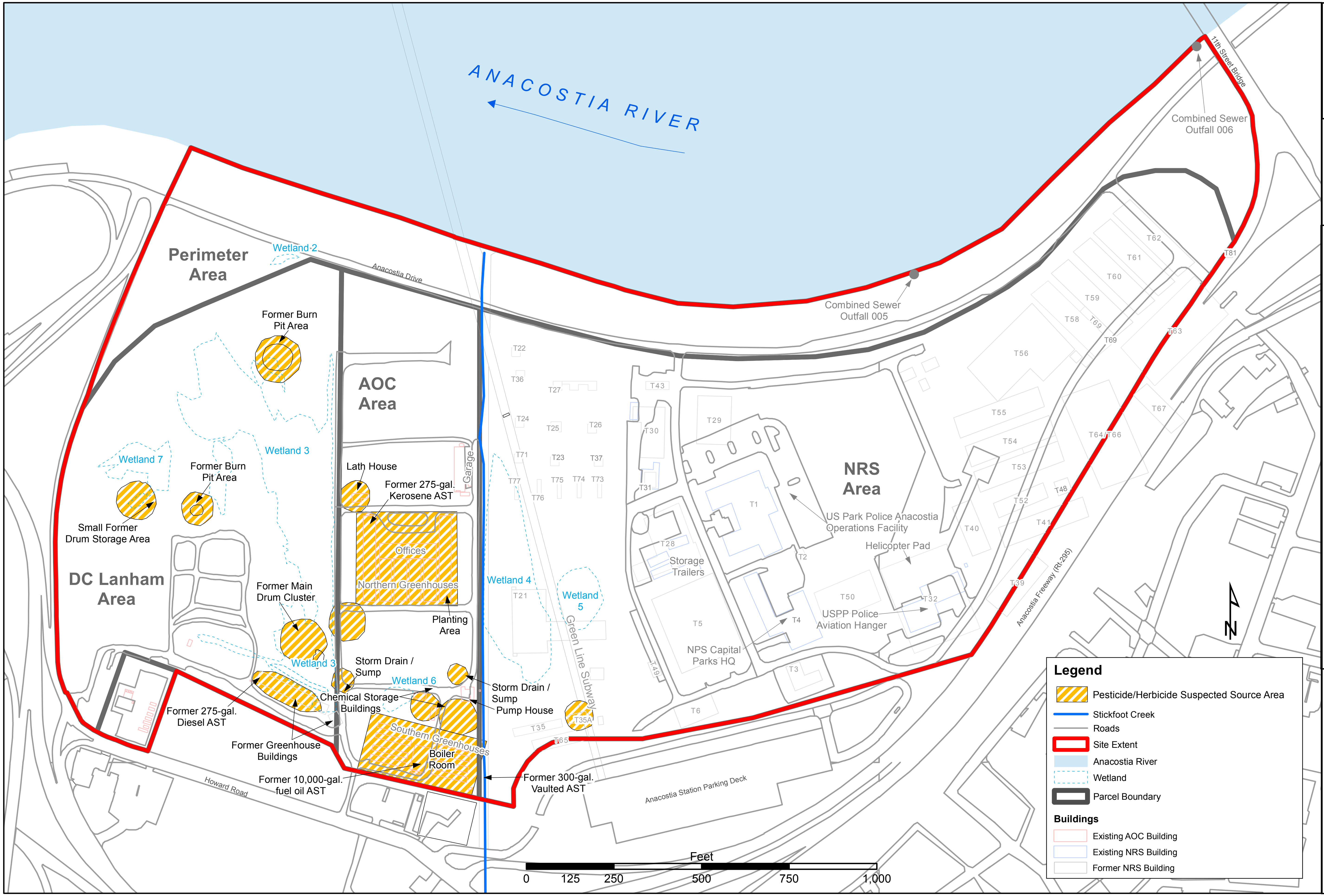

Figure 5-2

January 2013

Known or Suspected Pesticide/Herbicide Source Areas

POPLAR POINT, WASHINGTON, D.C.

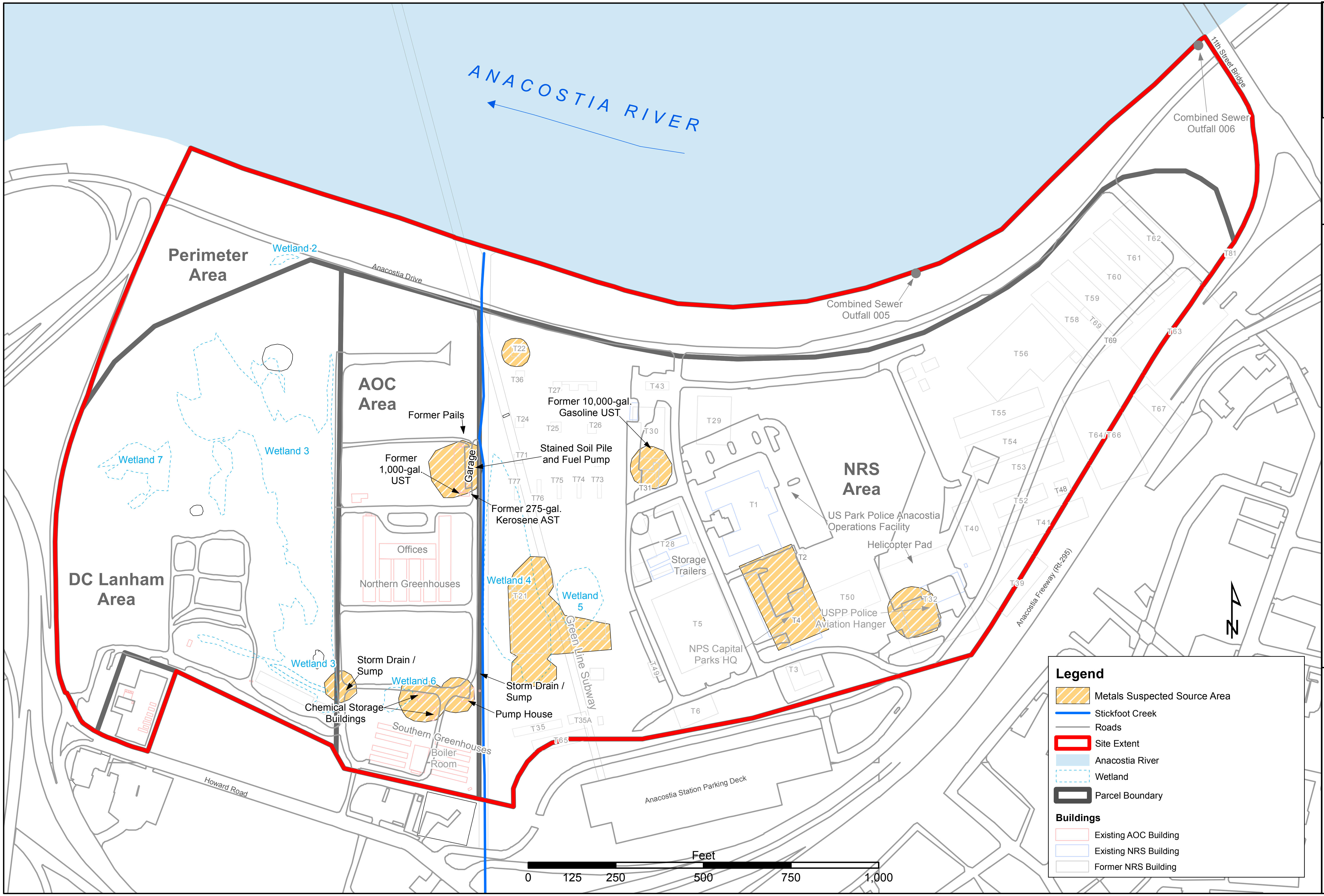

Figure 5-3

January 2013

Known or Suspected Metals Source Areas

POPLAR POINT, WASHINGTON, D.C.

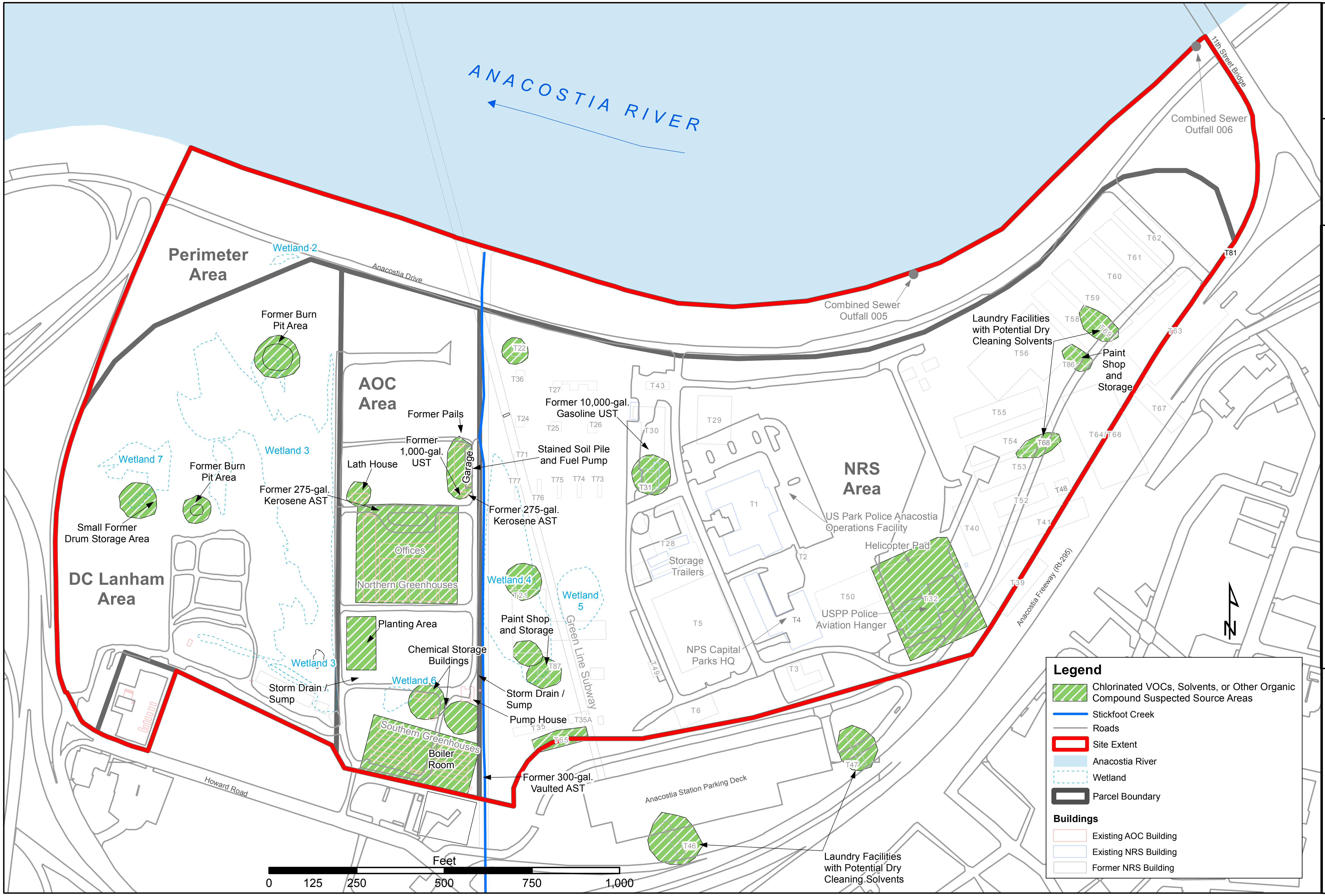

Figure 5-4

January 2013

Known or Suspected Chlorinated VOC, Solvent, or Other Organic Compound Source Areas

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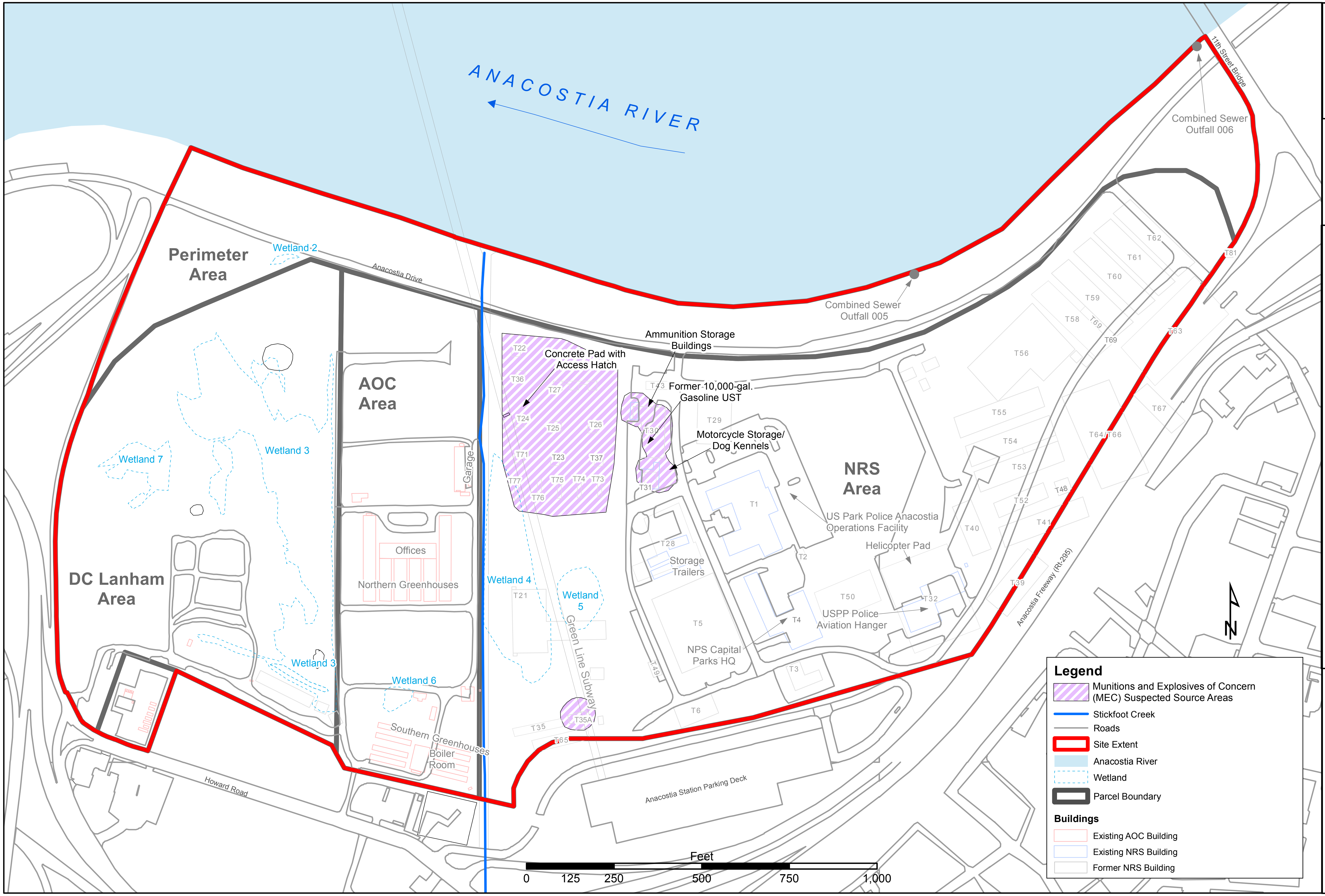

Figure 5-5

January 2013

Known or Suspected Munitions and Explosives of Concern (MEC) Source Areas

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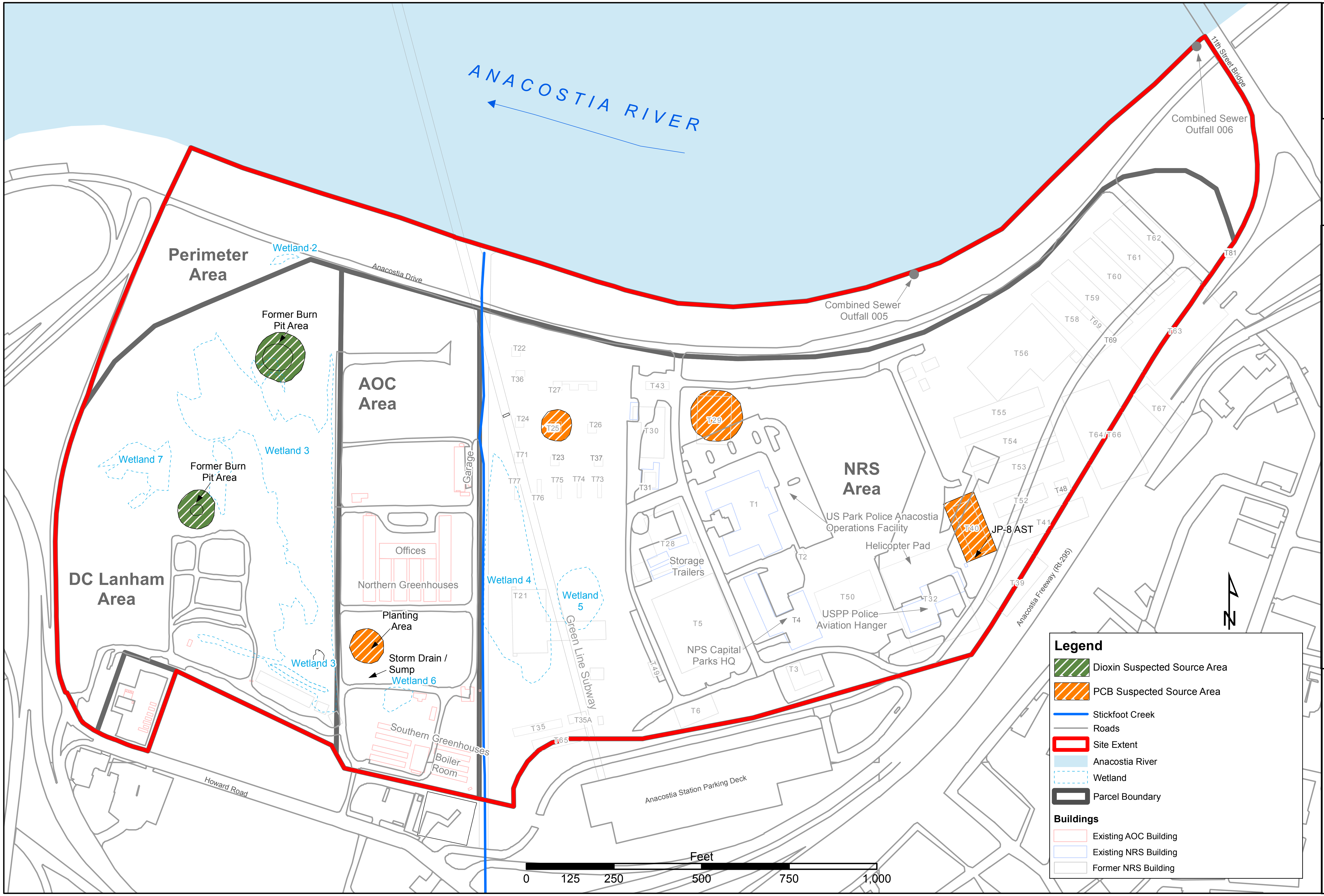

Figure 5-6

January 2013

Known or Suspected PCB and Dioxin Source Areas

POPLAR POINT, WASHINGTON, D.C.

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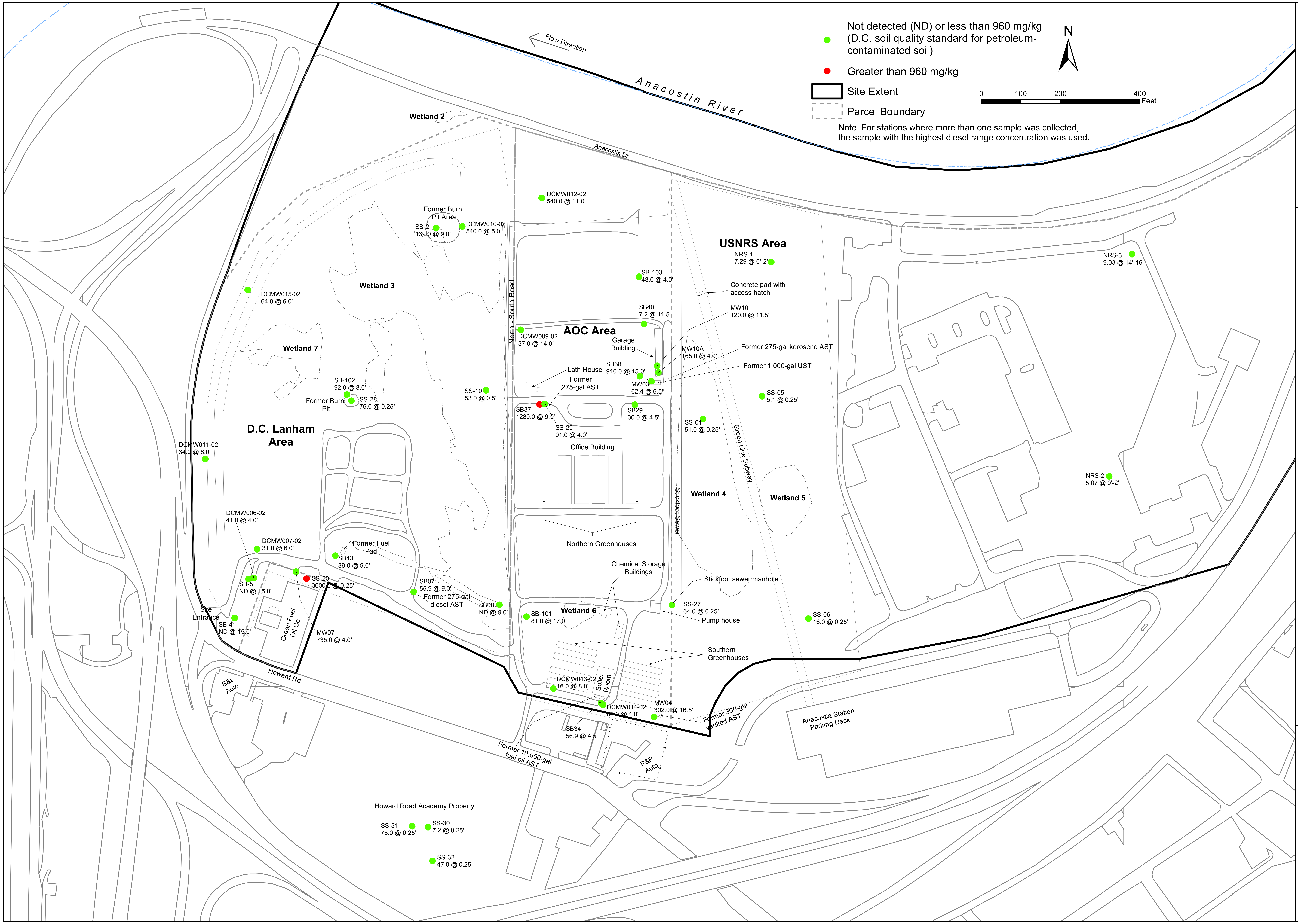

Figure 5-7

January 2013

Diesel-Range Hydrocarbons in Soil

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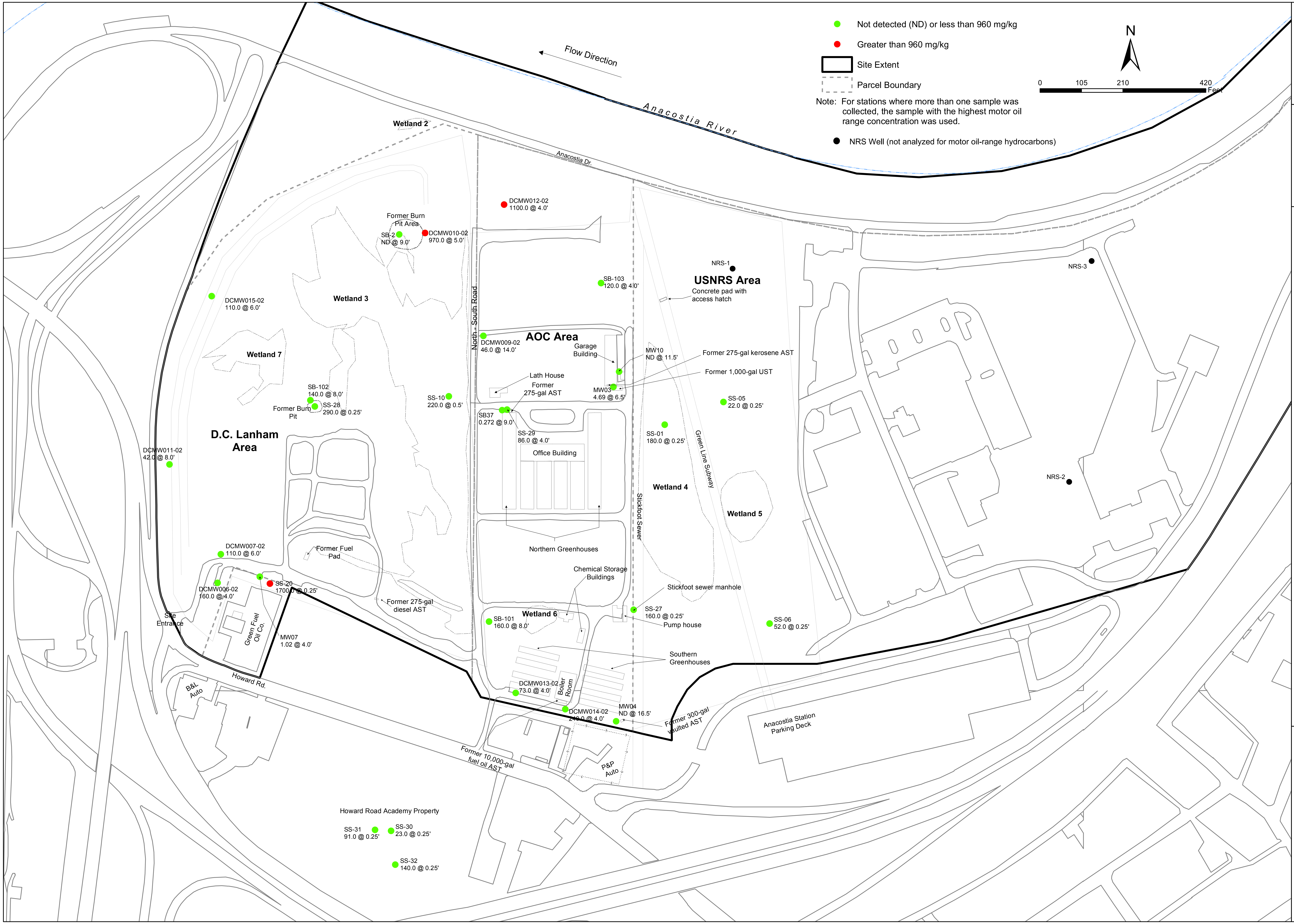

Figure 5-8

January 2013

Motor Oil-Range Hydrocarbons in Soil

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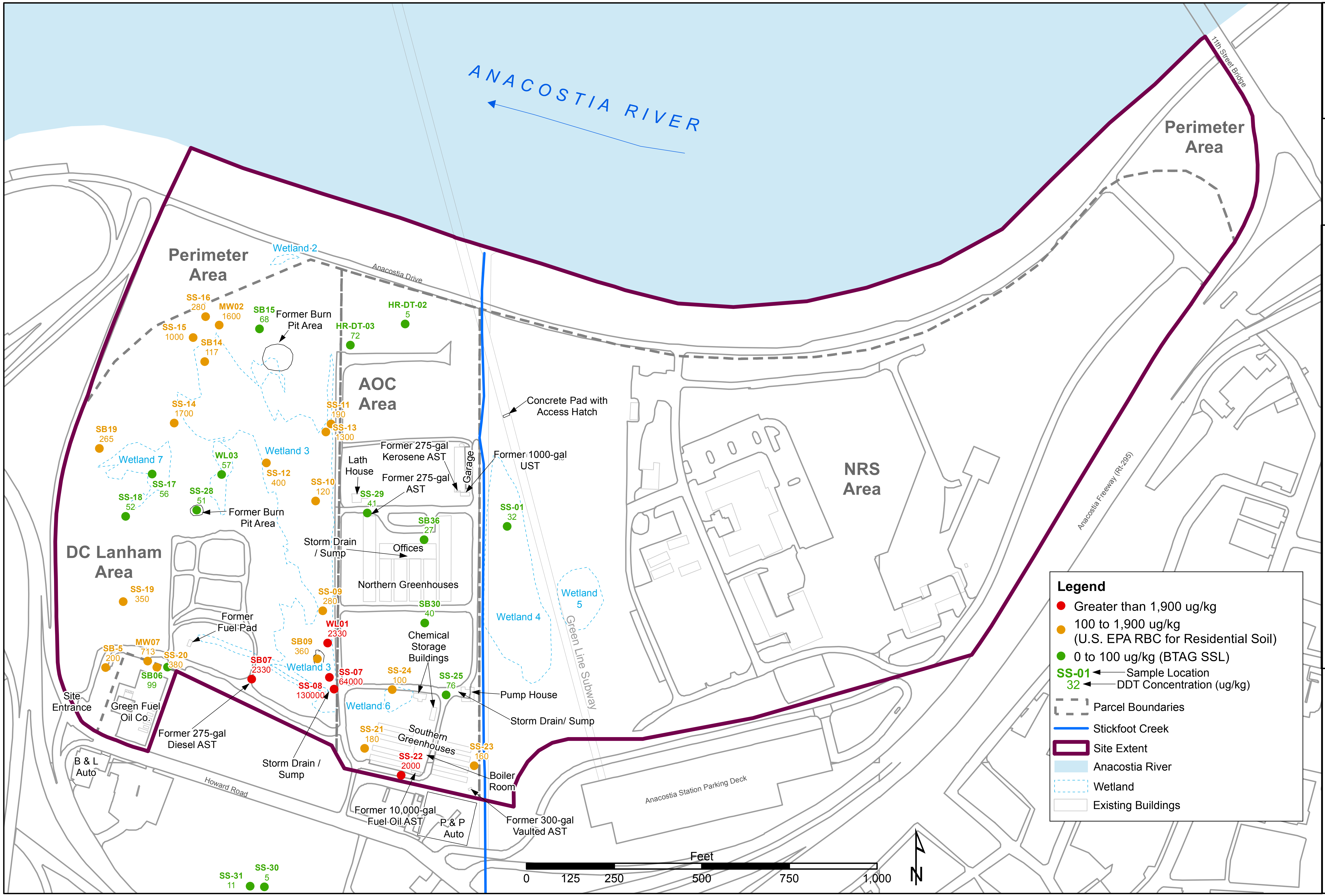
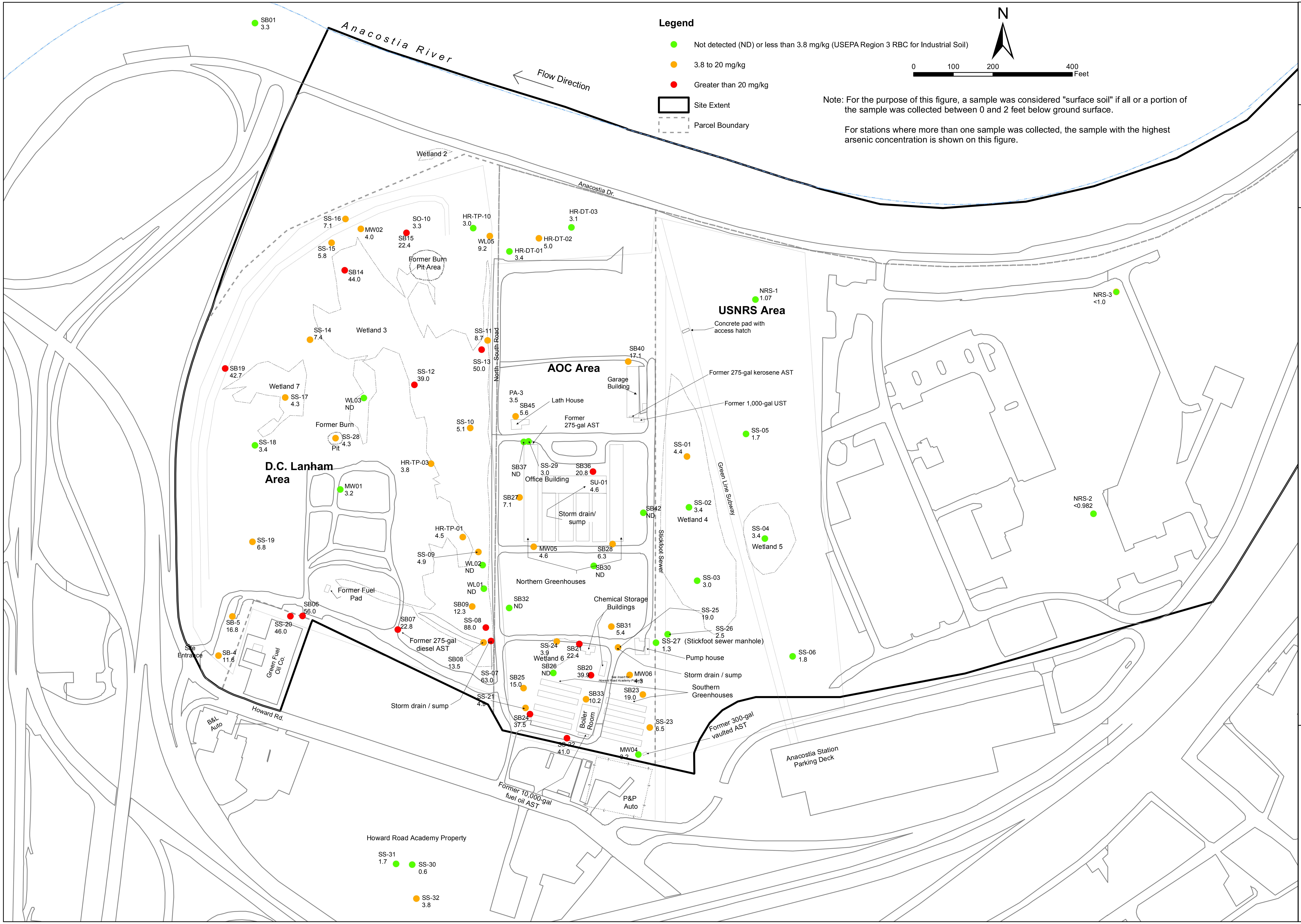


Figure 5-9

January 2013

DDT in Surface Soil

POPLAR POINT, WASHINGTON, D.C.



Legend

- 🟢 Not detected (ND) or less than 3.8 mg/kg (USEPA Region 3 RBC for Industrial Soil)
- 🟠 3.8 to 20 mg/kg
- 🔴 Greater than 20 mg/kg
- ▭ Site Extent
- ⬚ Parcel Boundary

Note: For the purpose of this figure, a sample was considered "surface soil" if all or a portion of the sample was collected between 0 and 2 feet below ground surface.

For stations where more than one sample was collected, the sample with the highest arsenic concentration is shown on this figure.

Figure 5-10

January 2013

Arsenic in Surface Soil

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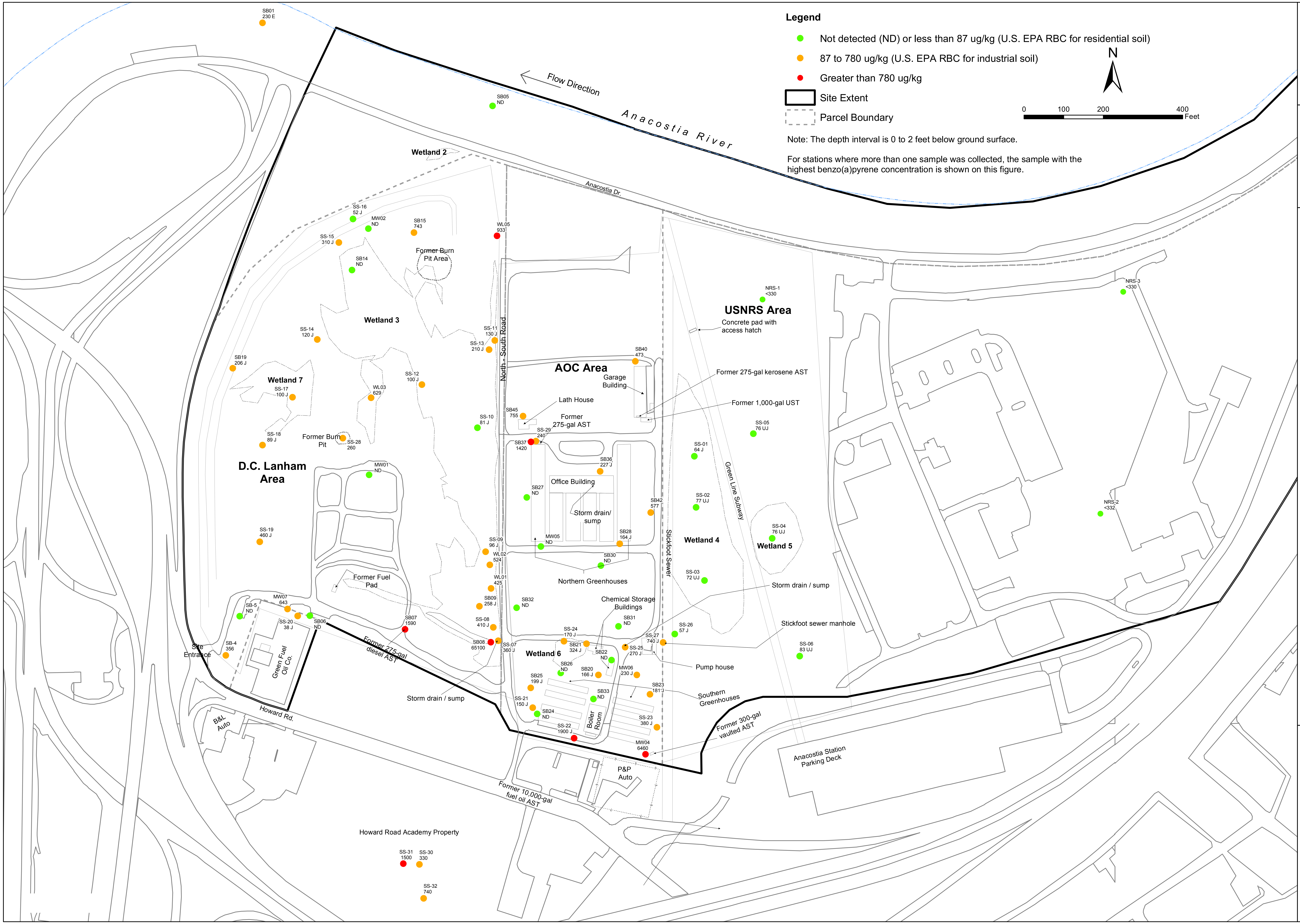

Note: The depth interval is 0 to 2 feet below ground surface.

For stations where more than one sample was collected, the sample with the highest benzo(a)pyrene concentration is shown on this figure.

Figure 5-11

January 2013

Benzo(a)pyrene
in Surface Soil

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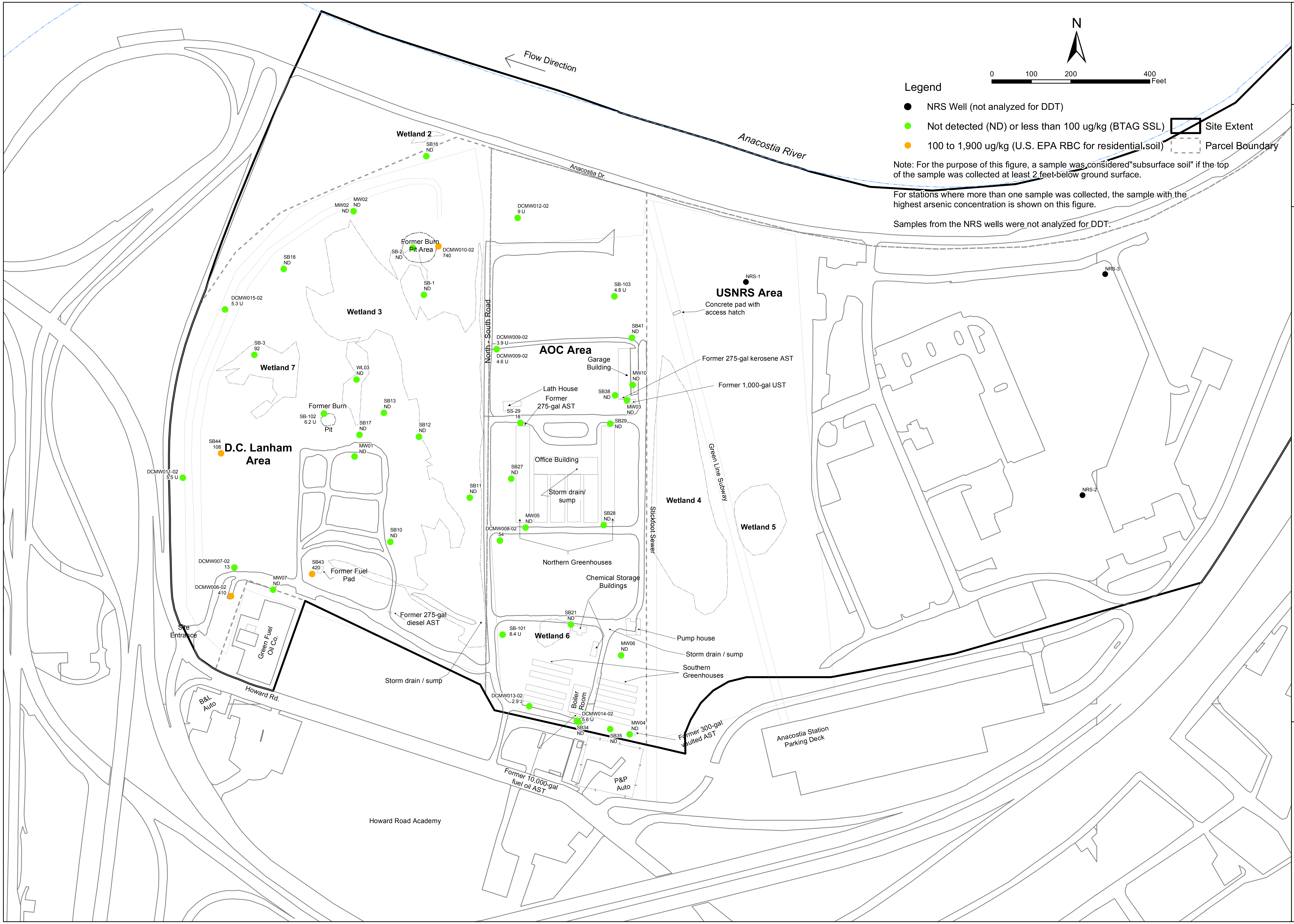
Figure 5-12

DDT in Subsurface Soil

January 2013

POPLAR POINT, WASHINGTON, D.C.



Legend

● NRS Well (not analyzed for DDT)

🟢 Not detected (ND) or less than 100 ug/kg (BTAG SSL)

🟠 100 to 1,900 ug/kg (U.S. EPA RBC for residential soil)

▭ Site Extent

⬚ Parcel Boundary

Note: For the purpose of this figure, a sample was considered"subsurface soil" if the top of the sample was collected at least 2 feet below ground surface.

For stations where more than one sample was collected, the sample with the highest arsenic concentration is shown on this figure.

Samples from the NRS wells were not analyzed for DDT.

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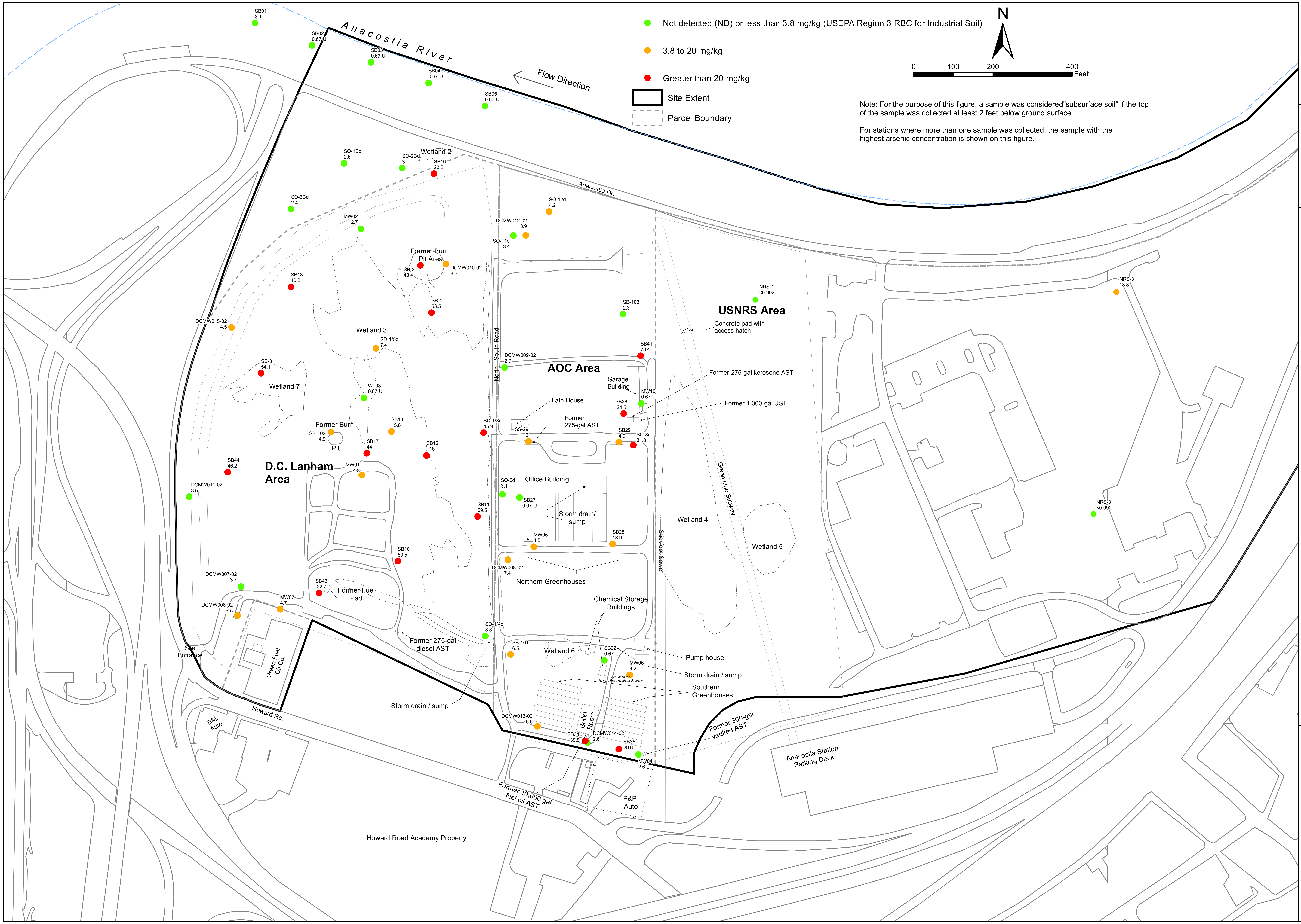


Note: For the purpose of this figure, a sample was considered"subsurface soil" if the top of the sample was collected at least 2 feet below ground surface.

For stations where more than one sample was collected, the sample with the highest arsenic concentration is shown on this figure.

Figure 5-13

January 2013

Arsenic in Subsurface Soil

POPLAR POINT, WASHINGTON, D.C.

amec
14428 Albemarle Point Place
Chantilly, VA 20151

Path: M:\Projects\457_PoplarPoint\Mapfiles\Figure_5-13.mxd Date Saved: 1/15/2013

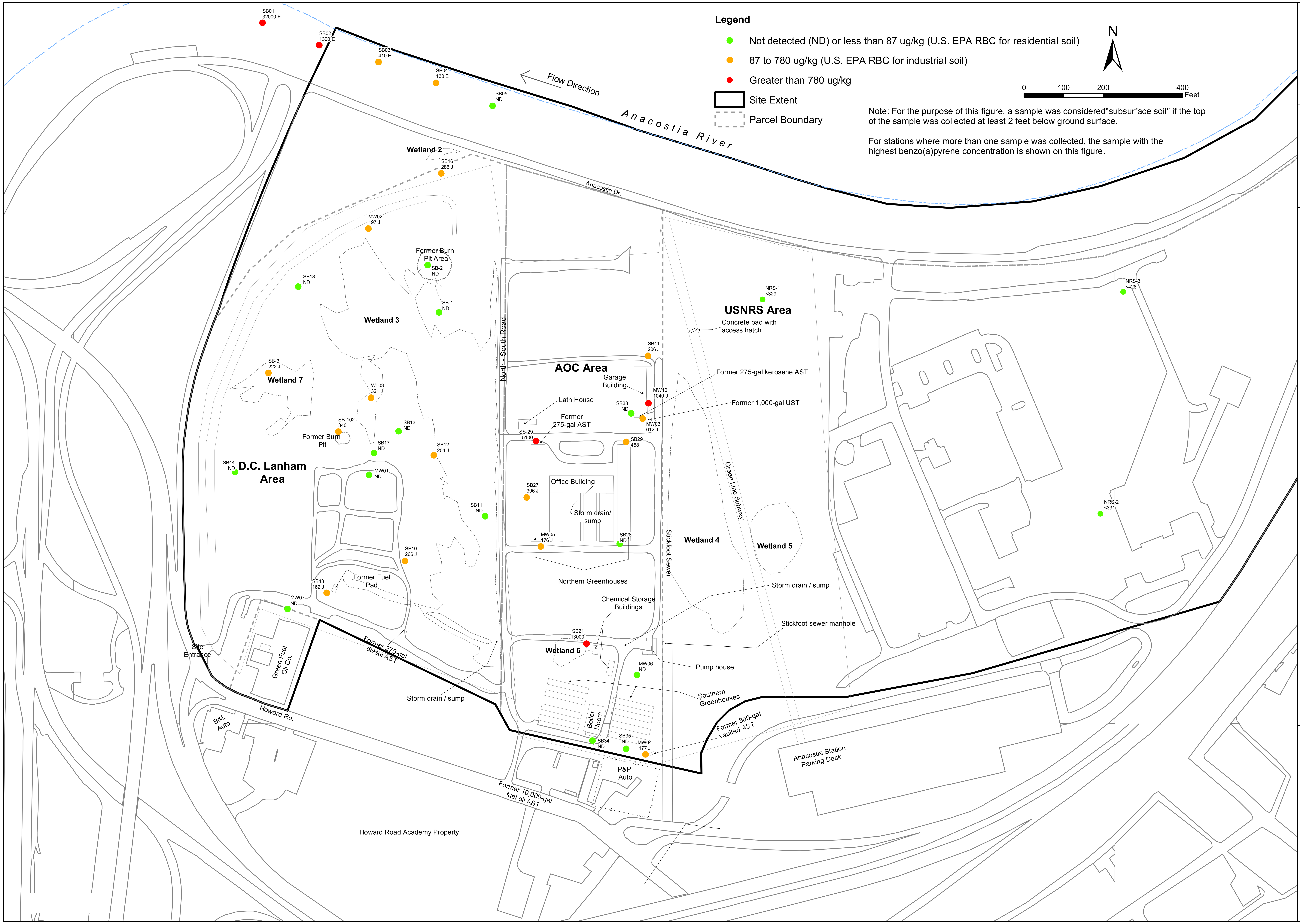


Figure 5-14

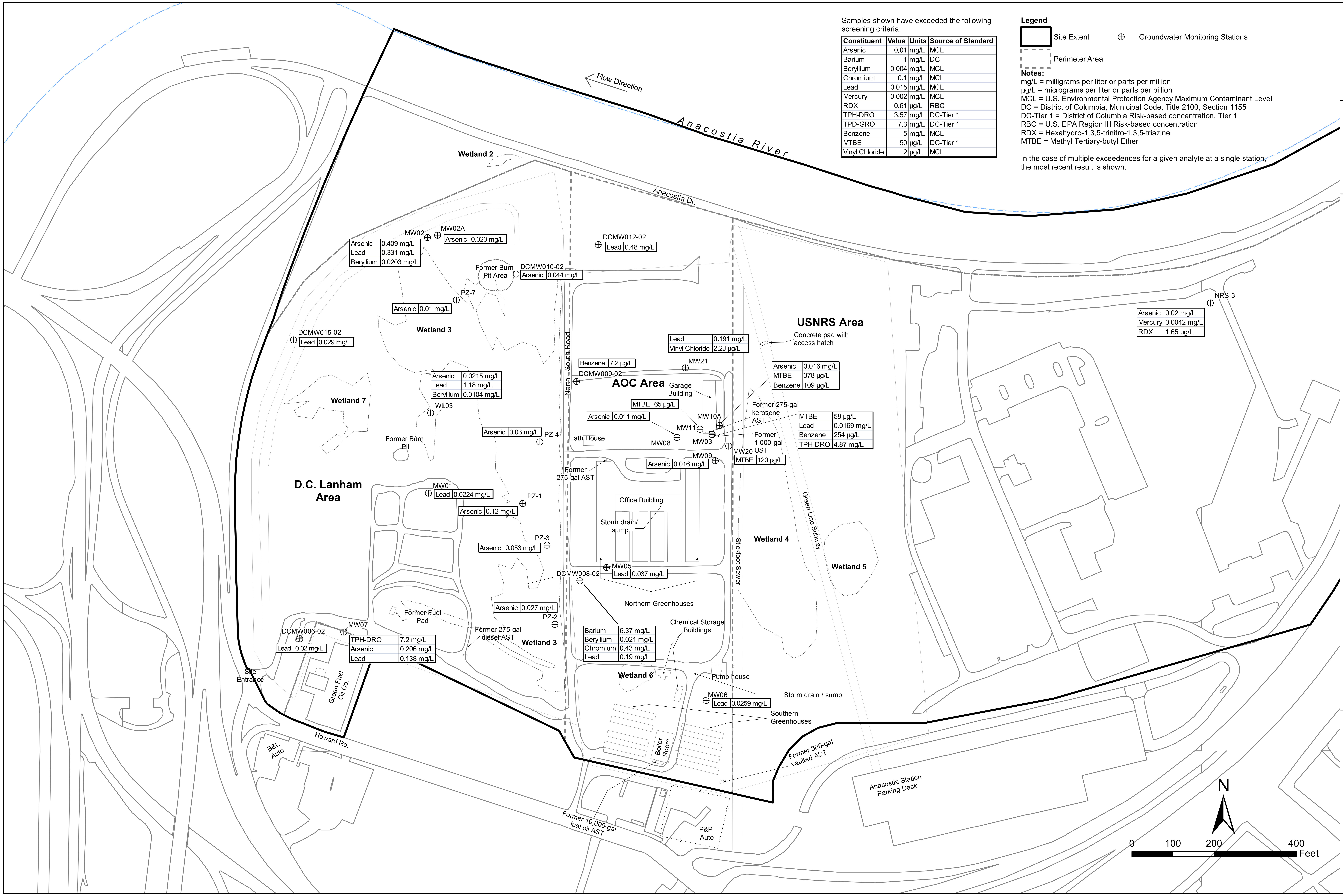
January 2013

Benzo(a)pyrene in Subsurface Soil

POPLAR POINT, WASHINGTON, D.C.

amec
14428 Albemarle Point Place
Chantilly, VA 20151

Path: M:\Projects\457_PoplarPoint\Mapfiles\Figure_5-14.mxd Date Saved: 1/15/2013



Samples shown have exceeded the following screening criteria:

Constituent	Value	Units	Source of Standard
Arsenic	0.01	mg/L	MCL
Barium	1	mg/L	DC
Beryllium	0.004	mg/L	MCL
Chromium	0.1	mg/L	MCL
Lead	0.015	mg/L	MCL
Mercury	0.002	mg/L	MCL
RDX	0.61	µg/L	RBC
TPH-DRO	3.57	mg/L	DC-Tier 1
TPD-GRO	7.3	mg/L	DC-Tier 1
Benzene	5	mg/L	MCL
MTBE	50	µg/L	DC-Tier 1
Vinyl Chloride	2	µg/L	MCL

Legend

▭	Site Extent
⊕	Groundwater Monitoring Stations
⬚	Perimeter Area

Notes:

mg/L = milligrams per liter or parts per million
µg/L = micrograms per liter or parts per billion
MCL = U.S. Environmental Protection Agency Maximum Contaminant Level
DC = District of Columbia, Municipal Code, Title 2100, Section 1155
DC-Tier 1 = District of Columbia Risk-based concentration, Tier 1
RBC = U.S. EPA Region III Risk-based concentration
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine
MTBE = Methyl Tertiary-butyl Ether

In the case of multiple exceedences for a given analyte at a single station, the most recent result is shown.

Figure 5-15

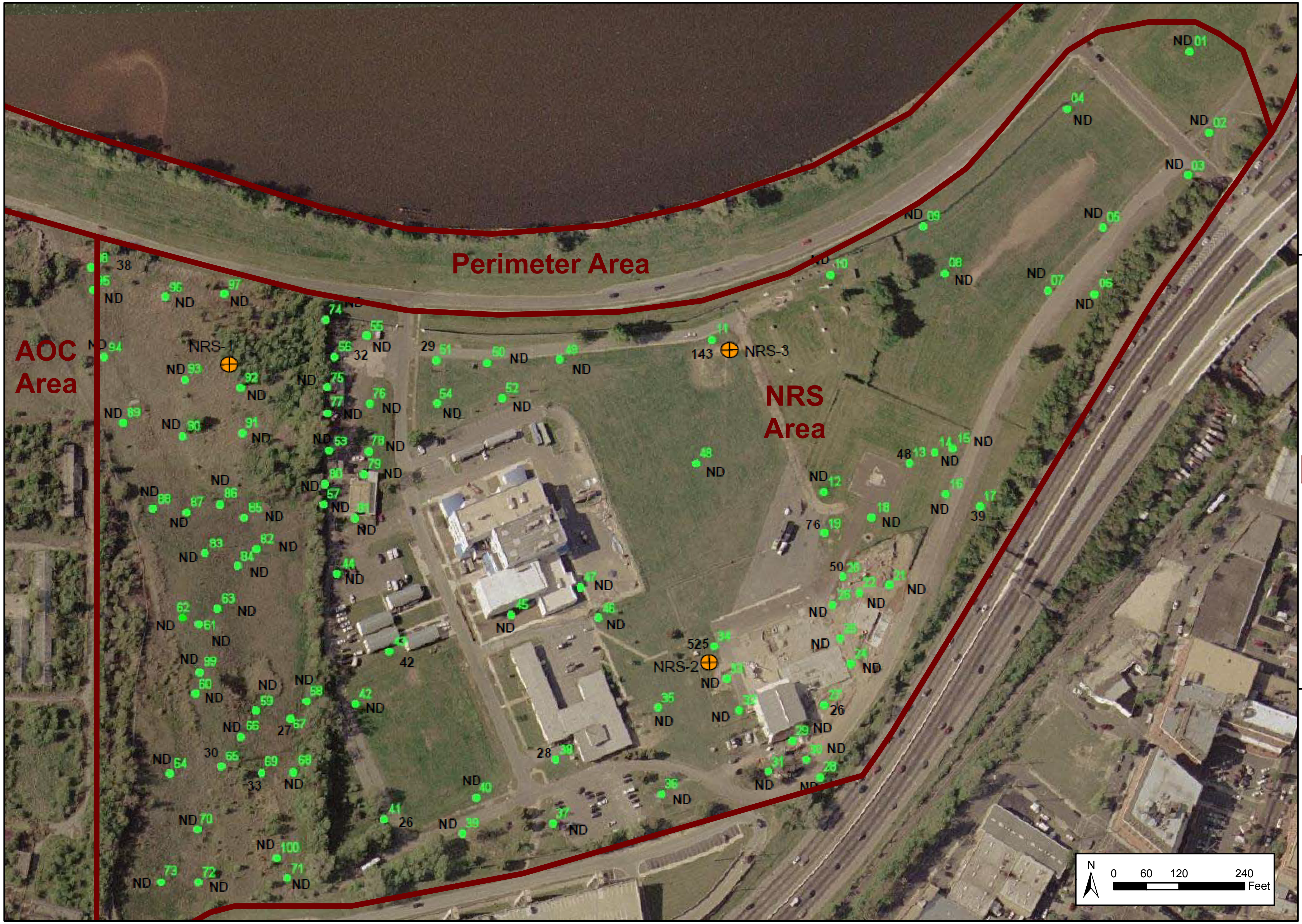
January 2013

Chemical Constituents Exceeding Regulatory Criteria or Risk-Based Criteria in Groundwater

POPLAR POINT, WASHINGTON, D.C.

amec
14428 Albemarle Point Place
Chantilly, VA 20151

Path: M:\Projects\457_PoplarPoint\Mapfiles\Figure_5-15.mxd



Source: Aerial photograph digital download from http://www.globexplorer.com. Aerial photograph dated April 2002.
Former NRS building locations based on 1957 aerial photograph

Legend

●	Passive Soil Gas Point Location
⊕	Soil Boring / Groundwater Monitoring Well
▭	Parcel Boundary
118	Total VOCs Detected in Passive Soil Gas in nanograms (ng)
ND	All VOCs were Not Detected

NOTE: For Points 76 through 100, All Munitions and Explosives Parameters were ND

Figure 5-16

January 2013

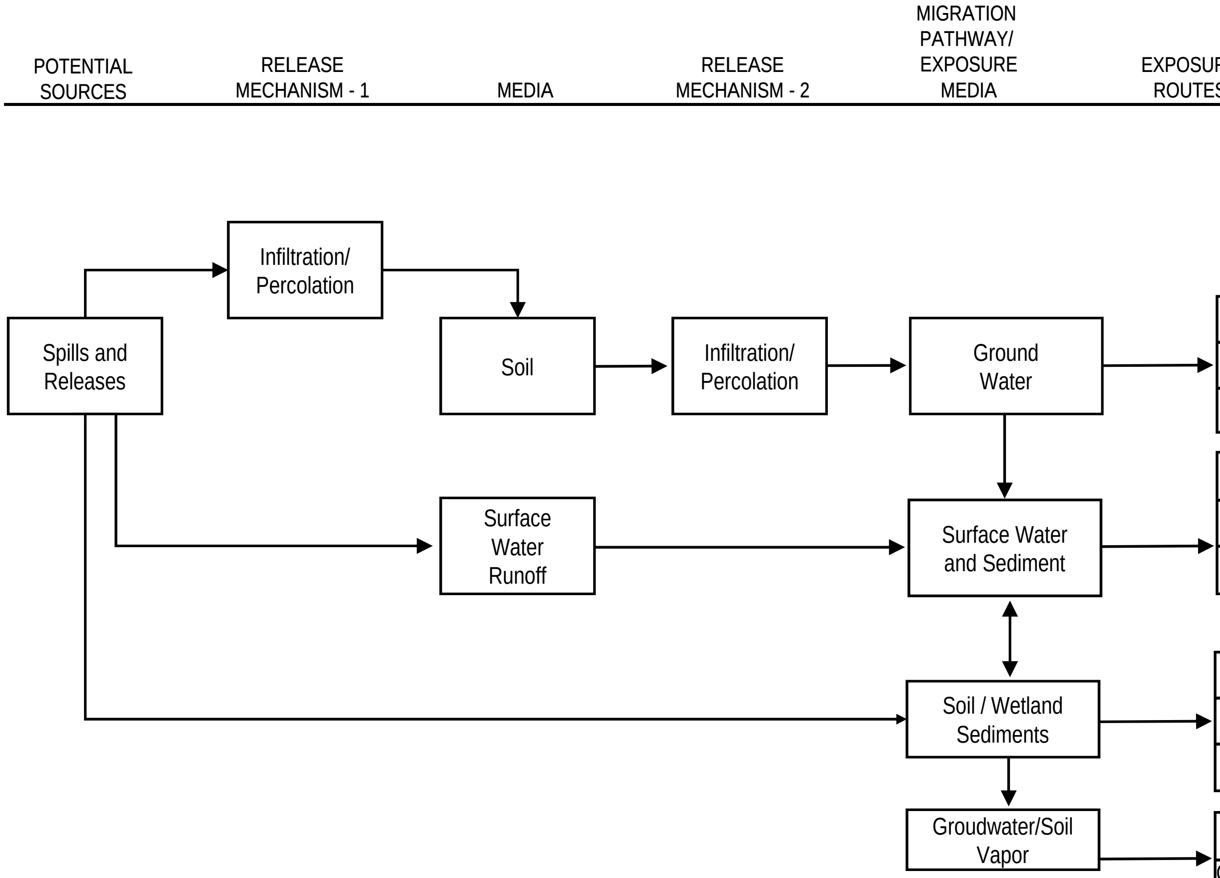
Soil Gas Results on
the NRS Parcel
Projected 3552-06-0944.7.4

POPLAR POINT, WASHINGTON, D.C.

FIGURE 5-17

CONCEPTUAL EXPOSURE MODEL – HUMAN RECEPTORS

Poplar Point Site Phase I RI



RECEPTORS

EXPOSURE ROUTES	Industrial / Commercial Worker	Utility / Construction Worker	Resident Adult & Child	Recreational Adult & Child	Maintenance Worker
Ingestion	(A)	●	●		
Inhalation	○	○	○		
Dermal Contact	(A)	●	●		
Ingestion	(C)	● (B)	(C)	● (B)	● (B)
Inhalation	(C)	○	(C)	○	○
Dermal Contact	(C)	● (B)	(C)	● (B)	● (B)
Ingestion	●	●	●	●	●
Dermal Contact	●	●	●	●	●
Fugitive Dust Inhalation	●	●	●	●	●
Indoor Air Vapor Emission Inhalation	○		○		
Outdoor Air Vapor Emission Inhalation	○	○	○	○	○

● Potentially complete exposure pathway evaluated in HHRA

○ Pathway deemed incomplete because previously detected volatile COPC concentrations were low ; if notable concentrations of volatile compounds are detected, this pathway will be evaluated.

(A) Addressed under residential use of groundwater as potable water

(B) Assumes "day lighting" of Stickfoot Creek

(C) Addressed under construction (incidental) or recreational scenarios.

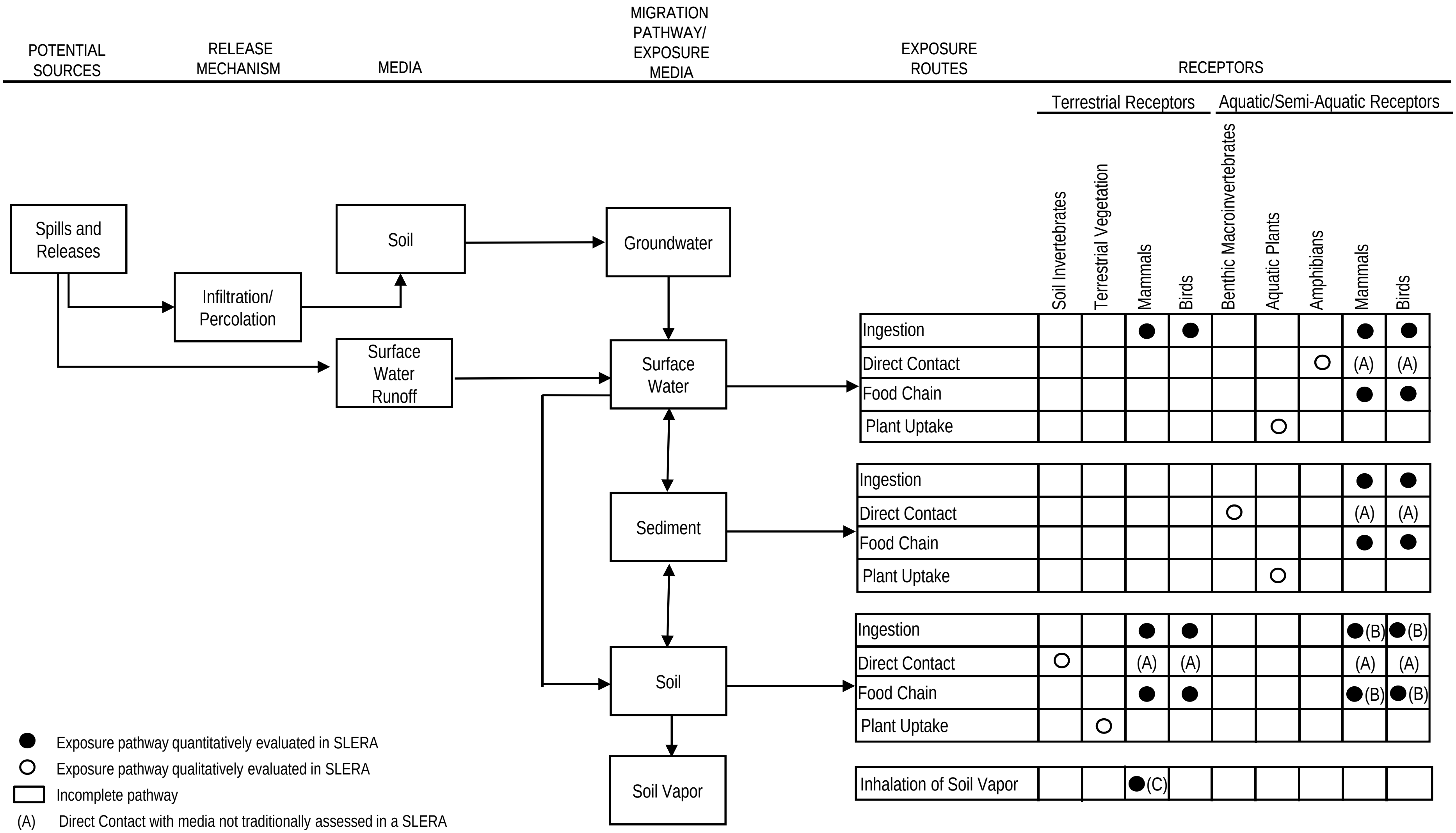
☐ Incomplete pathway

PREPARED/DATE: MKB 01/13/13
CHECKED/DATE: LMS 01/15/13

FIGURE 5.18

CONCEPTUAL EXPOSURE MODEL – ECOLOGICAL RECEPTORS

POPLAR POINT



		Terrestrial Receptors				Aquatic/Semi-Aquatic Receptors				
Exposure Media	Exposure Routes	Soil Invertebrates	Terrestrial Vegetation	Mammals	Birds	Benthic Macroinvertebrates	Aquatic Plants	Amphibians	Mammals	Birds
Surface Water	Ingestion			●	●				●	●
	Direct Contact							○	(A)	(A)
	Food Chain								●	●
	Plant Uptake						○			
Sediment	Ingestion								●	●
	Direct Contact					○			(A)	(A)
	Food Chain								●	●
	Plant Uptake						○			
Soil	Ingestion			●	●				●(B)	●(B)
	Direct Contact	○		(A)	(A)				(A)	(A)
	Food Chain			●	●				●(B)	●(B)
	Plant Uptake		○							
Soil Vapor	Inhalation of Soil Vapor			●(C)						

● Exposure pathway quantitatively evaluated in SLERA

○ Exposure pathway qualitatively evaluated in SLERA

☐ Incomplete pathway

(A) Direct Contact with media not traditionally assessed in a SLERA

(B) Semi-aquatic receptors only

(C) Burrowing mammals only

PREPARED/DATE: MKB 9/26/12
CHECKED/DATE: EFC 9/26/12

APPENDIX A

List of Acronyms and Abbreviations

List of Acronyms and Abbreviations

Acronym or Abbreviation	Definition
95 UCLs	95 percent upper confidence limits
µg/kg	Microgram per kilogram
µg/L	Microgram per liter
ACMs	asbestos-containing materials
AMEC	AMEC Environment and Infrastructure, Inc.
ANS	Academy of Natural Sciences
AOC	Architect of the Capitol
AOF	U.S. Park Police Anacostia Operations Facility
ARARs	“applicable” or “relevant and appropriate”
AST	above ground storage tank
B(a)P	benzo(a)pyrene
bgs	below the ground surface
Beacon	Beacon Environmental Services, Inc.
Brown	Thomas L. Brown Associates
BTAG	Biological Technical Assessment Group
BTEX	the sum of benzene, toluene, ethylbenzene, and xylenes
CCC	Criteria Continuous Concentration
CEM	Conceptual Evaluation Model
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations

Acronym or Abbreviation	**Definition**
CMC	Criteria Maximum Concentration
COCs	contaminants of concern
COI	Constituents of interest
COPCs	Constituents of Potential Concern
CSM	Conceptual Site Model
DAF	dilution attenuation factor
DC	District of Columbia
DCL	District of Columbia Lanham
DCMR	District of Columbia Municipal Regulations
District	District of Columbia
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDOE	District Department of the Environment
DDT	dichlorodiphenyltrichloroethane
DMPED	Deputy Mayor for Planning and Economic Development
DNAPLs	dense non-aqueous phase liquids
DOH	District of Columbia Department of Health
DQOs	data quality objectives
DRO	diesel range organics
E&E	Ecology and Environment, Inc.
EDD	Electronic Data Deliverable

Acronym or Abbreviation	**Definition**
EIS	Environmental Impact Statement
Environ	Environ Corporation
ESA	Environmental Site Assessment
ft	foot per foot
ft/ft	foot per feet (hydraulic gradient)
FS	Feasibility Study
g	gram
GC/MS	gas chromatography/mass spectrometry
GRO	gasoline range organics
HHRA	human health risk assessment
ID	Inner diameter
LBP	lead-based paint
LNAPL	light non-aqueous phase liquids
LPU	Lower Permeable Unit
MACTEC	MACTEC Engineering and Consulting, Inc.
MCLs	Maximum Contaminant Levels
MEC	Munitions and Explosives of Concern
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MIS	Multi Incremental Sampling
MPU	Middle Permeable Unit

Acronym or Abbreviation	**Definition**
msl	mean sea level
MTBE	methyl tertiary butyl ether
NACE	National Capital Parks-East
NAGPRA	Native American Graves Protection and Repatriation Act
NAPL	Non-aqueous Phase Liquids
NCP	National Contingency Plan
NFA	No Further Action
ng	nanogram
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRS	Naval Receiving Station
NRWQC	U.S. EPA National Recommended Water Quality Criteria
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene
PELs	Probable Effects Levels
pg/g	toxic equivalency factor in pictograms per gram
PRPs	Potentially Responsible Parties
PSG	passive soil gas
PSQ	Principal Study Question
ppt	parts per trillion

Acronym or Abbreviation	**Definition**
PREscore	preliminary ranking evaluation score
QC	quality control
RAI	Resource Applications, Inc.
RAO	Remedial Action Objectives
RBCs	Risk-Based Concentrations
RBSLs	Risk-Based Screening Levels
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RIDOLFI	RIDOLFI, Incorporated
RPI	Research Planning, Inc.
RSLs	Regional Screening Levels
SAP	Sampling and Analysis Plan
Site	Poplar Point Site
SL	Screening Level
SLERA	screening level ecological risk assessment
SQRTs	Screening Quick Reference Tables
SSL	Soil Screening Level
SVOCs	semi volatile organic compounds
T&E	threatened and endangered

Acronym or Abbreviation	**Definition**
TBC	to be considered
TCDD	2,3,7,8-tetrachloro-p-dibenzo-dioxin
TEF	toxic equivalency factor
TELs	Threshold Effects Levels
TEQs	toxic equivalents
TMB	Trimethylbenzene
TNT	2,4,6-trinitrotoluene
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TTO	Total Toxic Organics
USDOT	U.S. Department of Transportation
UPU	upper permeable unit
USEPA	U.S. Environmental Protection Agency
USPP	U.S. Park Police
UST	underground storage tank
UXO	unexploded ordnance
VOCs	volatile organic compounds
Volkert	Volkert Environmental Group, Inc.
WMATA	Washington Metropolitan Area Transit Authority
WQS	Water Quality Standards

APPENDIX B

RIDOLFI and MACTEC Soil Boring Logs with Monitoring Well Diagrams

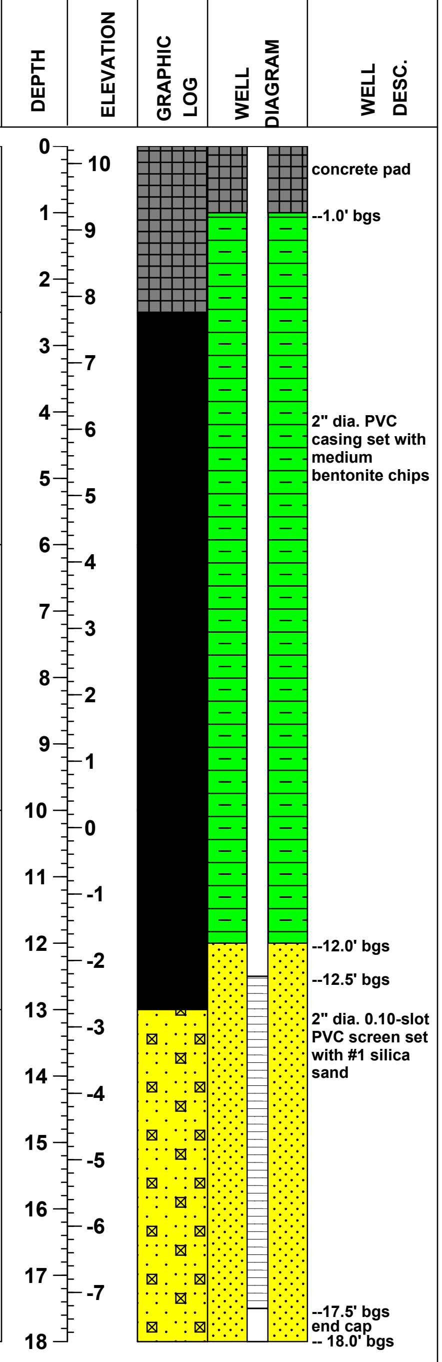
RIDOLFI Inc.

BORING ID: DCMW006-02

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** CT&E Environmental	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** Bobby Jordan	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Mark Hanker	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 18 feet	**RIG TYPE:** Mobile B-53	**FILTER PACK:** Silica Sand
DATE: December 19, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 5:20 pm **COMP. TIME:** 8:00 pm	**BORING ID:** DCMW006-02	**GROUT:** Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** DCMW006-02	**TOP OF CASING ELEV.:** 12.23' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
				CONCRETE: Driller Reported 2.5' of Concrete
2.5 to 4	1.5	16/13/13/15		**FILL: Silty Sand - Trace to Some Organics - Frequent Brick Fragments - Moist - Medium Dense to Dense**
4 to 6	0.0	6/7/18/12		
6 to 8	2.0	1/2/1/6		**FILL: Silty Sand - Some Clay and Gravel - Moist - Loose**
8 to 10	2.0	2/1/1/1		
10 to 12	2.0	5/5/6/5		**FILL: Sandy Clay - Occasional Organics - Brown - Soft**
12 to 14	2.0	10/10/20/20		**GP: Sandy Gravel - Some Silt - Brown - Moist to Wet at 14' - Dense (Gravel is Rounded)**
14 to 16	2.0	23/5/10/14		
16 to 18	2.0	12/14/12/10		



DEPTH TO GW DURING DRILLING (ft. bgs): 14.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 11.21 on 12/21/02

COMMENTS:

Soil sample 470E-SB30-01 was collected from 2.5' to 4.0' below ground surface (bgs). Soil sample 470E-SB30-02 was collected from 6.0' to 8.0' bgs. Monitoring well DCMW006-02 was insalled in borehole with screened interval and 6" endcap set between 12.5' and 18.0' bgs. Monitoring well was completed with an above ground casing protector and with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 1.97' above the ground surface.

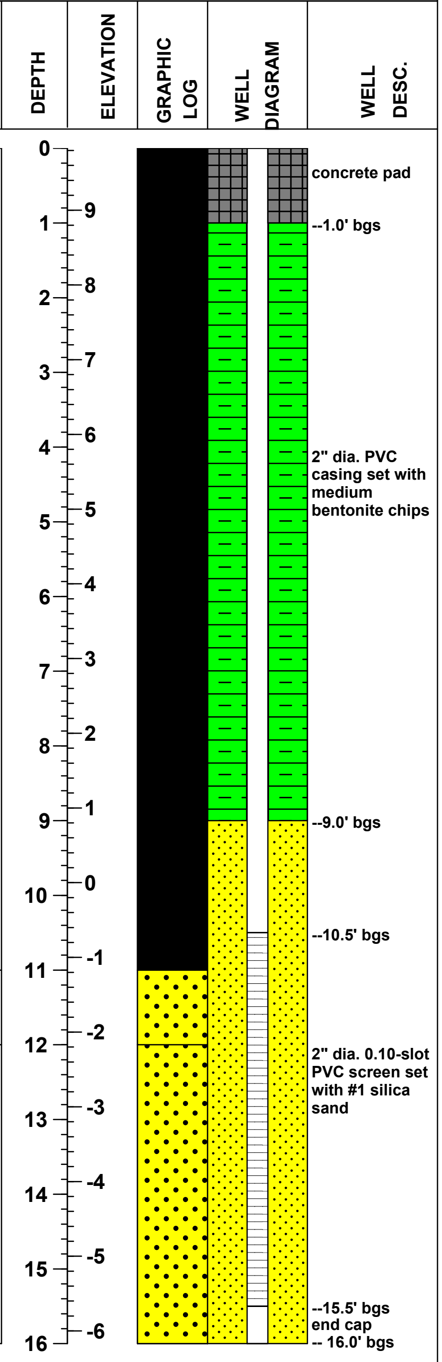
RIDOLFI Inc.

BORING ID: DCMW007-02

PAGE:1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** CT&E Environmental	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** Bobby Jordan	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 16 feet	**RIG TYPE:** Mobile B-53	**FILTER PACK:** Silica Sand
DATE: December 20, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 8:00 pm **COMP. TIME:** 9:30 pm	**BORING ID:** DCMW007-02	**GROUT:** Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** DCMW007-02	**TOP OF CASING ELEV.:** 11.62' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
				FILL: Sandy Clay - Some Gravel - Frequent Brick Fragments
2 to 4	NR	15/12/7/20		
4 to 6	NR	6/13/13/14		
6 to 8	NR	8/12/3/0		
8 to 10	0.0	8/10/12/15		
10 to 12	1.0	4/8/5/7		**SP: Fine Sand - Some Silt - Trace to Some Clay - Brown - Moist - Medium Dense**
12 to 14	0.0	6/12/43/28		**SP: Gravelly Sand - Brown - Wet - Medium Dense to Dense (Gravel is Rounded)**
14 to 16	NR	8/12/20/20		



DEPTH TO GW DURING DRILLING (ft. bgs): 12.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 10.48 on 12/21/02

COMMENTS:

Soil sample 470E-SB31-01 was collected from 4.0' to 6.0' below ground surface (bgs). Soil sample 470E-SB31-02 was collected from 10.0' to 12.0' bgs. Monitoring well DCMW007-02 was insalled in borehole with screened interval and 6" endcap set between 10.5' and 16.0' bgs. Monitoring well was completed with an above ground casing protector and with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 1.79' above the ground surface.

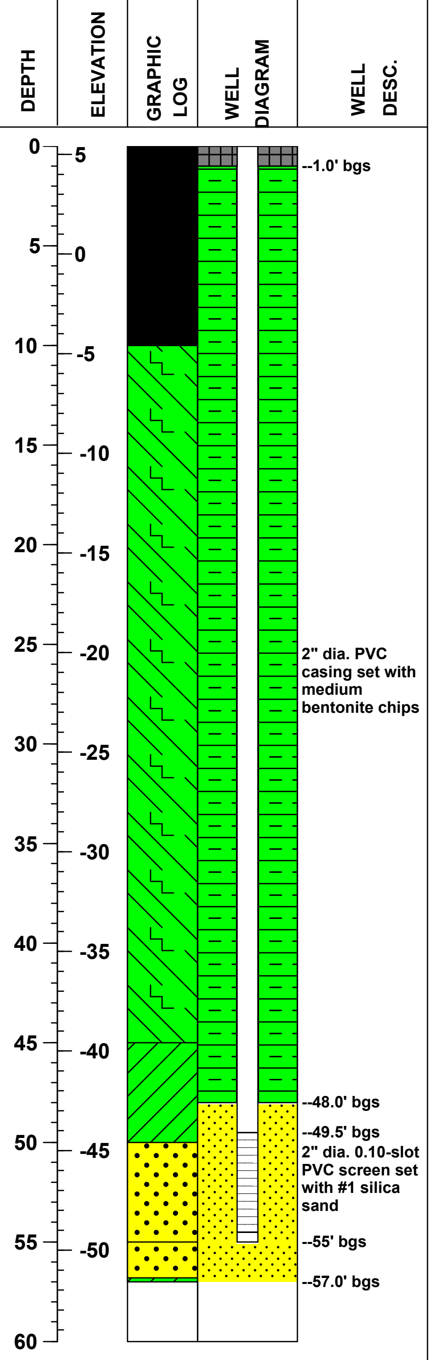
RIDOLFI Inc.

BORING ID: DCMW008-02

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** Eichelbergers, Inc.	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** Shane	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Kevin	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 57 feet	**RIG TYPE:** CME-75	**FILTER PACK:** #1 Silica Sand
DATE: November 20-21, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 11:30 am **COMP. TIME:** 8:30 am	**BORING ID:** DCMW008-02	**GROUT:** 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** DCMW008-02	**TOP OF CASING ELEV.:** 9.16' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 2	2.0	0/0/0/0		FILL: Sandy Clay - Some Silt - Frequent Organics and Brick Fragments - Soft
2 to 4	2.0	2/2/4/5		
4 to 6	0.0	1/4/6/3		FILL: Silty Sand - Frequent Brick Fragments - Wet - Loose
6 to 8	2.0	7/7/8/9		FILL: Sandy Clay - Some Silt - Frequent Brick Fragments - Soft
8 to 10	2.0	2/2/3/3		
10 to 12	2.0	0/0/0/0		OH: Silty Clay - Some Organics - Gray - Soft
12 to 14	2.0	0/0/0/0		
14 to 16	2.0	0/0/0/0		
16 to 18	2.0	0/0/0/0		
20 to 22	2.0	0/0/0/0		
24 to 26	2.0	0/0/0/0		
26 to 28	2.0	0/0/0/0		
28 to 30	2.0	0/0/0/0		
30 to 32	2.0	0/0/0/0		
32 to 34	0.0	0/0/0/0		
34 to 36	2.0	0/0/0/4		
36 to 38	2.0	0/0/0/0		
38 to 40	2.0	0/0/2/4		
40 to 42	2.0	2/2/3/4		
45 to 47	2.0	0/0/0/0		CL: Silty Clay - Some Sand - Trace Gravel - Frequent Organics - Gray - Soft
50 to 52	1.5	4/4/5/6		SP: Gravelly Sand - Gray - Wet - Loose to Medium Dense
55 to 57	0.5	4/4/0/0		SP: Gravely Sand - Trace Silt - Wet - Loose to Very Loose
				CL: Gravelly Clay - Hard (in tip of split-spoon)



DEPTH TO GW DURING DRILLING (ft. bgs): 50.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 7.56 on 12/21/02

COMMENTS:

Soil sample 470E-SB33-01 was collected from 2.0' to 4.0' below ground surface (bgs). Soil sample 470E-SB33-02 was collected from 12' to 14' bgs. Monitoring well DCMW008-02 was installed in borehole with screened interval and 6" endcap set between 49.5' and 55.0' bgs. Well sand was set from 48' to 57' bgs. Bentonite chips were installed from 1.0' to 48' bgs. Monitoring well was completed with a 6" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.75' above the ground surface.

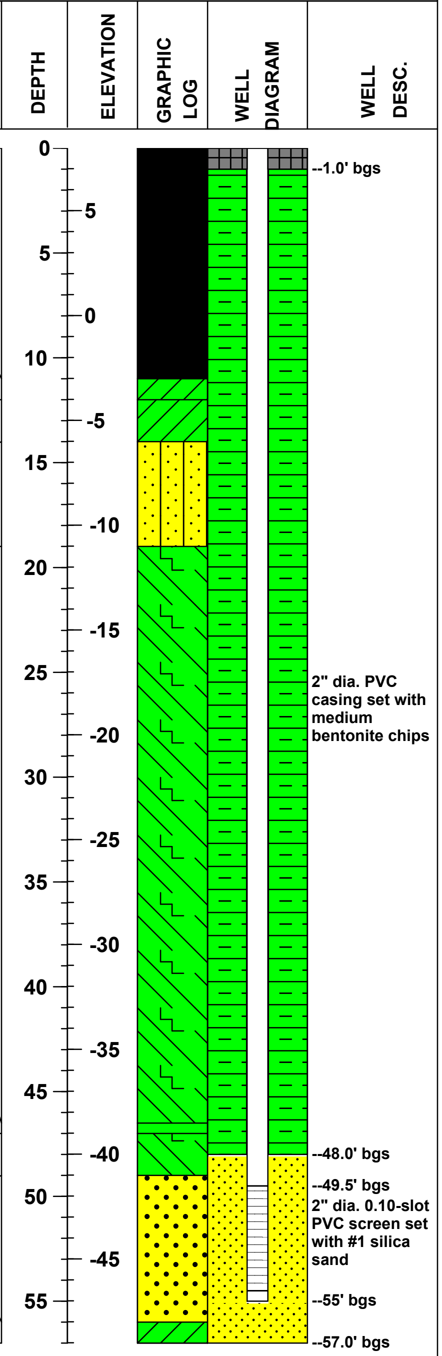
RIDOLFI Inc.

BORING ID: DCMW009-02

PAGE:1 of 1

PROJECT NAME: Poplar Pt. Site Characterization
CONTRACTOR: Eichelbergers, Inc.
MONUMENT TYPE: 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E
DRILLER: Shane
CASING DESC.: 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.
DRILLER'S ASSISTANT: Kevin
SCREEN DESC.: 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 57 feet
RIG TYPE: CME-75
FILTER PACK: #1 Silica Sand
DATE: November 19, 2002
METHOD: Hollow-stem Auger
SEAL: None Installed
START TIME: 10:15 am
COMP. TIME: 5:30 pm
BORING ID: DCMW009-02
GROUT: 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls
MONITORING WELL ID: DCMW009-02
TOP OF CASING ELEV.: 11.05' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 2	2.0	4/4/5/5		FILL: Silty Sand - Some Clay - Frequent Brick Fragments - Moist to Wet at 6' - Loose to Medium Dense
4 to 6	0.5	4/4/6/6		
6 to 8	2.0	5/6/7/7		
8 to 10	2.0	5/5/6/7		
10 to 12	2.0	NR		CL: Gravelly Clay - Some Sand - Black and Gray
12 to 14	2.0	0/0/0/0		CL: Sandy Clay - Some Silt - Gray - Soft
14 to 16	2.0	0/0/0/0		SM: Silty Sand - Gray - Wet - Very Loose
18 to 20	2.0	0/0/0/0		OH: Sandy Clay - Some Silt - Gray - Soft
20 to 22	NR	NR		
22 to 24	2.0	0/0/0/0		
24 to 26	2.0	0/0/0/0		
26 to 28	2.0	0/0/0/0		
28 to 30	1.0	0/0/0/0		
30 to 32	NR	0/0/0/0		
	NR			
35 to 37	2.0	0/0/0/1		
40 to 42	2.0	0/0/0/1		
45 to 47	2.0	0/0/2/2		PT: Amorphic Peat Layer
				OH: Sandy Clay - Some Silt - Soft
50 to 52	1.0	0/0/2/2		SP: Gravelly Sand - Brown - Wet - Very Loose (Gravel was Rounded)
55 to 57	2.0	NR		CL: Silty Clay - Orange and Gray Mottled - Hard



DEPTH TO GW DURING DRILLING (ft. bgs): 6.0 and 50.0
DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): 9.47 on 12/21/02

COMMENTS:

Soil sample 470E-SB34-01 was collected from 6.0' to 8.0' below ground surface (bgs). Soil sample 470E-SB34-02 was collected from 12' to 14' bgs. Monitoring well DCMW009-02 was installed in borehole with a 6' end cap and screened interval set between 49.5' and 54.5' bgs. Well sand was set from 48' to 55' bgs. Bentonite chips were installed from 1.0' to 48' bgs. Monitoring well was completed with a 6" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.07' above the ground surface.

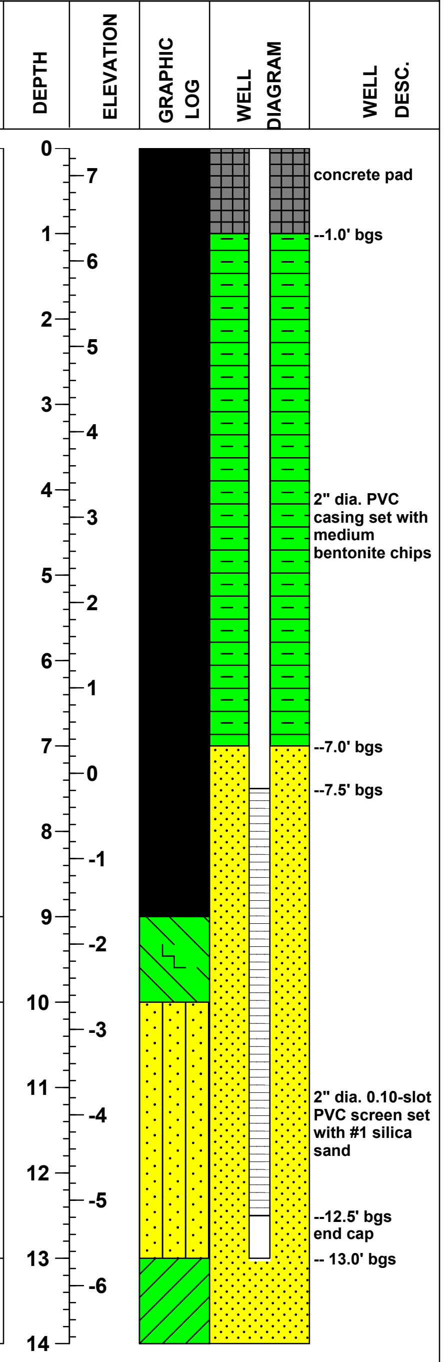
RIDOLFI Inc.

BORING ID: DCMW010-02

PAGE:1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** CT&E Environmental	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** Bobby Jordan	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Mark Hanker	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 14 feet	**RIG TYPE:** Mobile B-53	**FILTER PACK:** Silica Sand
DATE: December 19, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 12:30 pm **COMP. TIME:** 2:00 pm	**BORING ID:** DCMW010-02	**GROUT:** Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** DCMW010-02	**TOP OF CASING ELEV.:** 9.68 Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
				FILL: Sandy Silt - Some Clay - Frequent Glass, Wood, and Concrete Fagments - Black and Brown - Moist
2 to 4	**1.5**	**3/6/9/10**	**1.0**	
4 to 6	**2.0**	**3/6/12/2**		
6 to 8	**1.5**	**8/15/22/16**		
8 to 10	**0.5**	**4/1/3/6**		**OH: Silty Clay - Trace Sand - Occasional Organics - Gray**
10 to 12	**0.0**	**2/1/1/1**		**SM: Silty Sand - Trace Clay - Gray - Wet - Very Loose**
12 to 14	**2.0**	**0/0/2/2**		**CL: Silty Clay - Trace Sand - Gray**



DEPTH TO GW DURING DRILLING (ft. bgs): 10.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 6.45 on 12/21/02

COMMENTS:

Soil sample 470E-SB35-01 was collected from 3.0' to 5.0' below ground surface (bgs). Soil sample 470E-SB35-02 was collected from 6.0' to 8.0' bgs. Monitoring well DCMW010-02 was insalled in borehole with screened interval and 6" endcap set between 7.5' and 13.0' bgs. Monitoring well was completed with an above ground casing protector and with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 2.36' above the ground surface.

RIDOLFI Inc.

BORING ID: DCMW011-02

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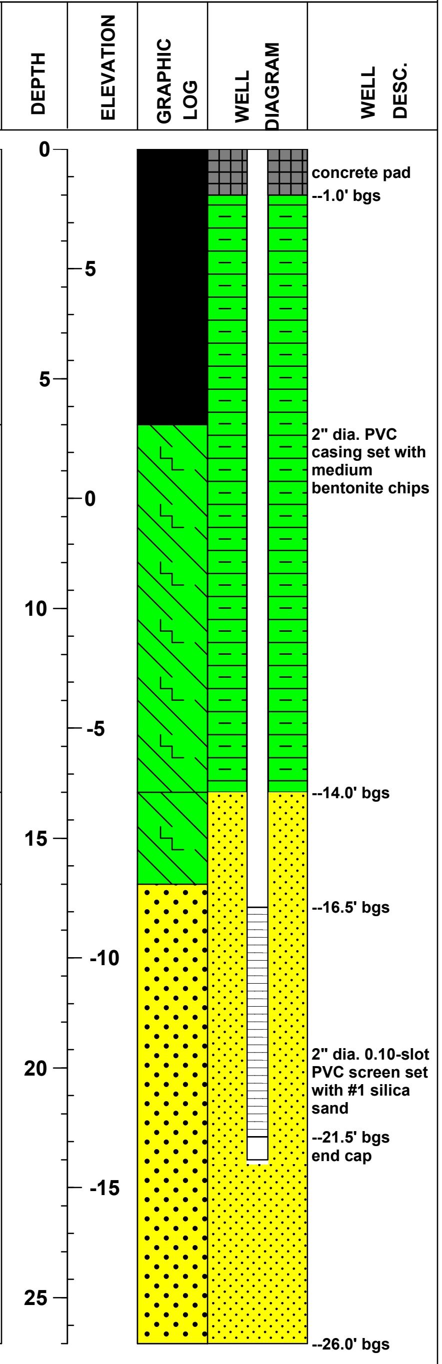
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** Eichelbergers, Inc.	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** Shane	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Kevin	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 26 feet	**RIG TYPE:** CME-75	**FILTER PACK:** #1 Silica Sand
DATE: November 18, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 12:45 pm **COMP. TIME:** 5:30 pm	**BORING ID:** DCMW011-02	**GROUT:** 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** DCMW011-02	**TOP OF CASING ELEV.:** 10.70' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 2	**0.5**	**3/3/3/3**		**FILL: Silty Clay - Frequent Asphalt Fragments**
2 to 4	**0**	**2/2/3/5**		
4 to 6	**0**	**0/0/0/0**		
6 to 8	**2.0**	**0/0/0/0**	**0.0**	**OH: Silty Clay - Trace Organics - Gray - Soft**
8 to 10	**2.0**	**0/0/0/0**		
10 to 12	**2.0**	**0/0/0/0**		
12 to 14	**2.0**	**0/0/0/0**		
14 to 16	**2.0**	**0/0/0/0**	**0.0**	**OH: Silty Clay - Trace Organics - Occasional Wet Sand Seam - Gray - Soft**
16 to 18	**2.0**	**0/0/0/0**		**SP: Fine Sand - Brown - Wet - Loose to Medium Dense**
18 to 20	**NR**	**0/0/0/2**		
20 to 22	**0**	**4/6/7/10**		
22 to 24	**1.0**	**NR**		
24 to 26	**1.0**	**NR**		



DEPTH TO GW DURING DRILLING (ft. bgs): 14.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 9.38 on 12/21/02

COMMENTS:

Soil sample 470E-SB37-01 was collected from 6.0' to 8.0' below ground surface (bgs). Soil sample 470E-SB37-02 was collected from 12' to 14' bgs. Monitoring well DCMW011-02 was installed in borehole with screened interval set between 16.5' and 21.5' bgs. Well sand was set from 14' to 26' bgs. Bentonite chips were installed from 1.0' to 14' bgs. Monitoring well was completed with a 6" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.10' above the ground surface.

RIDOLFI Inc.

BORING ID: DCMW012-02

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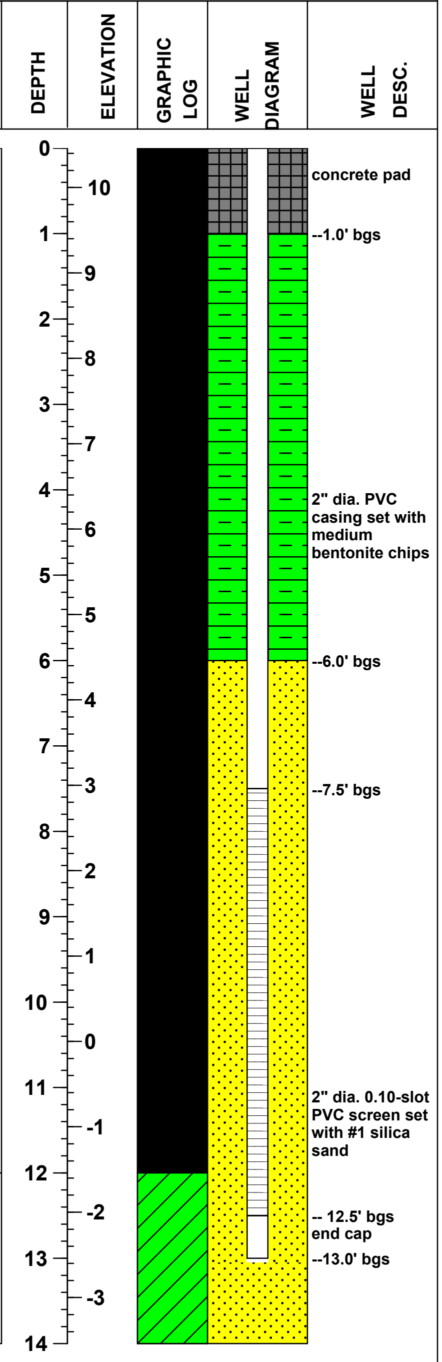
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** Eichelbergers, Inc.	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** Joe	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Dan	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 14 feet	**RIG TYPE:** CME-LC-60	**FILTER PACK:** Silica Sand
DATE: November 21 2002	**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 1:10 pm **COMP. TIME:** 3:15 pm	**BORING ID:** DCMW012-02	**GROUT:** Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** DCMW012-02	**TOP OF CASING ELEV.:** 12.21' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 2	**2.0**	**2/7/7/5**		**FILL: Silty Sand - Some Clay and Gravel - Frequent Brick and Wood Fragments - Brown - Moist to Wet at 8.0' - Loose to Dense**
2 to 4	**2.0**	**12/12/8/6**		
4 to 6	**2.0**	**4/5/7/8**		
6 to 8	**1.0**	**0/2/2/9**		
8 to 10	**1.0**	**18/23/24/11**		
10 to 12	**1.0**	**5/2/1/1**		
12 to 14	**2.0**	**2/2/2/2**		**CL: Sandy Clay - Gray - Soft**



DEPTH TO GW DURING DRILLING (ft. bgs): 8.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): 8.87 on 12/21/02

COMMENTS:

Soil sample 470E-SB39-01 was collected from 2.0' to 4.0' below ground surface (bgs). Soil sample 470E-SB39-02 was collected from 8.0' to 11.0' bgs. Monitoring well DCMW012-02 was insalled in borehole with screened interval and 6" endcap set between 7.5' and 13.0' bgs. Monitoring well was completed with an above ground casing protector and with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 1.75' above the ground surface.

RIDOLFI Inc.

BORING ID: DCMW013-02

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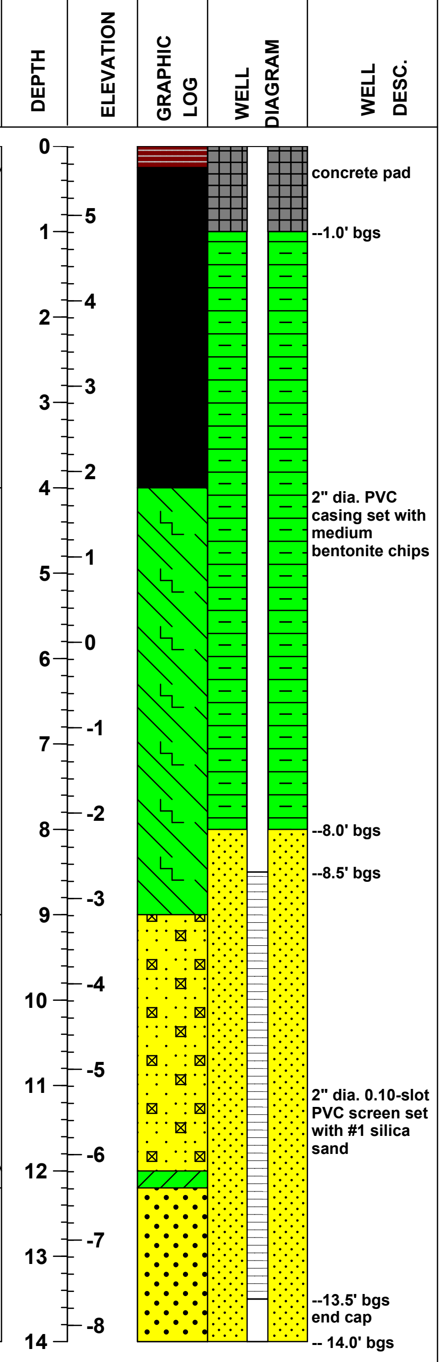
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** CT&E Environmental	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** Bobby Jordan	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Mark Hanker	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 14 feet	**RIG TYPE:** Mobile B-53	**FILTER PACK:** Silica Sand
DATE: December 19, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 3:30 pm **COMP. TIME:** 4:30 pm	**BORING ID:** DCMW013-02	**GROUT:** Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** DCMW013-02	**TOP OF CASING ELEV.:** 8.27' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
				ASPHALT: Driller Reported 3" of Asphalt
				FILL: Sandy Clay - Some Silt - Frequent Organics - Gray and Brown
2 to 4	**1.5**	**1/2/4/2**	**0.0**	
4 to 6	**2.0**	**1/2/1/3**		**OH: Silty Clay - Trace to Some Sand - Frequent Organics - Gray**
6 to 8	**NR**	**0/0/0/0**		
8 to 10	**1.5**	**0/0/15/15**		**GP: Sandy Gravel - Brown - Wet - Dense to Medium Dense (Gravel is Rounded)**
10 to 12	**1.5**	**10/12/15/10**		
				CL: Sandy Clay - Brown
12 to 14	**NR**	**25/5/7/5**		**SP: Fine Sand - Brown - Wet - Dense to Medium Dense**



DEPTH TO GW DURING DRILLING (ft. bgs): 9.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 5.14 on 12/21/02

COMMENTS:

Soil sample 470E-SB40-01 was collected from 2.0' to 4.0' below ground surface (bgs). Soil sample 470E-SB40-02 was collected from 6.0' to 8.0' bgs. Monitoring well DCMW013-02 was insalled in borehole with screened interval and 6" endcap set between 8.5' and 14.0' bgs. Monitoring well was completed with an above ground casing protector and with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 2.46' above the ground surface.

RIDOLFI Inc.

BORING ID: DCMW014-02

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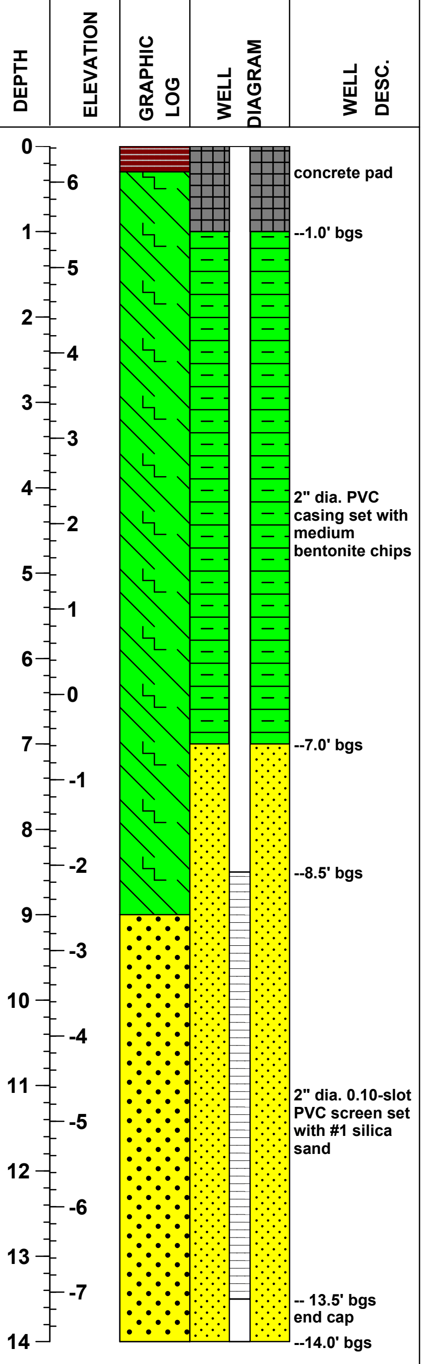
PROJECT NAME: Poplar Pt. Site Characterization		**CONTRACTOR:** Eichelbergers, Inc.	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E		**DRILLER:** Joe	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.		**DRILLER'S ASSISTANT:** Dan	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 14 feet		**RIG TYPE:** CME-LC-60	**FILTER PACK:** Silica Sand
DATE: November 22, 2002		**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 9:10 am	**COMP. TIME:** 11:00 am	**BORING ID:** DCMW014-02	**GROUT:** Bent. Chips
CLASSIFIED BY: A. Nicholls		**MONITORING WELL ID:** DCMW014-02	**TOP OF CASING ELEV.:** 8.66 Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 2	2.0	0/3/3/3	0.0	**ASPHALT: Asphalt** **OH: Silt Clay - Frequent Organics - Gray and Brown**
2 to 4	2.0	2/1/1/2	0.0	
4 to 6	2.0	1/1/1/2	0.0	
6 to 8	1.5	1/1/1/1		
8 to 10	1.5	3/3/4/12		**SP: Gravelly Sand - Brown - Moist to Wet at 10' - Loose to Medium Dense (Gravel was Angular to Rounded)**
10 to 12	1.0	3/5/6/6		
12 to 14	2.0	12/12/13/10		



DEPTH TO GW DURING DRILLING (ft. bgs): 10.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 6.79 on 12/21/02

COMMENTS:

Soil sample 470E-SB41-01 was collected from 2.0' to 4.0' below ground surface (bgs). Soil sample 470E-SB41-02 was collected from 6.0' to 8.0' bgs. Monitoring well DCMW014-02 was insalled in borehole with screened interval and 6" endcap set between 8.5' and 14.0' bgs. Monitoring well was completed with an above ground casing protector and with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 2.24' above the ground surface.

RIDOLFI Inc.

BORING ID: DCMW015-02

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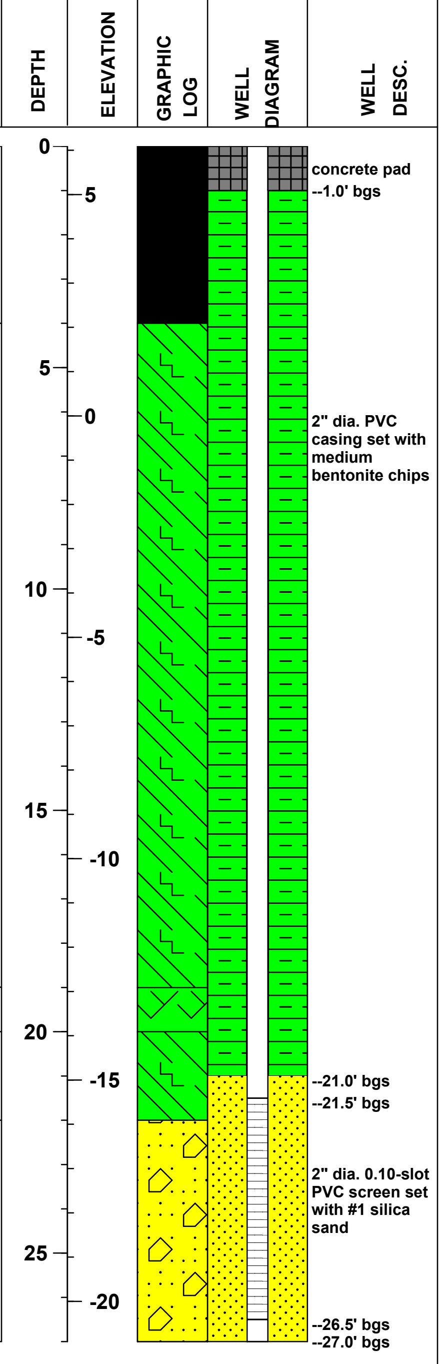
PROJECT NAME: Poplar Pt. Site Characterization		**CONTRACTOR:** CT&E Environmental	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E		**DRILLER:** Bobby Jordan	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.		**DRILLER'S ASSISTANT:** Mark Hanker	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 26 feet		**RIG TYPE:** CME-75	**FILTER PACK:** Silica Sand
DATE: December 20, 2002		**METHOD:** Hollow-stem Auger	**SEAL:** None Installed
START TIME: 10:00 am	**COMP. TIME:** 5:00 pm	**BORING ID:** DCMW015-02	**GROUT:** 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls		**MONITORING WELL ID:** DCMW015-02	**TOP OF CASING ELEV.:** 8.17' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
2 to 4	2.0	3/5/6/7		**FILL: Sandy Clay - Some Silt - Frequent Organics - Brown and Gray**
4 to 6	2.0	0/1/3/3		**OH: Silty Clay - Some Sand - Frequent Organics - Gray - Soft**
6 to 8	0.0	0/0/0/0		
8 to 10	2.0	0/0/0/0		
10 to 12	2.0	0/0/0/0		
12 to 14	0.5	0/0/0/0		
14 to 16	2.0	0/0/0/0		
16 to 18	0.0	0/0/0/3		
18 to 20	2.0	2/1/3/1		**PT: Fibrous Peat - Brown - Moist**
20 to 22	2.0	5/7/11/13		**OH: Silty Clay - Some Sand - Frequent Organics - Gray - Soft**
22 to 24	1.0	25/25/20/22		**GW: Sandy Gravel - Brown - Wet - Very Dense to Dense (Gravel is Rounded)**



DEPTH TO GW DURING DRILLING (ft. bgs): 22.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 6.33 on 12/21/02

COMMENTS:

Soil sample 470E-SB42-01 was collected from 4.0' to 6.0' below ground surface (bgs). Soil sample 470E-SB42-02 was collected from 13.5' to 16.0' bgs. Monitoring well DCMW015-02 was installed in borehole with screened interval set between 21.5' and 27.0' bgs. Well sand was set from 21' to 27' bgs. Bentonite chips were installed from 1.0' to 21' bgs. Monitoring well was completed with a 6" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 2.08' above the ground surface.

RIDOLFI Inc.

BORING ID: PZ-1

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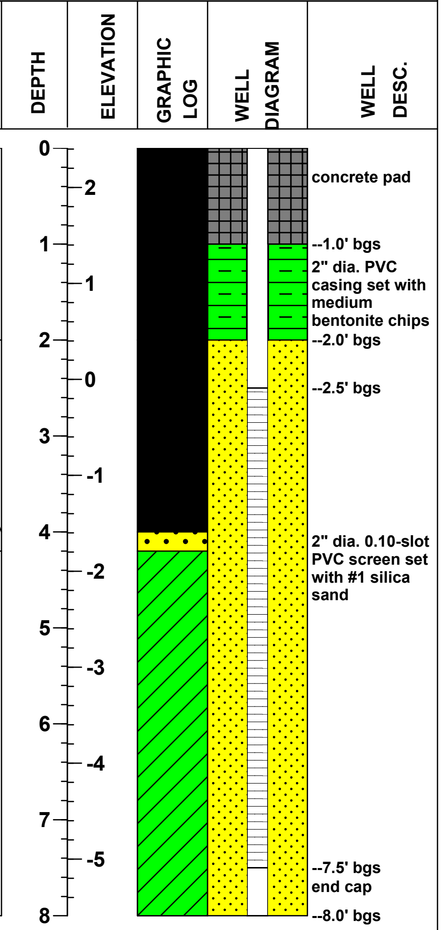
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 8 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 23, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 8:30 am **COMP. TIME:** 10:00 am	**BORING ID:** PZ-1	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-1	**TOP OF CASING ELEV.:** 5.94' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
			0.0	**FILL: Silty Sand - Some Clay - Trace Gravel - Frequent Organics - Dark Brown - Moist**
				FILL: Clay - Some Silt - Trace Sand - Frequent Organics - Brown and Gray - Soft
			0.0	**SP: Fine Sand - Dark Gray - Wet**
				CL: Clay - Some Silt - Gray - Soft



DEPTH TO GW DURING DRILLING (ft. bgs): 3.6	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 6.63 on 7/23/02

COMMENTS:

Piezometer PZ-1 was installed in borehole with screened interval set between 2.5' and 7.5' below ground surface (bgs). Well sand was set from 2.0' to 8.0' bgs. Bentonite chips were installed from 1.0' to 2.0' bgs. Piezometer was completed with a 6" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.53' above the ground surface.

RIDOLFI Inc.

BORING ID: PZ-2

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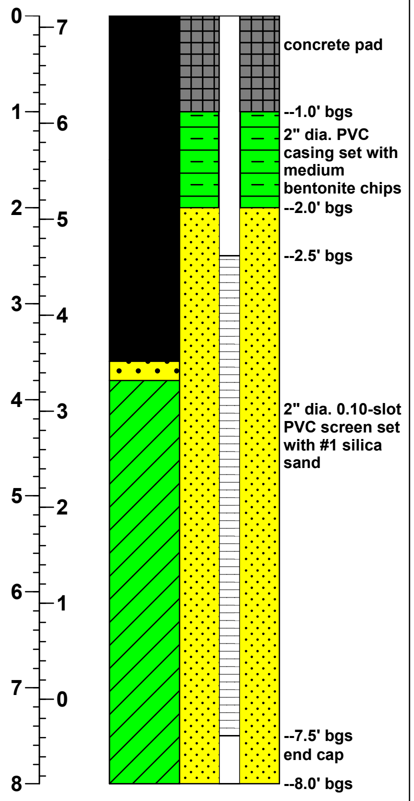
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 6" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 8 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 22, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 6:35 am **COMP. TIME:** 9:20 am	**BORING ID:** PZ-2	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-2	**TOP OF CASING ELEV.:** 7.12' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
				FILL: Sandy Clay - Frequent Roots, Bricks, and Concrete Fragments - Dark Gray - Moist
			0.0	**FILL: Silty Clay - Some Sand - Gray - Soft**
			0.0	
				SP: Fine Sand - Gray - Wet
			0.0	**CL: Clay - Some Silt - Trace Sand - Gray - Soft**

DEPTH ELEVATION GRAPHIC LOG WELL DIAGRAM WELL DESC.



DEPTH TO GW DURING DRILLING (ft. bgs): 3.6	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 6.08 on 7/22/02

COMMENTS:

Piezometer PZ-2 was installed in borehole with screened interval set between 2.5' and 7.5' below ground surface (bgs). Well sand was set from 2.0' to 8.0' bgs. Bentonite chips were installed from 1.0' to 2.0' bgs. Piezometer was completed with a 6" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.92' above the ground surface.

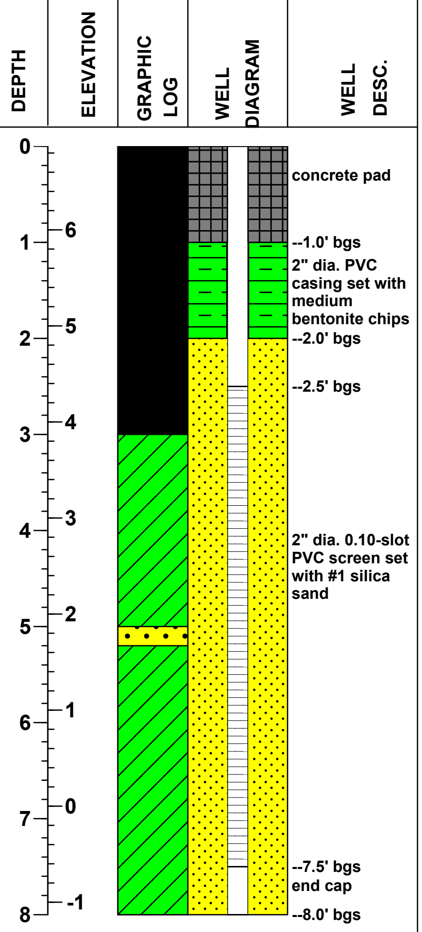
RIDOLFI Inc.

BORING ID: PZ-3

PAGE:1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 4" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 8 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 21, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 1:05 pm **COMP. TIME:** 2:20 pm	**BORING ID:** PZ-3	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-3	**TOP OF CASING ELEV.:** 6.87' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
			0.0	**FILL: Sandy Silt - Frequent Organics and Brick Fragments - Light Brown**
			0.0	**CL: Silty Clay - Gray - Soft**
				SP: Fine Sand - Gray - Wet
				CL: Silty Clay - Gray - Soft



DEPTH TO GW DURING DRILLING (ft. bgs): 5.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 6.14 on 7/22/02

COMMENTS:

Piezometer PZ-3 was installed in borehole with screened interval set between 2.5' and 7.5' below ground surface (bgs). Well sand was set from 2.0' to 8.0' bgs. Bentonite chips were installed from 1.0' to 2.0' bgs. Piezometer was completed with a 4" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.69' above the ground surface.

RIDOLFI Inc.

BORING ID: PZ-4

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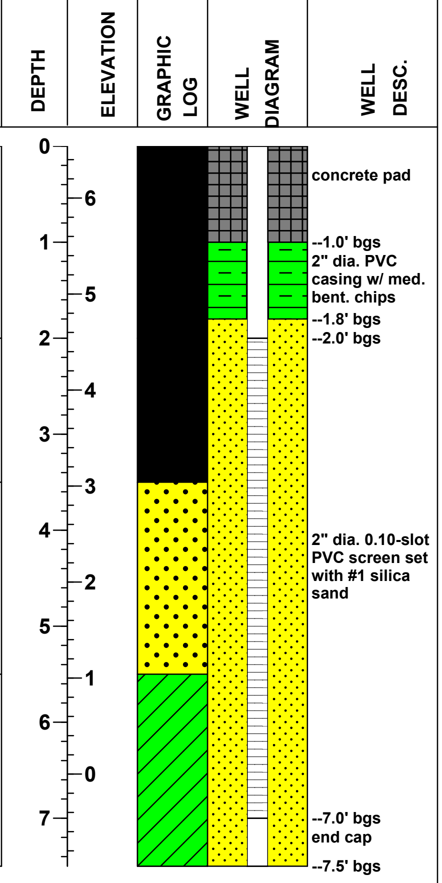
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 4" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 7.5 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 20, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 11:45 am **COMP. TIME:** 12:00 pm	**BORING ID:** PZ-4	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-4	**TOP OF CASING ELEV.:** 6.54' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
			0.0	**FILL: Sandy Silt - Trace to Some Gravel - Frequent Roots - Brown - Moist**
				FILL: Clay - Some Silt - Trace Sand - Frequent Roots - Brown and Gray - Soft
			0.0	**SP: Fine Sand - Dark Gray - Wet**
				CL: Clay - Some Silt - Trace Sand - Gray - Soft



DEPTH TO GW DURING DRILLING (ft. bgs): 3.5	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 7.43 on 7/22/02

COMMENTS:

Piezometer PZ-4 was installed in borehole with screened interval set between 2.0' and 7.0' below ground surface (bgs). Well sand was set from 1.8' to 7.5' bgs. Bentonite chips were installed from 1.0' to 1.8' bgs. Piezometer was completed with a 6" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.39' above the ground surface.

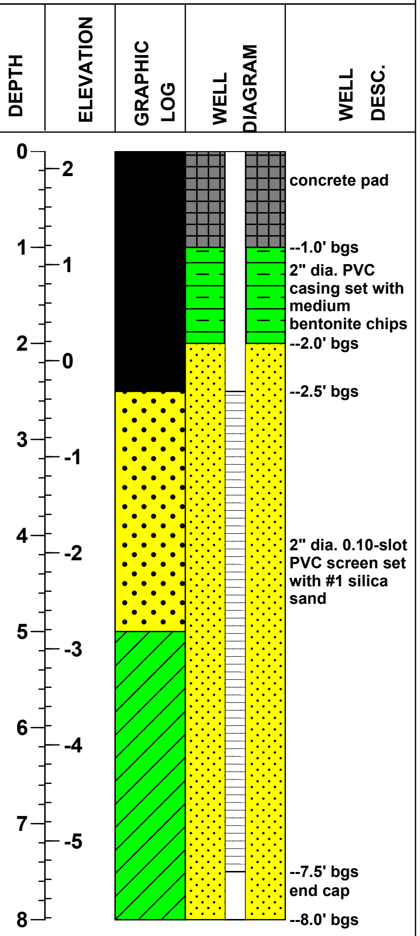
RIDOLFI Inc.

BORING ID: PZ-5

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 4" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 8 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 20, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 12:45 pm **COMP. TIME:** 2:45 pm	**BORING ID:** PZ-5	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-5	**TOP OF CASING ELEV.:** 5.42' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
			0.0	**FILL: Clay - Some Silt - Frequent Roots - Brown and Gray - Soft**
			0.0	**SP: Fine Sand - Brown to Dark Gray at 4.0' - Moist to Wet at 3.0'**
				CL: Clay - Some Silt - Tace Sand - Dark Gray - Soft



DEPTH TO GW DURING DRILLING (ft. bgs): 3.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): 7.21 on 7/22/02

COMMENTS:

Piezometer PZ-5 was installed in borehole with screened interval set between 2.5' and 7.5' below ground surface (bgs). Well sand was set from 2.0' to 8.0' bgs. Bentonite chips were installed from 1.0' to 2.0' bgs. Piezometer was completed with a 4" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.24' above the ground surface.

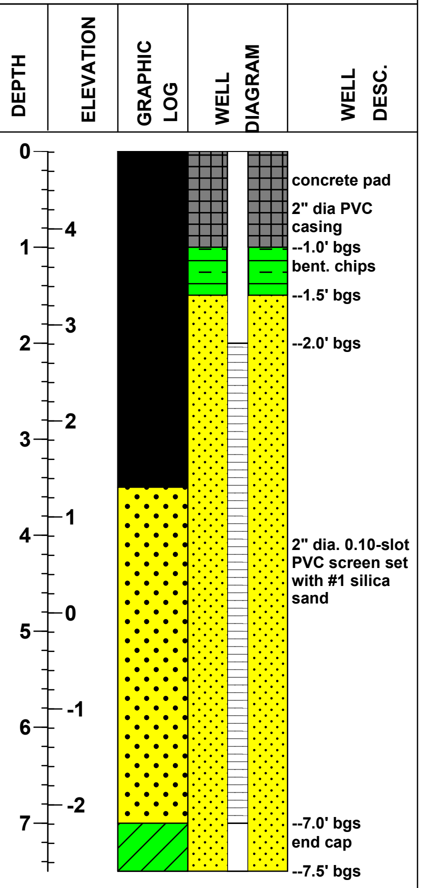
RIDOLFI Inc.

BORING ID: PZ-6

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 4" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 7.5 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 19, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 4:30 pm **COMP. TIME:** 5:30 pm	**BORING ID:** PZ-6	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-6	**TOP OF CASING ELEV.:** 4.81' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
			0.0	**FILL: Clay - Some Silt - Gray and Brown - Soft**
			0.0	**SP: Fine Sand - Gray - Wet**
				CL: Clay - Some Silt - Gray - Soft



DEPTH TO GW DURING DRILLING (ft. bgs): 3.5	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 6.71 on 7/22/02

COMMENTS:

Piezometer PZ-6 was installed in borehole with screened interval set between 2.0' and 7.0' below ground surface (bgs). Well sand was set from 1.5' to 7.5' bgs. Bentonite chips were installed from 1.0' to 1.5' bgs. Piezometer was completed with a 4" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.61' above the ground surface.

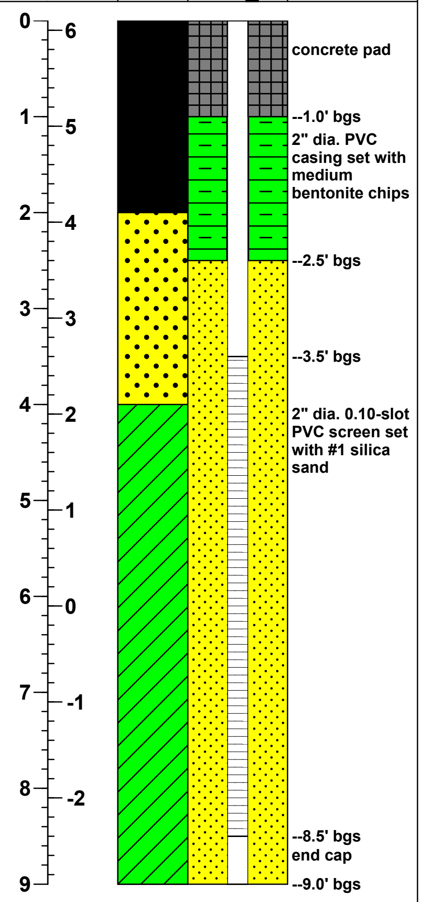
RIDOLFI Inc.

BORING ID: PZ-7

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 4" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 9 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 20, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 9:10 am **COMP. TIME:** 10:25 am	**BORING ID:** PZ-7	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-7	**TOP OF CASING ELEV.:** 6.10' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
			0.0	**FILL: Clay - Some Silt - Trace Sand - Frequent Root Fibers - Brown and Gray - Soft**
			0.0 0.0	**SP: Fine Sand - Trace Gavel - Brown to Dark Gray at 3.0' - Moist to Wet at 3.0'**
				CL: Silty Clay - Trace Sand - Gray - Soft



DEPTH TO GW DURING DRILLING (ft. bgs): 3.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 7.28 on 7/22/02

COMMENTS:

Piezometer PZ-7 was installed in borehole with screened interval set between 3.5' and 8.5' below ground surface (bgs). Well sand was set from 2.5' to 9.0' bgs. Bentonite chips were installed from 1.0' to 2.5' bgs. Piezometer was completed with a 4" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.53' above the ground surface.

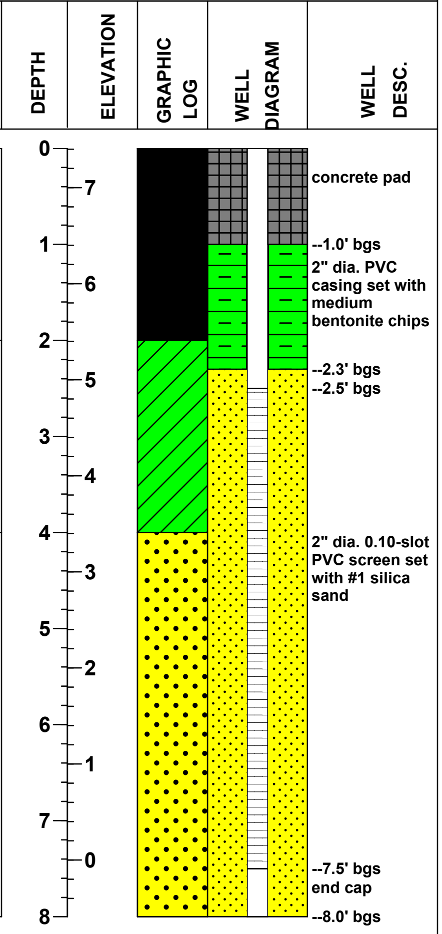
RIDOLFI Inc.

BORING ID: PZ-8

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** None	**MONUMENT TYPE:** 4" Dia. Above Ground Prot.
PROJECT NUMBER: 470E	**DRILLER:** None	**CASING DESC.:** 2" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 2" Dia. 0.10-Slot PVC
TOTAL DEPTH: 8 feet	**RIG TYPE:** None - Hand Auger	**FILTER PACK:** Millersville #1 Silica Sand
DATE: July 20, 2002	**METHOD:** 4" O.D. Hand Auger	**SEAL:** None Installed
START TIME: 7:55 am **COMP. TIME:** 9:00 am	**BORING ID:** PZ-8	**GROUT:** Sure-Plug 3/8" Bent. Chips
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** PZ-8	**TOP OF CASING ELEV.:** 7.41 Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
			0.0	**FILL: Silty Sand - Frequent Root Fibers, Wood, Glass, Plastic - Brown - Moist**
			0.0	**CL: Clay - Some Silt - Gray - Soft**
			0.0	**SP: Fine Sand - Trace Gravel - Brown to Dark Gray at 5.0' - Wet**



DEPTH TO GW DURING DRILLING (ft. bgs): 4.2	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 7.94 on 7/22/02

COMMENTS:

Piezometer PZ-8 was installed in borehole with screened interval set between 2.5' and 7.5' below ground surface (bgs). Well sand was set from 2.3' to 8.0' bgs. Bentonite chips were installed from 1.0' to 2.3' bgs. Piezometer was completed with a 4" diameter steel above ground casing protector with a surface seal of concrete from 0.0' to 1.0' bgs. The top of the PVC casing was cut 3.60' above the ground surface.

RIDOLFI Inc.

BORING ID: SB-101

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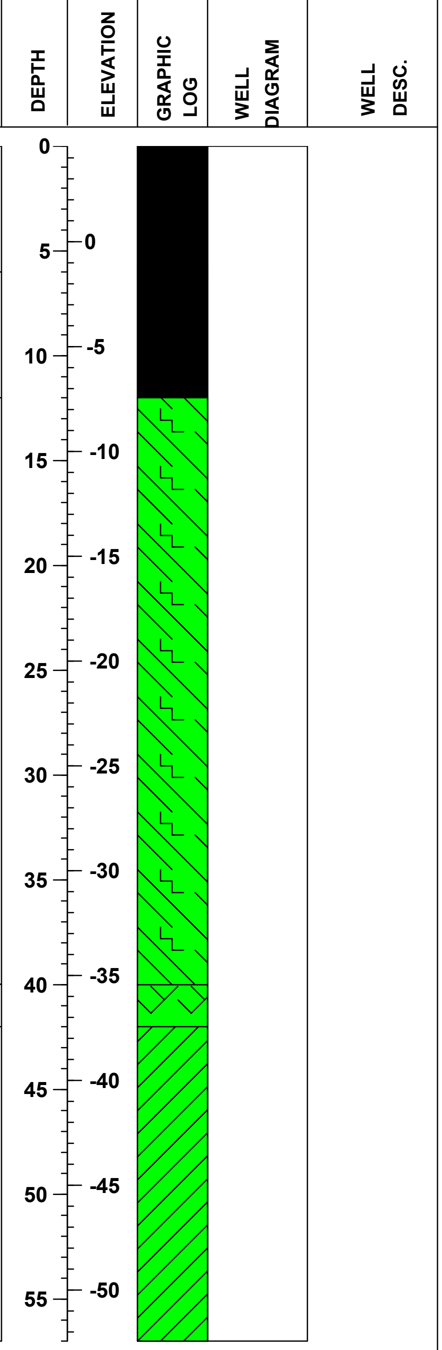
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** Eichelbergers, Inc.	**MONUMENT TYPE:** NA
PROJECT NUMBER: 470E	**DRILLER:** Shane	**CASING DESC.:** NA
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Kevin	**SCREEN DESC.:** NA
TOTAL DEPTH: 57 feet	**RIG TYPE:** CME-75	**FILTER PACK:** NA
DATE: November 21, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** NA
START TIME: 1:00 pm **COMP. TIME:** 5:30 pm	**BORING ID:** SB-101	**GROUT:** NA
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** None Installed	**TOP OF CASING ELEV.:** NA

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 2	0.8	2/2/2/2		FILL: Fine Sand - Frequent Organics - Brown - Moist - Very Loose to Loose
2 to 4	0.0	2/3/3/2		
4 to 6	0.5	2/4/6/12		
6 to 8	2.0	3/3/4/5		FILL: Gravely Sand - Brown - Wet - Loose
8 to 10	0.5	2/3/3/3		
10 to 12	0.5	2/4/3/5		
12 to 14	1.0	0/0/0/0		OH: Clay - Frequent Organics - Gray - Soft
15 to 17	2.0	0/0/0/0		
20 to 22	2.0	0/0/0/0		
25 to 27	0.8	0/0/0/0		
30 to 32	2.0	0/0/0/0		
35 to 37	1.5	0/0/0/0		
40 to 42	2.0	0/0/0/0		PT: Clayey Peat - Trace Sand - Brown - Dry
45 to 47	2.0	0/0/4/6		CL: Silty Clay - Frequent Organics - Gray and Orange - Hard
47 to 49	2.0	4/5/6/7		
50 to 52	NR	2/4/5/7		
55 to 57	2.0	2/2/2/2		



DEPTH TO GW DURING DRILLING (ft. bgs): 6.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** NA

COMMENTS:

Soil sample 470E-SB32-01 and 470E-SB32-03 (field duplicate) were collected from 8.0' to 10.0' below ground surface (bgs). Soil sample 470E-SB32-02 was collected from 15' to 17' bgs. No lower permeable unit was encountered. Therefore, no monitoring well was installed.

RIDOLFI Inc.

BORING ID: SB-102

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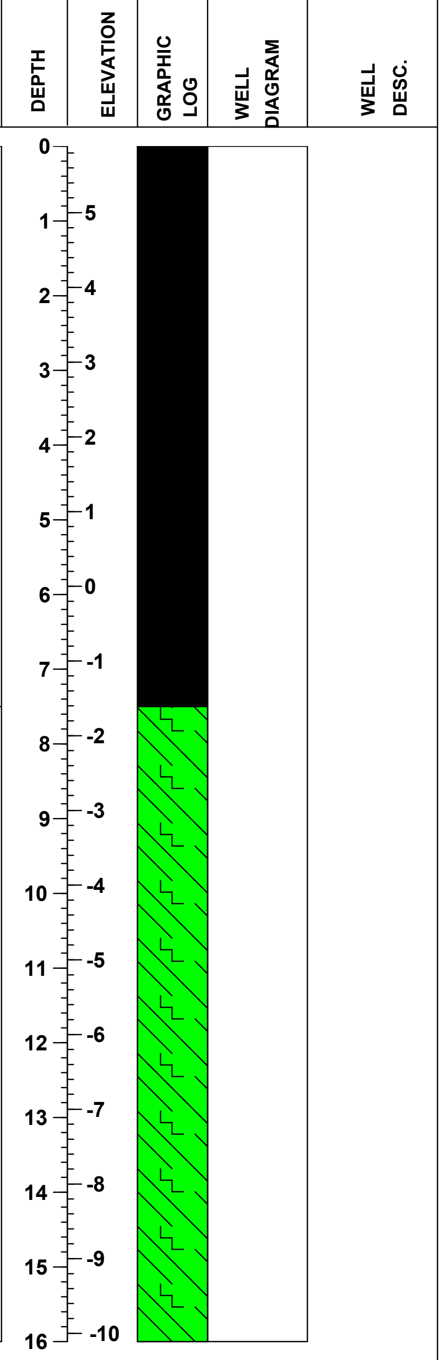
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** CT&E Environmental	**MONUMENT TYPE:** NA
PROJECT NUMBER: 470E	**DRILLER:** Bobby Jordan	**CASING DESC.:** NA
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Mark Hanker	**SCREEN DESC.:** NA
TOTAL DEPTH: 16 feet	**RIG TYPE:** Mobile B-53	**FILTER PACK:** NA
DATE: December 19, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** NA
START TIME: 9:00 am **COMP. TIME:** 10:45 am	**BORING ID:** SB-102	**GROUT:** NA
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** None Installed	**TOP OF CASING ELEV.:** NA

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
				FILL: Sandy Clay - Some Silt - Frequent Brick Fragments - Brown - Soft
2 to 4	**2.0**	**5/7/5/7**	**0.0**	
4 to 6	**0.5**	**5/5/5/5**		
6 to 8	**0.5**	**1/2/2/1**		
				OH: Silty Clay - Gray - Soft
8 to 10	**2.0**	**1/1/1/1**		
10 to 12	**2.0**	**0/0/0/0**		
12 to 14	**2.0**	**0/0/0/0**		
14 to 16	**2.0**	**0/0/0/0**		



DEPTH TO GW DURING DRILLING (ft. bgs): NA	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** NA

COMMENTS:

Soil sample 470E-SB36-01 and 470E-SB36-03 (field duplicate) were collected from 7.5' to 9.5' below ground surface (bgs). Soil sample 470E-SB36-02 was collected from 10.0' to 12.0' bgs. No ground water was encountered above the clay. Therefore, no monitoring well was installed.

RIDOLFI Inc.

BORING ID: SB-103

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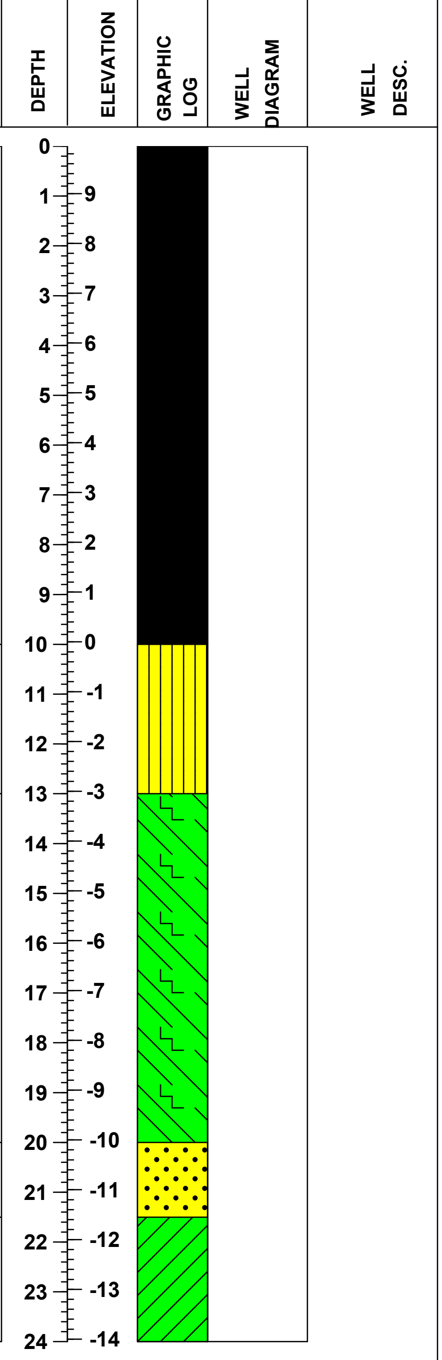
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** Eichelbergers, Inc.	**MONUMENT TYPE:** NA
PROJECT NUMBER: 470E	**DRILLER:** Joe	**CASING DESC.:** NA
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** Dan	**SCREEN DESC.:** NA
TOTAL DEPTH: 24 feet	**RIG TYPE:** CME-LC-60	**FILTER PACK:** NA
DATE: November 21, 2002	**METHOD:** Hollow-stem Auger	**SEAL:** NA
START TIME: 7:45 am **COMP. TIME:** 12:00 pm	**BORING ID:** SB-103	**GROUT:** NA
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** None Installed	**TOP OF CASING ELEV.:** NA

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 2	**2.0**	**2/5/7/10**		**FILL: Sandy Silt - Some Clay and Gravel - Occasional Organics and Brick Fragments - Brown and Gray**
2 to 4	**2.0**	**5/9/13/8**	**0.0**	
4 to 6	**2.0**	**13/10/6/7**		
6 to 8	**2.0**	**2/2/2/3**	**0.0**	
8 to 10	**2.0**	**5/7/9/5**		
10 to 12	**2.0**	**2/2/6/4**		**ML: Clayey Silt - Some Sand - Orange and Gray - Soft**
12 to 14	**2.0**	**9/6/5/5**		**OH: Silty Clay - Some Sand - Frequent Organics - Gray - Occasional Sand Layer - Soft**
14 to 16	**2.0**	**3/3/3/3**		
18 to 20	**2.0**	**2/2/2/2**		
20 to 22	**2.0**	**2/2/2/2**		**SP: Fine Sand - Trace to Some SIlt - Gray - Wet - Very Loose**
22 to 24	**2.0**	**2/2/2/2**		**CL: Silty Clay - Some Sand - Gray Soft**



DEPTH TO GW DURING DRILLING (ft. bgs): 20.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): NA

COMMENTS:

Soil sample 470E-SB38-01 was collected from 2.0' to 4.0' below ground surface (bgs). Soil sample 470E-SB38-02 was collected from 6' to 8' bgs. The sand seam from 20.0 to 21.5 was moist ot wet, but no free water was available. Therefore, no monitoring well was installed.

RIDOLFI Inc.

BORING ID: TMW-50

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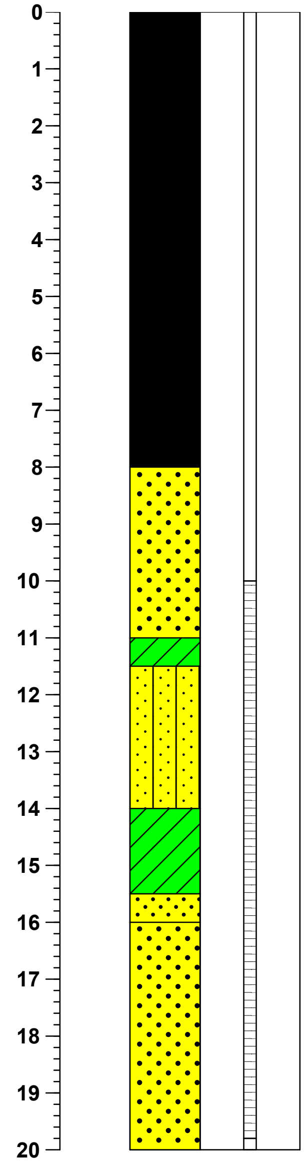
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. 0.10-Slot PVC
TOTAL DEPTH: 20 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 13, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 10:40 am **COMP. TIME:** 11:45 am	**BORING ID:** SP-50	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-50	**TOP OF CASING ELEV.:** 11.92' above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 4	**3.0**		**0.0**	**FILL: Silty Clay - Frequent Brick and Concrete Fragments - Occasional Organics - Brown**
4 to 8	**3.0**			
8 to 12	**3.0**			**SP: Fine Sand - Light Brown - Moist** **CL: Silty Clay - Gray - Soft** **SM: Silty Sand - Gray - Moist**
12 to 16	**3.0**		**0.0**	**CL: Sandy Clay - Brown - Soft** **SW: Gravelly Sand - Brown - Moist to Wet**
16 to 20	**4.0**			**SP: Fine Sand - Trace Gravel - Brown - Wet at 16'**



WELL DESC.

1" dia. PVC casing set in open probe-hole

--10.0' bgs

1" dia. 0.10-slot PVC screen set in open probe-hole

--20.0' bgs

DEPTH TO GW DURING DRILLING (ft. bgs): 16.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): 12.06 on 11/15/02

COMMENTS:

Soil sample 470E-SP50-01 was collected from 3.0' to 3.5' below ground surface (bgs). Temporary monitoring well TMW-50 was installed in probe-hole with screened interval set between 10' and 20' bgs. Ground water sample 470E-TMW50-01 was collected from the temporary monitoring well using a peristaltic pump.

RIDOLFI Inc.

BORING ID: TMW-51

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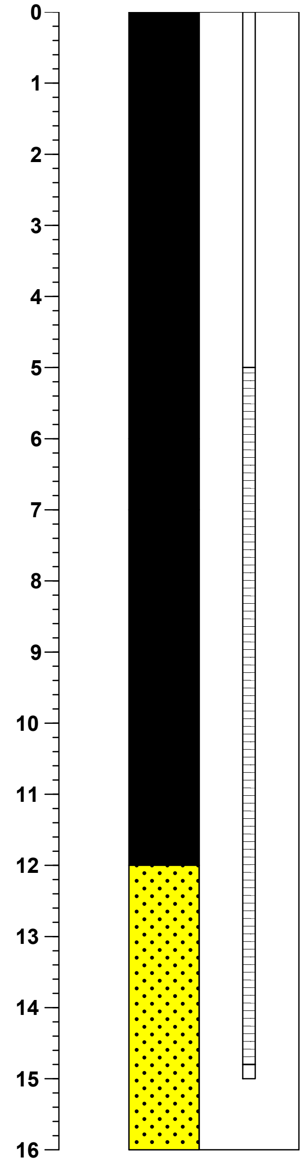
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. 0.10-Slot PVC
TOTAL DEPTH: 16 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 13, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 12:10 pm **COMP. TIME:** 1:00 pm	**BORING ID:** SP-51	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-51	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION	DEPTH	ELEVATION	GRAPHIC LOG	WELL DIAGRAM	WELL DESC.
0 to 4	**3.0**		**0.0**	**FILL: Gravelly Sand - Frequent Brick and Concrete Fragments - Brown to Black from 3.0 to 3.5' - Moist**					**1" dia. PVC casing set in open probe-hole**
									--5.0' bgs
4 to 8	**3.0**		**0.0**	**FILL: Silty Clay - Some Sand - Gray and Orange - Moist - Stiff**					
				FILL: Sandy Clay - Trace Gravel - Gray and Brown - Moist - Petroleum Odor at 10 to 16'					
8 to 12	**4.0**								**1" dia. 0.10-slot PVC screen set in open probe-hole**
12 to 16	**1.0**			**SW: Gravelly Sand - Brown - Moist to Wet at 12' - Slight Sheen on Water**					**--15.0' bgs**



DEPTH TO GW DURING DRILLING (ft. bgs): 12.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): Not Measured

COMMENTS:

Petroleum odors were noted at 10' to 16' below ground surface (bgs). Soil sample 470E-SP51-01 was collected from 10.5' to 11.5' bgs. Temporary monitoring well TMW-51 was installed in probe-hole with screened interval set between 5' and 15' bgs. Ground water sample 470E-TMW51-01 was collected from the temporary monitoring well using a peristaltic pump. A sheen was noted on the ground water sample.

RIDOLFI Inc.

BORING ID: TMW-52

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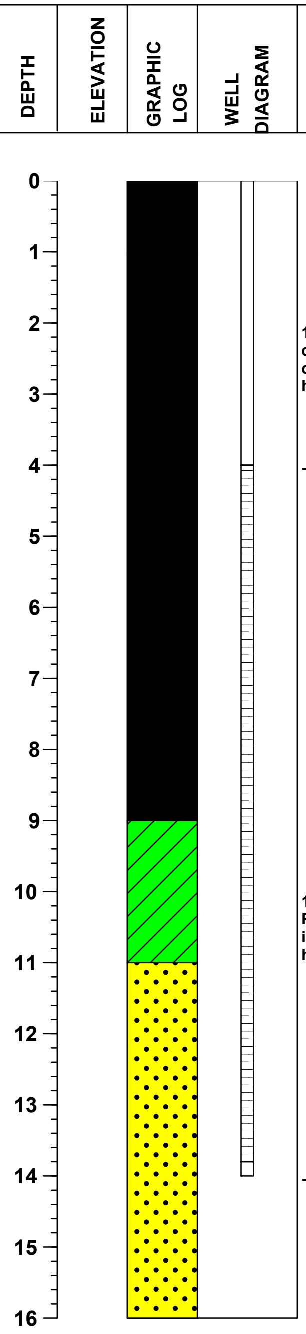
PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. 0.10-Slot PVC
TOTAL DEPTH: 16 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 13, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 2:15 pm **COMP. TIME:** 3:15 pm	**BORING ID:** SP-52	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-52	**TOP OF CASING ELEV.:** 9.92' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION	WELL DESC.
0 to 4	**4.0**			**FILL: Gravelly Sand - Frequent Organics and Brick Fragments - Brown and Black - Moist** **FILL: Clayey Silt - Trace Gravel - Frequent Concrete Fragments - Brown - Hard**	**1" dia. PVC casing set in open probe-hole** **--4.0' bgs**
4 to 8	**4.0**		**0.0**		
8 to 12	**4.0**			**CL: Sandy Clay - Brown - Soft** **SP: Fine Sand - Brown - Wet**	**1" dia. 0.10-slot PVC screen set in open probe-hole**
12 to 16	**4.0**				**--14.0' bgs**



DEPTH TO GW DURING DRILLING (ft. bgs): 11.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** 9.96 on 11/16/02

COMMENTS:

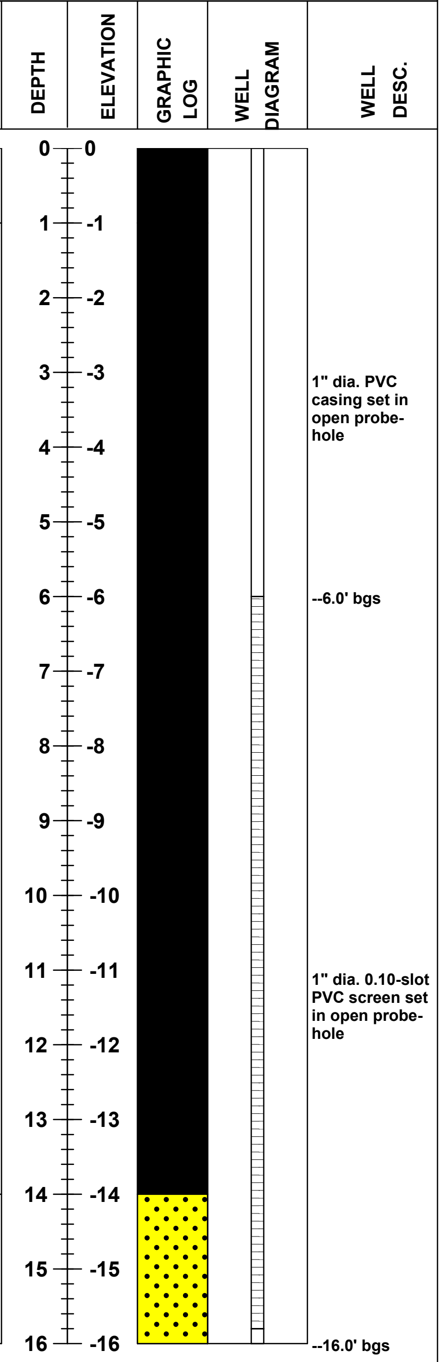
Soil sample 470E-SP52-01 was collected from 7.0' to 7.5' below ground surface (bgs). Temporary monitoring well TMW-52 was installed in probe-hole with screened interval set between 4' and 14' bgs. Ground water sample 470E-TMW52-01 was collected from the temporary monitoring well using a peristaltic pump.

RIDOLFI Inc.

BORING ID: TMW-53

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. PVC
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. 0.10-Slot PVC
TOTAL DEPTH: 16 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 13, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 3:30 pm **COMP. TIME:** 4:45 pm	**BORING ID:** SP-53	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-53	**TOP OF CASING ELEV.:** 5.99' Above MSL

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 4	4.0			**FILL: Sandy Gravel - Some Silt - Frequent Brick Fragments - Black - Moist** **FILL: Silty Clay - Trace Gravel - Occasional Brick Fragments - Gray - Soft**
4 to 8	4.0			
8 to 12	4.0			
12 to 16	4.0			**SP: Fine Sand - Some Gravel - Brown - Wet**



DEPTH TO GW DURING DRILLING (ft. bgs): 14.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** Not measured

COMMENTS:

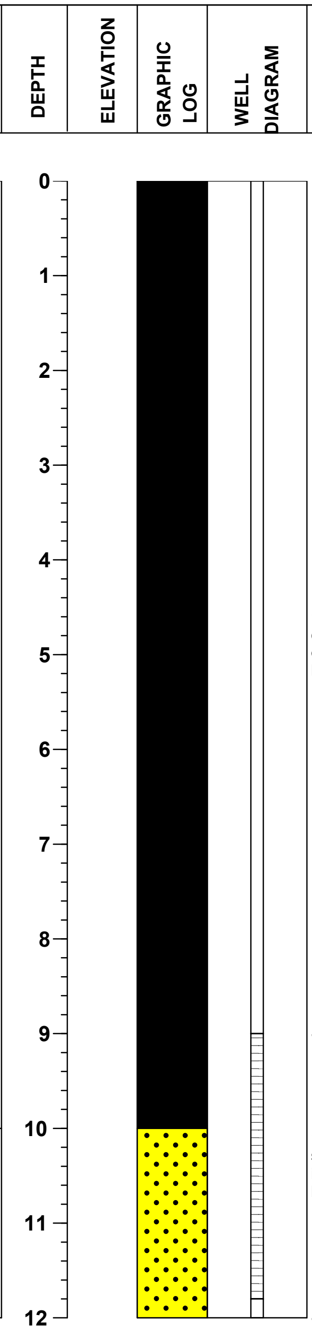
Soil sample 470E-SP53-01 was collected from 1.0' to 2.0' below ground surface (bgs). Temporary monitoring well TMW-53 was installed in probe-hole with screened interval set between 6' and 16' bgs. Ground water sample 470E-TMW53-01 was collected from the temporary monitoring well using a peristaltic pump.

BORING ID: TMW-54

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 12 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 7:15 am **COMP. TIME:** 8:20 am	**BORING ID:** SP-54	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-54	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION	WELL DESC.
				FILL: Silty Clay - Trace Gravel - Occasional Concrete Fragments - Brown and Gray	
0 to 4	**2.0**				
4 to 8	**4.0**				**1" dia. steel casing set in open probe-hole**
					--9.0' bgs
8 to 12	**4.0**			**SP: Fine Sand - Some Gravel and Silt - Brown - Wet**	**1" dia. laser-cut steel screen set in open probe-hole**
					--12.0' bgs



DEPTH TO GW DURING DRILLING (ft. bgs): 10.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** Not Measured

COMMENTS:

Soil sample 470E-SP54-01 was collected from 9.5' to 10.0' below ground surface (bgs). Temporary monitoring well TMW-54 was installed in probe-hole with screened interval set between 9' and 12' bgs. Ground water sample 470E-TMW54-01 was collected from the temporary monitoring well using a peristaltic pump.

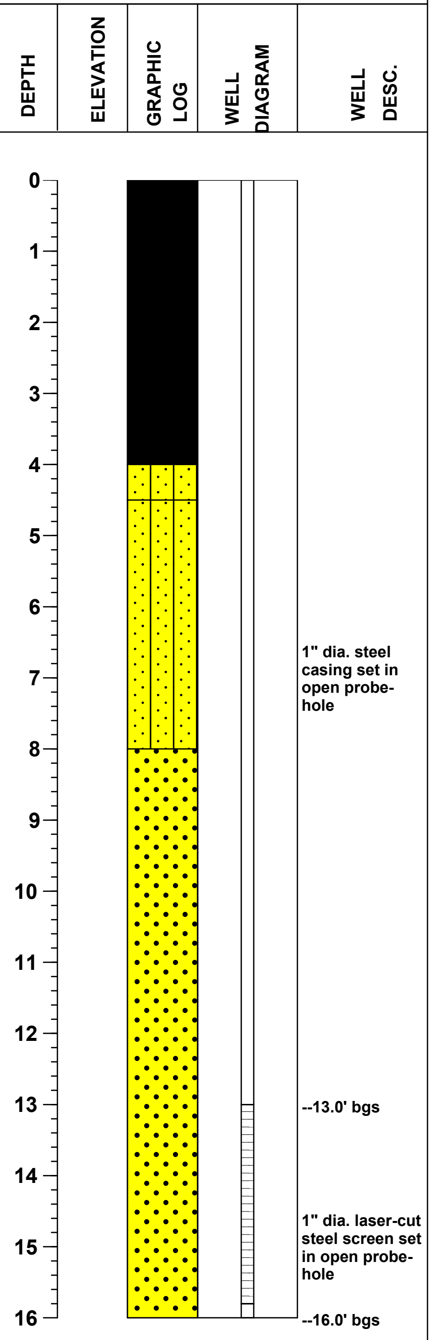
RIDOLFI Inc.

BORING ID: TMW-55

PAGE:1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 16.0	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 8:40 am **COMP. TIME:** 9:35 am	**BORING ID:** SP-55	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-55	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 4	**3.0**			**FILL: Silty Clay - Some Sand - Trace to Some Gravel - Frequent Brick Fragments - Brown and Gray**
				SM: Silty Sand - Black - Moist - Slight Foreign Odor
4 to 8	**3.0**			**SM: Silty Sand - Brown - Moist**
8 to 12	**3.0**			**SP: Fine Sand - Some Gravel and Silt - Brown - Moist to Wet at 12'**
12 to 16	**3.0**			



DEPTH TO GW DURING DRILLING (ft. bgs): 12.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** Not Measured

COMMENTS:

Slight foreign odors were noted from 4.0' to 4.5' below ground surface (bgs). Soil sample 470E-SP55-01 was collected from 4.0' to 4.5' bgs. Temporary monitoring well TMW-55 was installed in probe-hole with screened interval set between 13' and 16' bgs. Ground water sample 470E-TMW55-01 was collected from the temporary monitoring well using a peristaltic pump.

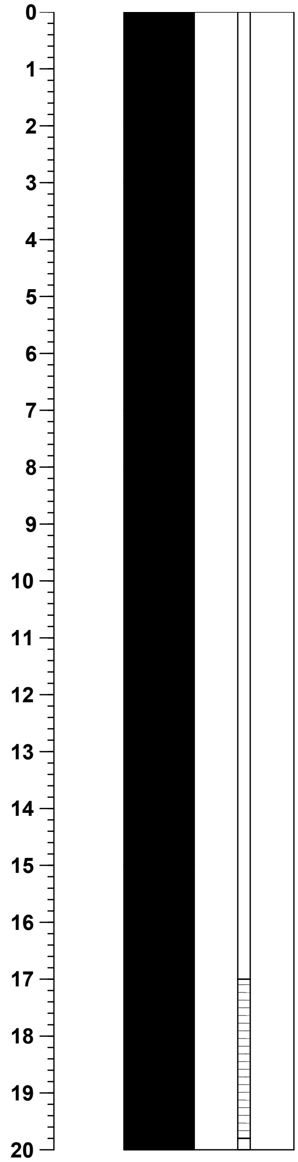
RIDOLFI Inc.

BORING ID: TMW-56

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 20 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 9:45 am **COMP. TIME:** 10:30 am	**BORING ID:** SP-56	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-56	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION	DEPTH	ELEVATION	GRAPHIC LOG	WELL DIAGRAM	WELL DESC.
				FILL: Silty Clay - Some Gravel - Frequent Brick Fragments - Brown	0				
0 to 4	**3.0**			**FILL: Fine Sand - Some Gravel - Frequent Brick Fragments -**	2				
				FILL: Silty Clay - Some Sand - Frequent Brick Fragments - Brown	3				
4 to 8	**4.0**								
				FILL: Fine Sand - Trace Silt - Brown - Moist	7				
				FILL: Sandy Clay - Some Silt - Frequent Brick Fragments	8				**1" dia. steel casing set in open probe-hole**
8 to 12	**4.0**								
12 to 16	**4.0**								
				FILL: Fine Sand - Some Gravel - Frequent Brick Fragments - Wet	15				
					17				**--17.0' bgs** **1" dia. laser-cut steel screen set in open probe-hole**
16 to 20	**4.0**								
					20				**--20.0' bgs**



DEPTH TO GW DURING DRILLING (ft. bgs): 15.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): Not Measured

COMMENTS:

Soil sample 470E-SP56-01 was collected from 2.5' to 3.0' below ground surface (bgs). Temporary monitoring well TMW-56 was installed in probe-hole with screened interval set between 17' and 20' bgs. Ground water sample 470E-TMW56-01 was collected from the temporary monitoring well using a peristaltic pump.

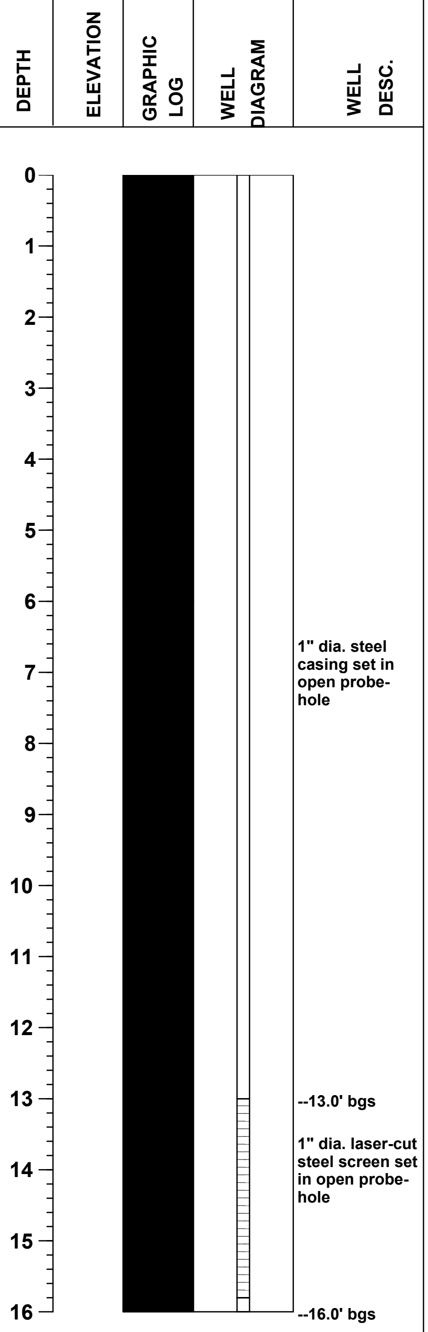
RIDOLFI Inc.

BORING ID: TMW-57

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 16 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 11:33 am **COMP. TIME:** 12:20 pm	**BORING ID:** SP-57	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-57	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 4	2.0			**FILL: Silty Clay - Some Sand - Frequent Brick, Concrete, and Coal Fragments - Moist**
4 to 8	2.0			**FILL: Silty Sand - Occasional Brick Fragments - Brown - Moist** **FILL: Fine Sand - Some Silt - Occasional Brick Fragments - Brown - Moist to Wet at 10'**
8 to 12	2.0			
12 to 16	2.0			



DEPTH TO GW DURING DRILLING (ft. bgs): 10.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): Not Measured

COMMENTS:

Soil sample 470E-SP57-01 was collected from 2.5' to 3.0' bgs. Temporary monitoring well TMW-57 was installed in probe-hole with screened interval set between 13' and 16' bgs. Ground water sample 470E-TMW57-01 was collected from the temporary monitoring well using a peristaltic pump.

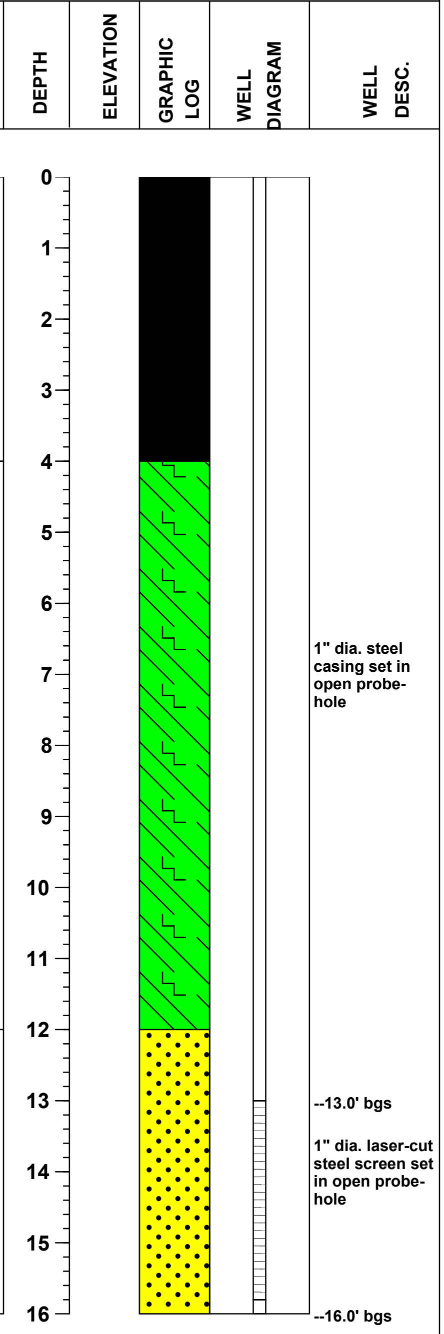
RIDOLFI Inc.

BORING ID: TMW-58

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization		**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E		**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.		**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 16 feet		**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002		**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 1:10 pm	**COMP. TIME:** 1:45 pm	**BORING ID:** SP-58	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls		**MONITORING WELL ID:** TMW-58	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 4	3.0			**FILL: Silty Clay - Some Gravel and Sand - Frequent Brick and Concrete Fragments - Gray and Black**
4 to 8	0.0			**OH: Sandy Clay - Some Silt - Brown - Moist**
8 to 12	4.0			
12 to 16	3.0			**SP: Fine Sand - Trace to Some Gravel - Trace Silt - Brown - Wet**



DEPTH TO GW DURING DRILLING (ft. bgs): 12.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** Not Measured

COMMENTS:

Soil sample 470E-SP58-01 was collected from 10.0' to 10.5' below ground surface (bgs). Temporary monitoring well TMW-58 was installed in probehole with screened interval set between 13' and 16' bgs. Ground water sample 470E-TMW58-01 was collected from the temporary monitoring well using a peristaltic pump.

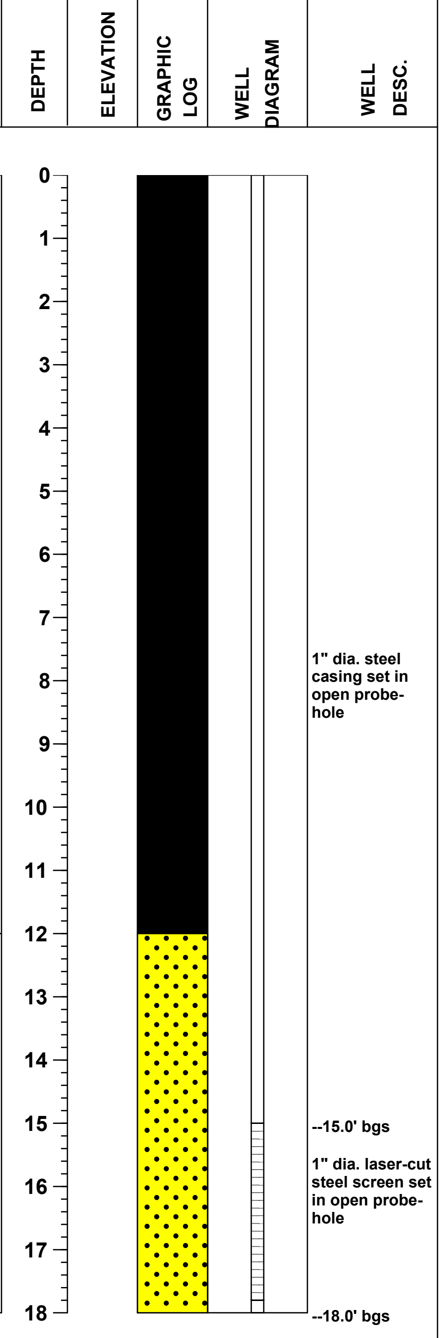
RIDOLFI Inc.

BORING ID: TMW-59

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 16 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 2:15 pm **COMP. TIME:** 2:50 pm	**BORING ID:** SP-59	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-59	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 4	4.0			**FILL: Silty Clay - Some Sand and Gravel - Frequent Brick and Concrete Fragments - Brown and Black**
4 to 8	2.0			
8 to 12	4.0			
12 to 16	3.0			**SP: Fine Sand - Trace to Some Gravel - Brown - Wet**



DEPTH TO GW DURING DRILLING (ft. bgs): 12.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** Not Measured

COMMENTS:

Soil sample 470E-SP59-01 was collected from 10.5' to 11.0' below ground surface (bgs). Temporary monitoring well TMW-59 was installed in probe-hole with screened interval set between 15' and 18' bgs. Ground water sample 470E-TMW59-01 was collected from the temporary monitoring well using a peristaltic pump.

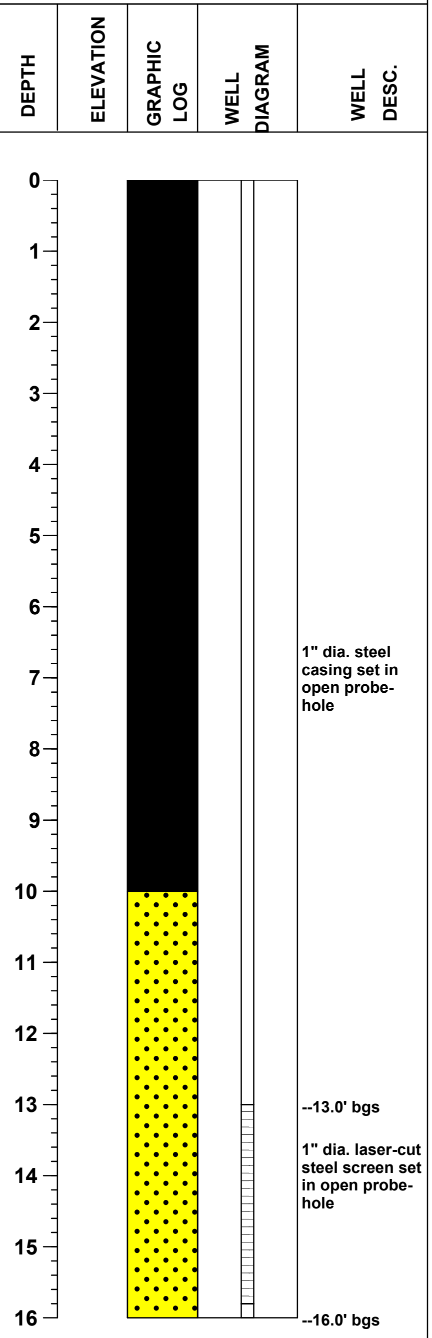
RIDOLFI Inc.

BORING ID: TMW-60

PAGE:1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 16 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 3:00 pm **COMP. TIME:** 4:20 pm	**BORING ID:** SP-60	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-60	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION
0 to 4	4.0			**FILL: Silty Clay - Some Sand and Gravel - Frequent Brick, Concrete, and Coal Fragments - Brown and Black - Moist**
4 to 8	4.0			
8 to 12	4.0			**SP: Fine Sand - Trace to Some Gravel - Brown - Moist to Wet**
12 to 16	4.0			



DEPTH TO GW DURING DRILLING (ft. bgs): 12.0	**DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC):** Not Measured

COMMENTS:

A 0.2' layer of burn material (coal) was observed from 5.0' to 5.2' below ground surface (bgs). Soil sample 470E-SP60-01 was collected from 5.5' to 6.0' bgs. Temporary monitoring well TMW-60 was installed in probe-hole with screened interval set between 13' and 16' bgs. Ground water sample 470E-TMW60-01 was collected from the temporary monitoring well using a peristaltic pump.

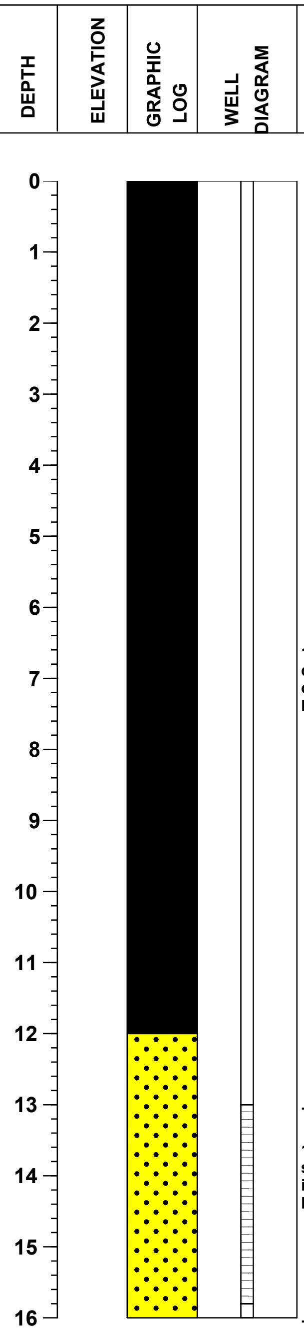
RIDOLFI Inc.

BORING ID: TMW-61

PAGE: 1 of 1

PROJECT NAME: Poplar Pt. Site Characterization	**CONTRACTOR:** ESN Southeast	**MONUMENT TYPE:** None Installed
PROJECT NUMBER: 470E	**DRILLER:** David Hoilett	**CASING DESC.:** 1" Dia. Stainless Steel
PROJECT LOCATION: Washington, D.C.	**DRILLER'S ASSISTANT:** None	**SCREEN DESC.:** 1" Dia. Laser-cut Steel
TOTAL DEPTH: 16 feet	**RIG TYPE:** Direct-Push Probe	**FILTER PACK:** None Installed
DATE: November 14, 2002	**METHOD:** 4' long 2" dia. macro sampler	**SEAL:** None Installed
START TIME: 4:30 pm **COMP. TIME:** 5:15 pm	**BORING ID:** SP-61	**GROUT:** None Installed
CLASSIFIED BY: A. Nicholls	**MONITORING WELL ID:** TMW-61	**TOP OF CASING ELEV.:** Not Surveyed

DRIVE DEPTH (ft)	RECOVERY (ft.)	BLOWS/6"	PID (ppm)	LITHOLOGIC DESCRIPTION	WELL DESC.
0 to 4	4.0			**FILL: Silty Clay - Some Sand and Gravel - Frequent Brick Fragments - Moist**	
4 to 8	4.0				**1" dia. steel casing set in open probe-hole**
8 to 12	4.0				
12 to 16	0.0			**SP: Fine Sand - Trace to Some Gravel - Wet**	**--13.0' bgs** **1" dia. laser-cut steel screen set in open probe-hole** **--16.0' bgs**



DEPTH TO GW DURING DRILLING (ft. bgs): 12.0

DEPTH TO GW AFTER WELL INSTALLATION (ft. below TOC): Not Measured

COMMENTS:

Soil sample 470E-SP61-01 was collected from 5.0' to 5.5' below ground surface (bgs). Temporary monitoring well TMW-61 was installed in probe-hole with screened interval set between 13' and 16' bgs. Ground water sample 470E-TMW61-01 was collected from the temporary monitoring well using a peristaltic pump.

MACTEC

BORING NO. **NRS-1** SHEET 1 OF 1

PROJECT **Poplar Point**

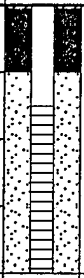
LOCATION **NRSI**

PROJECT NO. **3552-06-0944.7.4**

PREPARED BY **D. Dunlap** DATE: 1/11/2008

COORDINATES

SURFACE ELEVATION DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	WELL CONSTRUCTION DETAIL
DEPTH FEET	LAB SAMPLE (mg/kg)	BLOW COUNTS	USCS	Recovery (inches)	OVM (ppm)			
			FILL		0.0	▩	Apparent FILL (FILL), dark brown (7.5YR 3/4) silty clay (CL), root material, dry, low recovery	 Cement grout, flush mount manhole cover with locking cap 3/8" Bentonite Chips (0.5' to 2.0' bgs) 1.0" I.D. Schedule 40 PVC casing from 0.0' to 2.0' bgs No. 2 Clean Silica Sand Filter Pack (2.0' to 8.0' bgs) 1" I.D. Schedule 40 PVC 0.010 factory slotted screen with 2" O.D. stainless steel wire mesh pre-packed with 20/40 grade silicia sand filter pack (3.0' to 8.0' bgs)
			SW		0.0	░	Strong brown (7.5YR 4/6) medium to fine SAND (SW), damp	
5			SW		0.0	░	Similiar to above with apparent organic or posible petroleum odor, wet	
			CL		0.0	▨	Dark gray (7.5YR 4/1) CLAY (CL) with fine white sand, wet	
							Boring terminated at 8.0' bgs. Overdrilled using 3" I.D. steel casing to 8.0 feet and set well. Groundwater at approximately 4.0 feet bgs at drilling.	

DRILLING CONTRACTOR **Tidewater**

DRILLING METHOD **Geoprobe DP**

DRILLING EQUIPMENT **Geoprobe 6620DT**

DRILLING STARTED **1/11/08** ENDED **1/11/08**

REMARKS **Located near baseball diamond.**
Organic vapor measurements (OVM) collected from soil head-space on site using a photo-ionization detector.
Checked by: BC Date: 2/27/2008

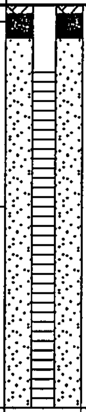
See key sheet for symbols and abbreviations used above.

MACTEC

BORING NO. **NRS-2** SHEET **1** OF **1**
PROJECT **Poplar Point**
LOCATION **NRSI**
PROJECT NO. **3552-06-0944.7.4**
PREPARED BY **D. Dunlap** DATE: 1/11/2008

COORDINATES
SURFACE ELEVATION DATUM

SAMPLE INFORMATION						STRATA	DESCRIPTION	WELL CONSTRUCTION DETAIL
DEPTH FEET	LAB SAMPLE (mg/kg)	BLOW COUNTS	USCS	Recovery (inches)	OVM (ppm)			
			FILL		0.0		0.0' to 2.0' No recovery, hit refusal at 4.0' on concrete; moved to 2.0' east of sidewalk. Low recovery, top 6" FILL (FILL) topsoil or root matter	Cement grout, flush mount manhole cover with locking cap 3/8" Bentonite Chips (0.25' to 1.0' bgs) 1.0" I.D. Schedule 40 PVC casing from 0.0' to 2.0' bgs
			SW		1.0		Strong brown (7.5YR 5/8) medium to fine SAND (SW)	
5					11.6			
					0.5		Very dark gray (10YR 3/1) silty CLAY (CL)	No. 2 Clean Silica Sand Filter Pack (1.0' to 12.0' bgs) 1" I.D. Schedule 40 PVC 0.010 factory slotted screen with 2" O.D. stainless steel wire mesh pre-packed with 20/40 grade silicia sand filter pack (2.0' to 12.0' bgs)
10			CL		1.0			
					0.5			
							Boring terminated at 12.0' bgs. Overdrilled using 3" I.D. steel casing to 12.0 feet and set well. Groundwater at approximately 6.0 feet bgs at drilling.	

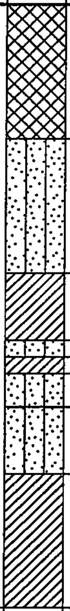


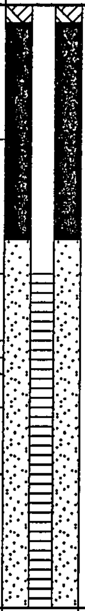
DRILLING CONTRACTOR **Tidewater**
DRILLING METHOD **Geoprobe DP**
DRILLING EQUIPMENT **Geoprobe 6620DT**
DRILLING STARTED **1/11/08** ENDED **1/11/08**

REMARKS **Adjacent to Helicopter pad.**
Organic vapor measurements (OVM) collected from soil head-space on site using a photo-ionization detector.
Checked by: BC Date: 2/27/2008
See key sheet for symbols and abbreviations used above.

MACTEC

BORING NO. **NRS-3** SHEET 1 OF 1
PROJECT **Poplar Point**
LOCATION **NRSI**
PROJECT NO. **3552-06-0944.7.4**
COORDINATES
SURFACE ELEVATION DATUM
PREPARED BY **D. Dunlap** DATE: 1/11/2008





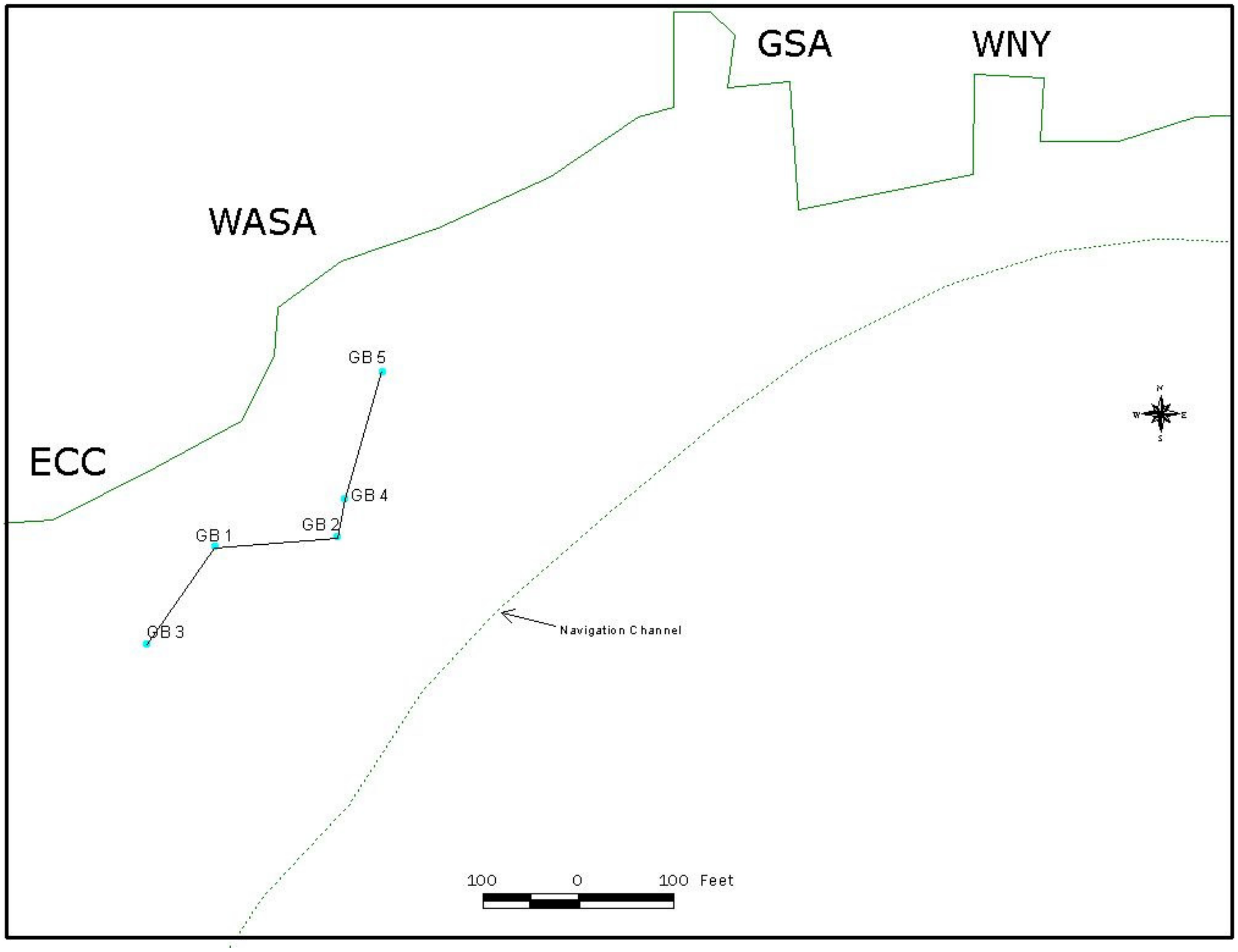
SAMPLE INFORMATION								
DEPTH FEET	LAB SAMPLE (mg/kg)	BLOW COUNTS	USCS	Recovery (inches)	OVM (ppm)	STRATA	DESCRIPTION	WELL CONSTRUCTION DETAIL
			FILL		0.5 1.1		Apparent FILL (FILL); yellowish brown (10YR 5/6) medium SAND (SM) with trace pebbles, dry to damp 6" at bottom is dark gray (10YR 4/2) silty Clay	Cement grout, flush mount manhole cover with locking cap 3/8" Bentonite Chips (0.5' to 7.0' bgs)
5			SM		1.2 0.6		Yellowish brown (10YR 5/6) SAND (SM) similiar to above, damp	1.0" I.D. Schedule 40 PVC casing from 0.0' to 8.0' bgs
			CL		3.1		Dark gray (10YR 4/2) silty CLAY (CL), with black "rubber" odor fill material, pebbles, brick, damp	
10			SM CL SM		4.2		Yellowish brown (10YR 5/6) SAND (SM), damp Dark gray (10YR 5/2) CLAY (CL) with black fill material, dry	
			SM		1.1		Grayish brown (10YR 5/6) medium to fine SAND (SM) with white fine sand, dry	No. 2 Clean Silica Sand Filter Pack (7.0' to 18.0' bgs) 1" I.D. Schedule 40 PVC 0.010 factory slotted screen with 2" O.D. stainless steel wire mesh pre-packed with 20/40 grade silica sand filter pack (8.0' to 18.0' bgs)
15			CL		5.4		Yellowish brown (10YR 5/6) SAND (SM) with black fill material in pockets, wet Black fill material; bottom 4" is olive brown (1.5YR 4/3) silty CLAY (CL) with white sand	
							Boring terminated at 18.0' bgs. Overdrilled using 3" I.D. steel casing to 18.0 feet bgs and set well. Groundwater at approximately 10 feet bgs at drilling.	

DRILLING CONTRACTOR **Tidewater**
DRILLING METHOD **Geoprobe DP**
DRILLING EQUIPMENT **Geoprobe 6620DT**
DRILLING STARTED **1/11/08** ENDED **1/11/08**

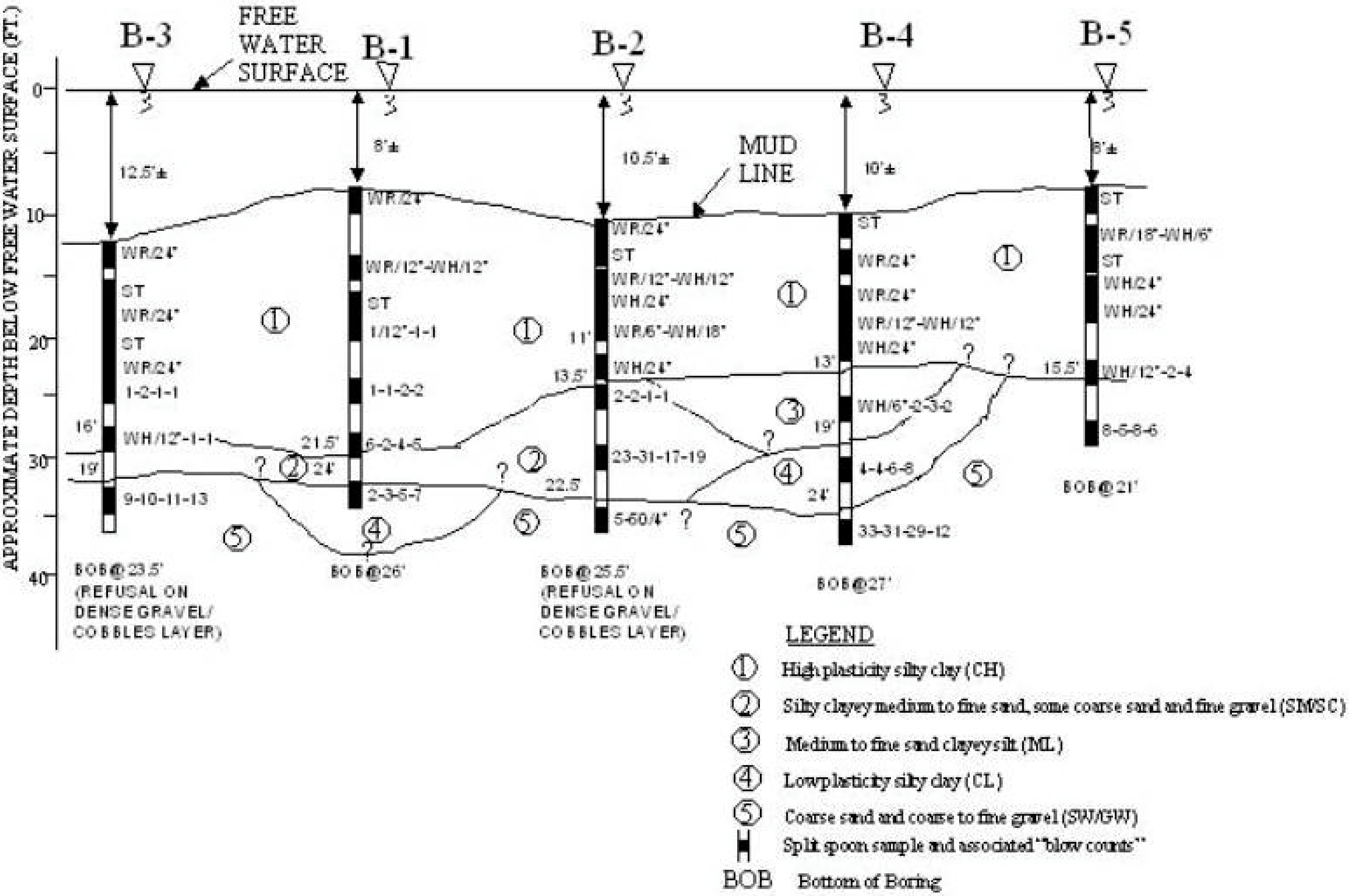
REMARKS **Located in open field.**
Organic vapor measurements (OVM) collected from soilhead-space on site using a photo-ionization detector.
Checked by: BC Date: 2/27/2008
See key sheet for symbols and abbreviations used above.

APPENDIX C

Soil Boring Logs, Cross Sections, and River Cores from Other Investigations



Boring 1	38 degrees 52' 17.7" 77 degrees 00' 17.3"
Boring 2	38 degrees 52' 17.8" 77 degrees 00' 15.7"
Boring 3	38 degrees 52' 16.7" 77 degrees 00' 18.2"
Boring 4	38 degrees 52' 18.2" 77 degrees 00' 15.6"
Boring 5	38 degrees 52' 19.5 77 degrees 00' 15.1


APPROXIMATE DEPTH BELOW FREE WATER SURFACE (FT.)
0
10
20
30
40
FREE WATER SURFACE
MUD LINE
B-3
B-1
B-2
B-4
B-5
12.5'±
8'±
10.5'±
10'±
8'±
WR/24"
ST
WR/24"
ST
WR/24"
1-2-1-1
16'
WH/12"-1-1
19'
9-10-11-13
BOB@23.5' (REFUSAL ON DENSE GRAVEL/ COBBLES LAYER)
WR/24"
WR/12"-WH/12"
ST
1/12"-1-1
1-1-2-2
21.5'
6-2-4-5
24'
2-3-5-7
BOB@26'
WR/24"
ST
WR/12"-WH/12"
WH/24"
11'
WR/6"-WH/18"
13.5'
WH/24"
2-2-1-1
23-31-17-19
22.5'
5-60/4"
BOB@25.5' (REFUSAL ON DENSE GRAVEL/ COBBLES LAYER)
ST
WR/24"
WR/24"
WR/12"-WH/12"
WH/24"
13'
WH/6"-2-3-2
19'
4-4-6-8
24'
33-31-29-12
BOB@27'
ST
WR/18"-WH/6"
ST
WH/24"
WH/24"
15.5'
WH/12"-2-4
8-6-8-6
BOB@21'
①
②
③
④
⑤
?
LEGEND
① High plasticity silty clay (CH)
② Silty clayey medium to fine sand, some coarse sand and fine gravel (SM/SC)
③ Medium to fine sand clayey silt (ML)
④ Low plasticity silty clay (CL)
⑤ Coarse sand and coarse to fine gravel (SW/GW)
Split spoon sample and associated "blow counts"
BOB Bottom of Boring

Ground Water Observation	Job: Anacostia River No. 3288F02	Boring Number B-1
At_______ ft, after ______ hrs	Drilling Rig: HC Drilling	Boring Offset
At_______ ft, after ______ hrs	Operator: Brian	Surface Elevation
At_______ ft, after ______ hrs	Sampler: Bill Deutsch	Date Start: 4/2/03 Date Finish: 4/2/03

Depth Blow Surf.	Sample Depth		Type of Sample	Blows/6" Gage, Core Recovery	Drilling Method & Resist.	Strata Change Depth	Field	Sample Preserved		
	Form	To						No.	From	To
							9' Free water			
	0	2	SS	WOR/24"			BR- Gray silty clay plastic			
							Bottom casing @ 4.5' BML			
	5.5	7.5	SS	WOR/12"			SAME			
				WOR/12"						
	8.5	10.5	ST	PUSH			SAME			
	10.5	12.5	SS	1/12"			SAME			
				1-1			Free Water @ 7'/ casing @11.5			
	15.5	17.5	SS	1-1-2-2			SAME, more silty			
							SAND @21.5' +/- BML			
	20	22	SS	6-2-4-5			Silty clayey M-F sand			
							Silty Clay @ 24 BML			
	24	26	SS	2-3-5-7			Stiff Silty Clay			
							EOB @ 26' BML			

Ground Water Observation

At_______ ft, after ______ hrs

At_______ ft, after ______ hrs

At_______ ft, after ______ hrs

Job: Anacostia River No. 3288F02

Drilling Rig: HC Drilling

Operator: Brian

Sampler: Bill Deutsch

Boring Number B-2

Boring Offset

Surface Elevation

Date Start: 4/2/03 Date Finish: 4/2/03

Depth Blow Surf.	Sample Depth		Type of Sample	Blows/6" Gage, Core Recovery	Drilling Method & Resist.	Strata Change Depth	Field	Sample Preserved		
	From	To						No.	From	To
							11' Free water depth			
	0	2	SS	WOR/18"			V. Soft F- Sandy, Clayey, Silt/ Silty Clay			
				WOR/6"			DRG, DK.GR,Petro. HC Smell			
	5	7	SS	WOR/24"			SAME			
							B-2(OFFSET) = B-2 (0)			
							10.5' Free Water			
	0	2	SS	WR/24"			V.Soft F- Sandy Clayey silt			
							Silty clay, ORG. DK. GR. PETRO HC Smell			
	2	4	ST	PUSH			SAME; 24" REC			
	4	6	SS	WR/12"			SAME			
				WH/12"						
	6	8	SS	WH/24"			SAME			
	8	10	SS	WR/ 6" WH/18"			SAME			
	11	13	SS	WH/24"			DK. BR. Silty Clay, Plastic			
	13.5	15.5	SS	2-2-1-1			DK BR. Silty Clayey M-F Sand			
	18.5	20.5	SS	23-31-17-19			No REC./ Poss Driving rock (or steel rod type)			
	23.5	25.5	SS	5-50/4"			C- Sane + Cobbles+ Gravel			
							EOB= 25.5'			

Ground Water Observation

At_______ ft, after ______ hrs

At_______ ft, after ______ hrs

At_______ ft, after ______ hrs

Job: Anacostia River No. 3288F02

Drilling Rig: HC Drilling

Operator: Mark

Sampler: Dana Jackson

Boring Number B-3

Boring Offset

Surface Elevation

Date Start: 4/8/03 Date Finish: 4/8/03

Depth Blow Surf.	Sample Depth		Type of Sample	Blows/6" Gage, Core Recovery	Drilling Method & Resist.	Strata Change Depth	Field	Sample Preserved		
	Form	To						No.	From	To
							Free Water 12.5 feet			
	0	2	SS	WOR/24			V. Soft Silty, organic rich clay			
							petro HC odor			
							Casing set at 3 feet blm			
	3	5	ST	PUSH			1 push under own weigh except			
				26/30			for last 5 inches- full recovery			
							sample lost on deck (soft)			
							B3 offset			
							Casing set at 3 feet blm			
	3	5	ST	PUSH			Weight of rod 18" push 12"			
							Dark olive green clay silt at base,slight petroleum odor at base			
	5	7		WOR			Dark olive Clay w/silt (soft)			
	7	9	ST	26/30			Same at the bottom			
	9	11	SS	WOR	70% R		Shell materials present less than 1cm			
							Dark olive plastic silty clay			
	11	13	SS	1-2-1-1			light olive clay, plastic shell material invading through brick fragment at 1' below tops of spoon abundant leaf stems through out sample			
	15	17	SS	1-1-1-1-	NR					
	15	17	SS	WH/12 1-1			Cray green silty clay upper 1 foot			
							lower foot clayey sand			
	19						cobbles drilled through			
	20	22	SS	9/1011/13	50%		coarse sandy around 1-4c m trace of clay present at top spoon caving (?)			
	25	27	SS		NS		Sample not taken refusal at 23.5 cobble lag			

Ground Water Observation	Job: Anacostia River No. 3288F02	Boring Number B-4
At_______ ft, after ______ hrs	Drilling Rig: HC Drilling	Boring Offset
At_______ ft, after ______ hrs	Operator: Mark	Surface Elevation
At_______ ft, after ______ hrs	Sampler: Dana Jackson	Date Start: 4/8/03 Date Finish: 4/8/03

Depth Blow Surf.	Sample Depth		Type of Sample	Blows/6" Gage, Core Recovery	Drilling Method & Resist.	Strata Change Depth	Field	Sample Preserved		
	Form	To						No.	From	To
							Free water 10 feet			
	0	2.5	ST	PUSH	26/30		Full Recovery			
	3	5	SS	WOR			Light olive green, silty clay, abundant shell debris, black organic rich materials, motestly plastic			
	6	8	SS	WOR			Same as above			
	8	10	WR/12				dark olive grays silty clay to soft to plastic at base			
			WH/12							
	10	12		WHH			Same as above			
	15	17		WHH/ 6 7,3,2			Light olive clay silt more sand coarsoning towards base			
	20	22	4-4-6-8				Light ovlive silty clay mod stiff balling easily			
	25	27	33,31,20,12	70%			Coarse broken gravel 3-5 cm w couase sand			

Ground Water Observation

At_______ ft, after ______ hrs

At_______ ft, after ______ hrs

At_______ ft, after ______ hrs

Job: Anacostia River No. 3288F02

Drilling Rig: HC Drilling

Operator: Mark

Sampler: Dana Jackson

Boring Number B-5

Boring Offset

Surface Elevation

Date Start: 4/10/03 Date Finish: 4/10/03

Depth Blow Surf.	Sample Depth		Type of Sample	Blows/6" Gage, Core Recovery	Drilling Method & Resist.	Strata Change Depth	Field	Sample Preserved		
	Form	To						No.	From	To
	0	2.5	ST	PUSH	22/30					
	3	5	SS	WOR 18			slight offset (3-21) due to high wind conditions from ST to settling casing and running down to 3 feet			
				WOH 24			Dark olive green clay, high organic content, petrolific, very soft			
	5	7	ST	PUSH	26/30					
	7	9	SS				Med. Olive green, clay w/ some silt and organic debris soft at top less water at base			
				WOH/						
	9	11	SS	WOH/			Same as above			
	14	16	SS	WOH/12	70% R		Dark olive green clay stiff sharp contact with coarse sand and five gravel at base sand about 1.5 inches			
					2 4					
	19	21		8586	50%R		Broken gravel top 5" of SS sharp contact w/ light green olive silty clay very stiff			

Memorandum

July 28, 2003 (Revised Table; 9/10/03)

To: Mr. Colin Wagoner, Ridolfi Engineers Inc.

From: Dr. David Velinsky, ANS-PCER

Subj: Anacostia Sediment Core Sampling

CC: Mike Buchman (NOAA), File

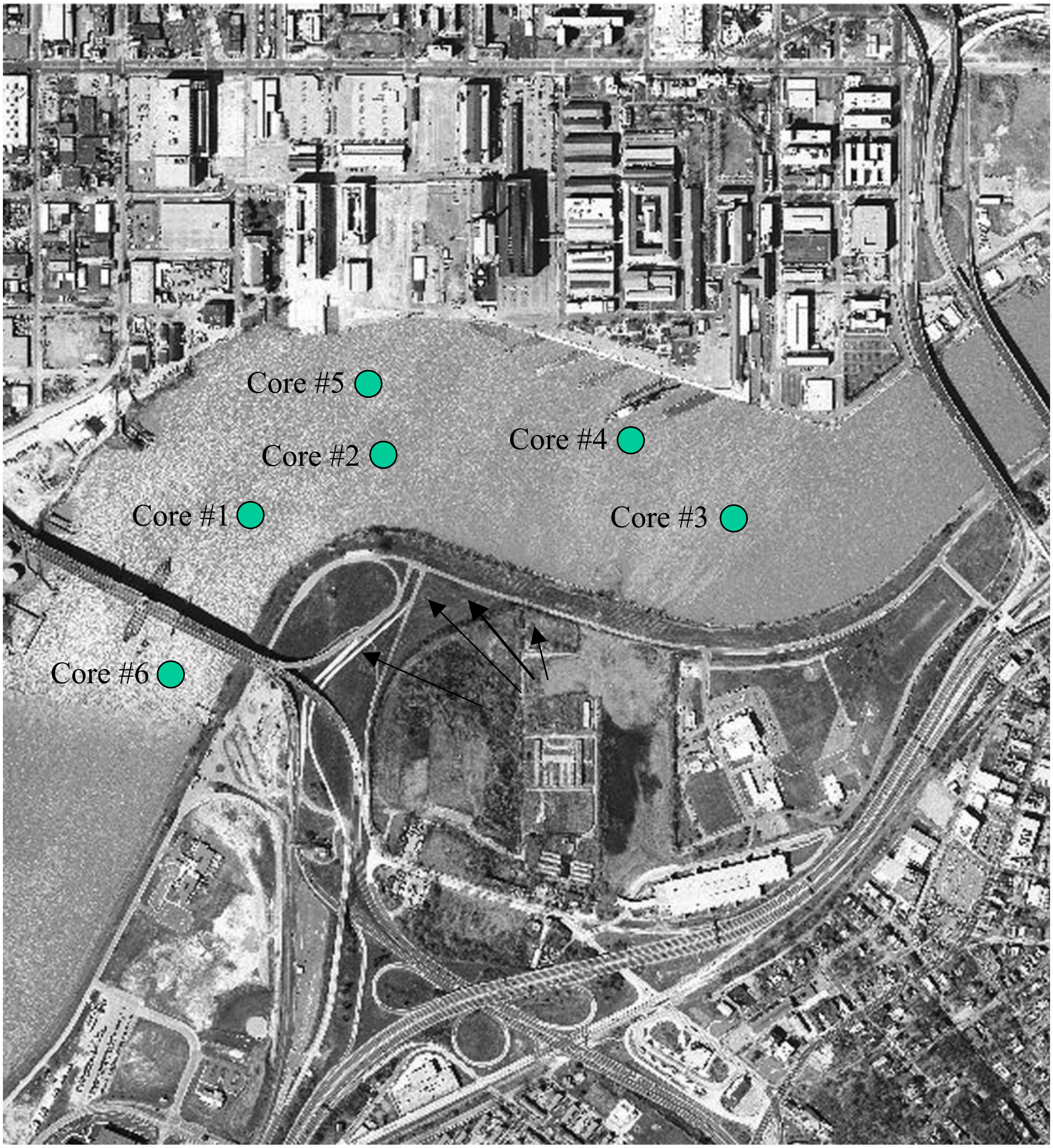
This memo provides a brief summary and update on the Poplar Point Anacostia core sediment sampling effort. On Tuesday, June 24th, staff from the Patrick Center and the Virginia Institute of Marine Sciences collected 6 cores from the area surrounding Poplar Point in the lower Anacostia River (Table 1; Figure 1).

Table 1: Locations, time sampled, core lengths and water depths for cores in Anacostia River.

Core #	Time Taken	Latitude	Longitude	Total Length (m)	Water Depth (m)
Core 1	0913	38.86984 N	77.00364 W	4.90	4.73
Core 2	1105	38.87073 N	77.00093 W	5.20	5.34
Core 3	1140	38.86963 N	76.99438 W	4.92	4.27
Core 4	1236	38.87070 N	76.99638 W	4.24	4.73
Core 5	1448	38.87171 N	77.00121 W	4.62	4.37
Core 6	1554	38.86752 N	77.00505 W	5.04	4.88

Cores were taken aboard the *RV Bay Eagle* (VIMS) using a submersible vibracore and aluminum core tubes. Sites were eventually selected based on the project needs and the many restricted areas in the river defined on the NOAA chart, including METRO tunnels and underwater cables and pipes. This prevented us from sampling locations cited in our original proposal. In addition, Ms. Diane Douglas from the District of Columbia was on board and assisted in site selection based on project needs and safety concerns.

Core depths were not as deep (approx. 5m) as we had proposed given the historical stratigraphy (RPI, 2002) and original project design (6 to 8m). We attempted to take three 10m cores but the wall thickness of these barrels (which was different from the 6m barrels) was not sufficient and the cores bent over and cracked during penetration.



Sampling Locations (●

← Potential GW

Figure 1. Approximate locations of sediment coring sites around Poplar Point.

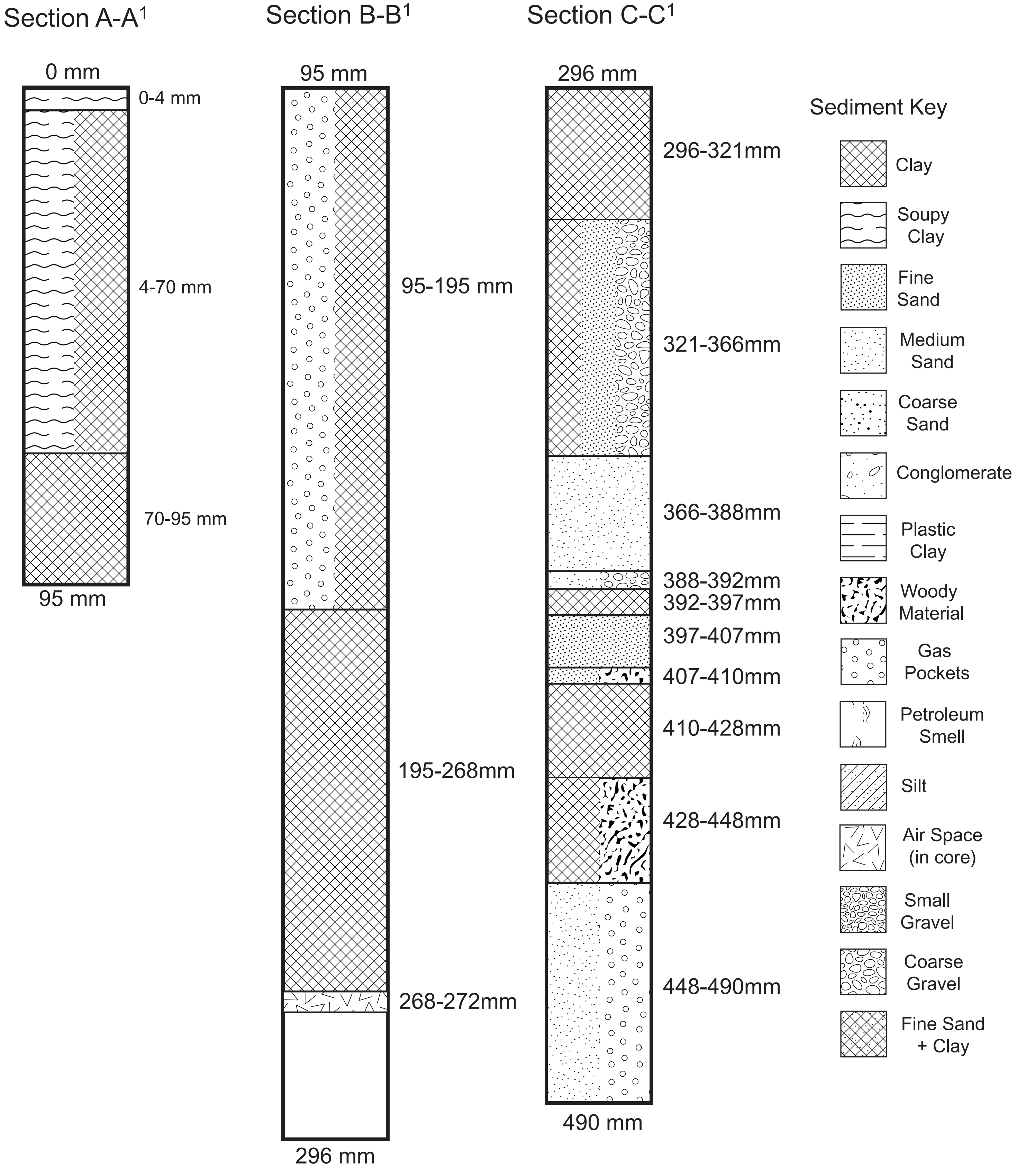
Cores were sliced on deck into 2m intervals and placed into a refrigerated truck for transport to VIMS for core sectioning and logging. All cores were processed on Thursday and Friday, June 27th and 28th. Upon sectioning the cores we did find that, in all cores, the sediment changed from a very fine clay+silt (i.e., mud) at the top of the cores to a sand-sized sediment nearer the bottom. In Cores 2 and 6 (and to some degree Core 4), material changed to gravel-sand sediment near the bottom (e.g., see attached pdf file for Core 2). This suggests that, in these cores, we were able to penetrate into the target strata, which was referred to in our proposal.

Seventy-two, plus a few extra, sediment samples were taken from the six cores. Core sediment sub-sectioning depths were selected based on the visual changes in sediment color and texture. Intervals were generally 20 cm but were smaller in the upper portion of each core. Recognizable woody material, near the base of two cores, was obtained for ^{14}C dating. Pore water samples (15) for dissolved total As (arsenic) were obtained from all cores including those with substantial sand-gravel at the base.

We feel that we have a good-excellent sample set to evaluate historical levels of chemical contaminants near Poplar Point and potential groundwater or sub-surface water levels of specific chemicals. In the short term, we will be putting together a more comprehensive record of the material observed from these cores (i.e., stratigraphic description) and in conjunction with physical and chemical analyses provide information to complete the objective of this project.

Poplar Point Core #1

DRAFT



Memorandum

September 25, 2003

To: Mr. Colin Wagoner, Ridolfi Engineers Inc.

From: Dr. David Velinsky, ANS-PCER

Subj: Anacostia Sediment Core Sampling

Attached are the initial descriptions of Cores 4 and 6 along with an illustration of each core section. These are in draft format and any suggestions would be appreciated. Table 1 provides information regarding core locations, length and water depth at the time of collection.

Table 1: Locations, time sampled, core lengths and water depths for cores in Anacostia River.

Core #	Time Taken	Latitude	Longitude	Total Length (m)	Water Depth (m)
Core 1	0913	38.86984 N	77.00364 W	4.90	4.73
Core 2	1105	38.87073 N	77.00093 W	4.24	5.34
Core 3	1140	38.86963 N	76.99438 W	4.92	4.27
Core 4	1236	38.87070 N	76.99638 W	4.24	4.73
Core 5	1448	38.87171 N	77.00121 W	4.62	4.37
Core 6	1554	38.86752 N	77.00505 W	5.04	4.88

The field descriptions include features such as color, smell, texture (clay versus sand), presence of shell or woody debris, and other features that may help in future interpretations. Selected pieces of the woody material, found at specific intervals, was sent out for dating.

If you have any questions regarding these images please let me know. To print out the cores, in Adobe print as images.

Core Four: Descriptions

Section A-A’

0-17cm: Fine clay; olive gray color; slightly unconsolidated
17-31cm: Fine clay; olive gray; more solid than previous layer with some gas pockets

Section B-B’

31-175cm: Fine clay; olive gray; gas pockets
175-212cm: Plastic clay-mud; dark yellowish brown intermixed with dark yellowish orange; gas pockets throughout
212-232cm: Fine plastic clay; mix of colors: olive gray, dark gray and black with moderate yellowish brown layers; slight scent of petroleum

Section C-C’

232-254cm: Fine plastic clay; alternating thin layers of olive gray, dark gray, medium gray and grayish orange; some small gas pockets
254-277cm: Fine clay; thick dark gray layers with thin olive gray and grayish orange layers; strong petroleum scent
277-332cm: Thick, dry plastic mud; same colors as above interval
332-340cm: Fine grain sand mixed with clay; olive black in color
340-354cm: Dry sticky clay; between light olive gray and olive gray color
354-403cm: Very fine sand mixed with dry clay; dark gray in color
403-411cm: Top and bottom centimeters (~1) are fine sand; pale olive in color; center area: very fine sand and silt mixture with organic matter; dark gray/black
407-408cm: large piece of woody material
411-424cm: Fine sand/clay mix with large gravel pieces; between olive and dark greenish gray color

Latitude: 38.87070 N
Longitude: 76.99638 W

Core Six: Description

Section A-A’

0-22cm: Very fine wet clay with very fine sand; olive gray/light olive gray in color;
22-79cm: Very fine clay; olive gray with medium dark gray/grayish black 4cm layers at 25cm and 38cm depth; thin grayish orange, light olive, olive gray, and dark gray layers as well; gas pockets
79-109cm: Very fine clay; grayish black; woody debris
109-110cm: Very fine clay; olive gray/light olive gray

Section B-B’

110-116cm: Very fine clay with very fine sand; wet; dark greenish gray color
116-130cm: Fine clay; olive gray color
130-280cm: Fine clay with very, very fine sand; grayish black; (141-148cm- had thick olive gray layers [clay]) (208-209cm - one large gravel piece) (230-233cm- large air space
280-294cm: Fine sand in fine clay with woody organic matter; olive/grayish black
294-303cm: Medium sand with some clay; organic woody material; gravel
303-311cm: Medium sand; medium yellowish brown

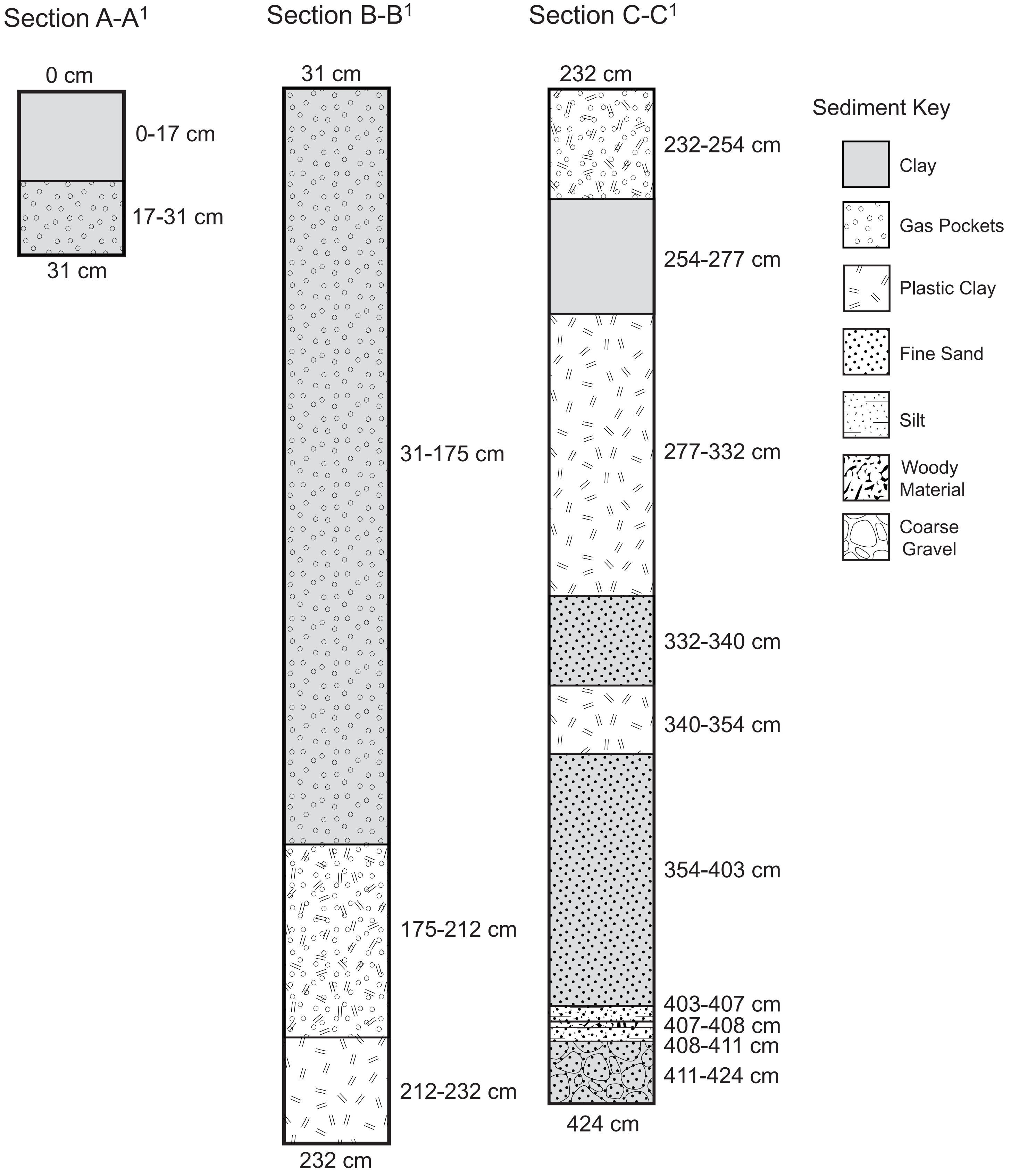
Section C-C’

311-345cm: Medium coarse sand; yellowish brown; some clay areas
345-383cm: Coarse sand, silt, and clay (olive color); woody organic material; gravel becomes gradually larger with depth over intervals
371-383cm: leads to gravel layer in next interval
383-395cm: gravel layer; large gravel with coarse sand
395-428cm: Very light bluish gray clay; very dense and dry; play-doh consistency with some sand intrusions beginning at 418cm
428-431cm: Clay with very, very fine sand; rusty brown/yellow in color
431-461cm: Coarse sand; rusty brown/yellow in color with scattered gravel
461-504cm: Large gravel, gradually decreasing in size with depth; intermixed with coarse sand; (467-474cm- large rock)

Latitude: 38.86752 N
Longitude: 77.00505 W

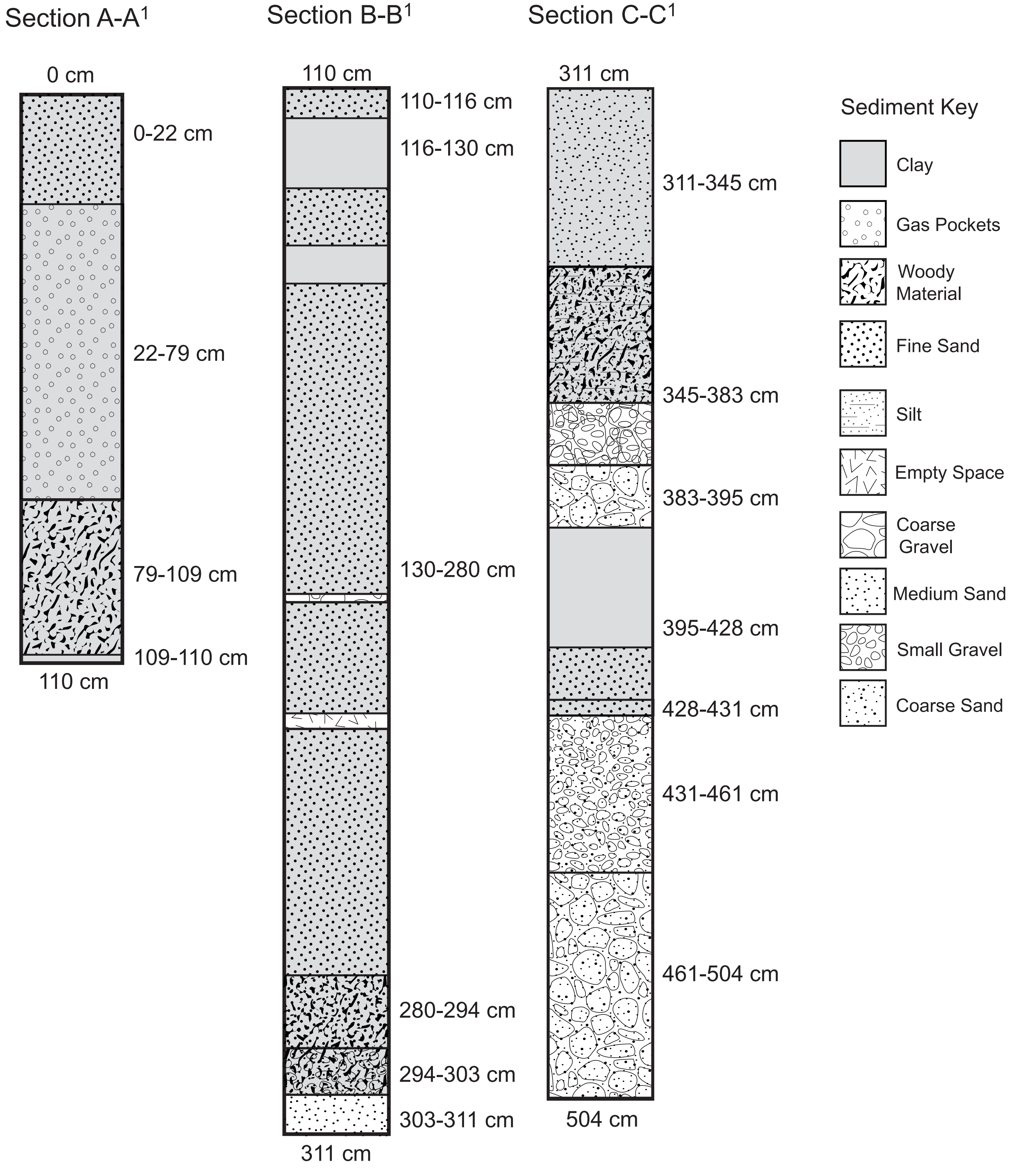
Poplar Point Core #4

DRAFT



Poplar Point Core #6

DRAFT



THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-1
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.10 Ft.
Date Started 7/10/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/10/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Dark brown, HUMUS, trace glass (FILL)				D	3-3-4-12	1	DS	16	1. Encountered water at 6.5 feet.
	Black, gravelly SAND, trace asphalt (FILL)			5	D/I	24-27-23-19	2	DS	19	2. Pieces of asphalt.
-.4	Brown, sandy CLAY, little gravel (FILL)	6.5			I	3-2-3-3	3	DS	15	
-2.9	Greenish gray, moist, medium stiff CLAY, little fine sand	9.0			D	1-1-1	4	DS	16	
	Gray, wet, very loose, fine SAND, little clay			10						
-5.4	Greenish gray, moist, medium stiff CLAY	11.5			I	2-3-3	5	DS	18	
	Bottom of Boring at 11.5 Feet									
				15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
- .S - DRIVEN SPLIT SPOON
- PT - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

SAMPLE CONDITIONS
- D - DISINTEGRATED
- I - INTACT
- U - UNDISTURBED
- L - LOST

GROUNDWATER DEPTH
AT COMPLETION 5.0 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 3.0 FT.
CAVED AT ______ FT.

BORING METHOD
- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-2
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.97 Ft.
Date Started 7/10/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/10/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Yellowish orange, dry, SILT, little gravel (FILL)				D	9-25-20-10	1	DS	17	1. Pieces of asphalt and hydrocarbon odor in soil at 8.0 feet.
	Black, sandy CLAY, little gravel (FILL)			5	D	1-4-2-5	2	DS	8	
	Black, organic, sandy CLAY (FILL)				D	12-4-5	3	DS	24	
	Gray, sandy GRAVEL (FILL)				D	12-4-5	4	DS	12	
-1.0		10.0		10						
	Gray, wet, very loose, fine SAND, little clay				D	1-1-2	5	DS	18	
-5.5		14.5		15	D/I	WOH/6"-1-2	6	DS	12	
	Greenish gray to greenish brown, moist to wet, very soft CLAY, little sand									
-11.0		20.0		20	I	1-1-1	7	DS	17	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 11.0 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 5.8 FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-3
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.06 Ft.
Date Started 7/10/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/10/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown to light brown, moist, medium stiff, clayey SILT, some fine sand (FILL)				D	1-3-4-4	1	DS	17	1. Encountered water at 7.75 feet.
1.8		4.5		5	D	2-3-2-5	2	DS	4	
	Greenish gray to grayish brown, moist to wet, very soft to soft CLAY, trace vegitation				I	WOH/12"-2-	3	DS	18	
				10	I	6-2-3	4	DS	18	
-5.4		11.5			I	WOH/6"-1-2	5	DS	18	
	Bottom of Boring at 11.5 Feet			15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

S - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 8.4 FT
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 4.0 FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-4
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum ____
Surf. Elev. 12.1 Ft.
Date Started 7/9/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/9/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, silty **SAND**, little brick **(FILL)**				D	5-9-8-15	1	DS	8	1. Encountered water at 10.0 feet.
	Yellowish **SILT**, some clay **(FILL)**				D/I	13-7-6-9	2	DS	18	
	Brown to orange, mottled **CLAY (FILL)**			5						
5.6		6.5			I	14-7-11-9	3	DS	19	
	Brown to rusty brown, moist, loose, fine **SAND**, little clay				I	3-3-3	4	DS	18	
	Greenish brown, wet, very loose, fine **SAND**, little clay, trace gravel			10	I	1-1-2	5	DS	18	
-.9		13.0								
-2.9	Greenish gray to yellowish orange, wet, dense, gravelly **SAND**	15.0		15	-	13-20-15	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 13.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 11.9 FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-5
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 11.35 Ft.
Date Started 7/9/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/9/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	SAMPLE Blows/6"	SAMPLE No.	SAMPLE Type	SAMPLE Rec	BORING & SAMPLING NOTES
	Brown and gray **CINDER, RED BRICK** (FILL)				D	6-15-14-9	1	DS	12	1. Encountered water at 13.0 feet.
	Gray, sandy **CLAY**, little asphalt (FILL)			5	D/I	6-4-5-5	2	DS	18	
	Brown, clayey **SAND**, little red brick (FILL)				D/I	6-3-4-3	3	DS	15	
1.8	Brown, sandy **CLAY**, trace asphalt, brick (FILL)	9.5			I	3-2-3	4	DS	2	
	Brown, moist, loose, clayey **SAND**, trace gravel			10		2-4-3	5	DS	18	
-3.7	Yellowish orange, wet, medium dense, sandy **GRAVEL**	15.0		15		15-11-10	6	DS	12	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

S - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 12.0 FT
AFTER ______ HRS. ______ FT.
AFTER 24 HRS 10.8 FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

ontracted With District of Columbia Department of Public Works - BTCS   Boring # SB-6
roject Name Anacostia Station Regional Parking Lot and Access Road   Job # 97009
ocation Southeast, Washington, D.C.

SAMPLER

atum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Hunter
urf. Elev. 7.39 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
ate Started 7/9/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/9/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
4.9	Brown, little green **CLAY, CINDER** (FILL)	2.5			D/I	8-6-3-3	1	DS	18	1. Encountered water at 9.5 feet.
	Greenish gray, moist, soft to medium stiff **CLAY**, little black vegitation			5	I	WOH/12"-2-2	2	DS	18	
-.6		8.0			I	WOH/6"-2-2-6	3	DS	18	
	Gray to yellowish orange, moist to wet, dense to medium dense, gravelly **SAND**				D	7-20-26	4	DS	18	
				10	D	6-6-7	5	DS	18	
	Brown, wet, medium dense **SAND**, little clay, trace gravel			15	D	2-4-10	6	DS	14	
-12.6	Yellowish orange, wet, medium dense **SAND**, some gravel	20.0		20	I	3-8-13	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE	SAMPLE CONDITIONS	GROUNDWATER DEPTH	BORING METHOD
S - DRIVEN SPLIT SPOON	D - DISINTEGRATED	AT COMPLETION 7.5 FT.	HSA - HOLLOW STEM AUGERS
T - PRESSED SHELBY TUBE	I - INTACT	AFTER ___ HRS. ___ FT.	CFA - CONTINUOUS FLIGHT AUGERS
A - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER 24 HRS. 7.4 FT.	DC - DRIVING CASING
- ROCK CORE	L - LOST	CAVED AT ___ FT.	MD - MUD DRILLING

TANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

TLB **THOMAS L. BROWN ASSOCIATES, P.C.**
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With: District of Columbia Department of Public Works - BTCS
Boring #: SB-15
Project Name: Anacostia Station Regional Parking Lot and Access Road
Job #: 97009
Location: Southeast, Washington, D.C.

SAMPLER

Datum:
Surf. Elev.: 7.52 Ft.
Date Started: 7/10/97
Hammer Wt.: 140 Lbs.
Hammer Drop: 30 In.
Spoon Size: 3.0 In.
Hole Diameter: 8.0 In.
Rock Core Dia.: N/A
Boring Method: HSA
Foreman: W. Hunter
Inspector: N. Richardson
Date Completed: 7/10/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
2.0	Brown, moist, very stiff SILT, some clay and red brick (FILL) Yellow CLAY, some brick (FILL)	5.5		5	D D	3-5-9-12 41-29-14-13	1 2	DS DS	8 15	1. Encountered water at 9.5 feet.
-.5	Greenish gray, some brown, moist, stiff, mottled CLAY	8.0			I	6-5-5-6	3	DS	12	
-3.5	Gray, wet, loose, fine SAND, little clay	11.0		10	D	1-3-3	4	DS	7	
-7.5	Gray to greenish gray, wet to moist, very soft CLAY, some fine sand	15.0		15	D I	WOH/18" 1-1-2	5 6	DS DS	6 18	
	Bottom of Boring at 15.0 Feet			20 25 30 35 40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 8.0 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 5.2 FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

TLB **THOMAS L BROWN ASSOCIATES, P.C.**
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-16
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Hammer Wt. 140 Lbs.
Hole Diameter 8.0 In.
Foreman W. Hunter
Surf. Elev. 6.59 Ft.
Hammer Drop 30 In.
Rock Core Dia. N/A
Inspector N. Richardson
Date Started 7/10/97
Spoon Size 3.0 In.
Boring Method HSA
Date Completed 7/11/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Black, clayey **SAND** with gravel, trace brick **(FILL)**				D	1-3-7-26	1	DS	17	1. Encountered water at 5.5 feet.
	Black **SILT**, some gravel, plastic, glass **(FILL)**			5	D	10-16-5-4	2	DS	15	2. Gasses released when spoon pulled; kept venting for a couple of hours.
1.1		5.5								
	Greenish gray, moist to wet, soft to very soft **CLAY**, some sand, trace gravel				D	1-3-3-2	3	DS	8	
					I	1-1-1	4	DS	12	
-3.9		10.5		10						
	Greenish gray, wet, very loose, clayey, fine **SAND**				D	3-1-2	5	DS	18	
-7.4		14.0								
	Greenish gray to light brown, moist to wet, medium stiff to very soft **CLAY**, little fine sand, trace organics			15	I	2-2-4	6	DS	12	
-13.4		20.0		20	I	WOH/12"-2	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 8.7 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-7
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.15 Ft.
Date Started 7/9/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/9/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
4.7	Black, sandy GRAVEL, trace cinder, glass (FILL)	2.5			D	1-4-43-15	1	DS	9	1. Encountered water at 10.0 feet.
.7	Gray to brown, moist, medium stiff, mottled CLAY Greenish gray, moist, stiff CLAY, trace gravel	6.5		5	D/I	40-6-4-6	2	DS	16	
-4.3	Gray to brown, moist to wet, dense, sandy GRAVEL	11.5			I	WOH/6"-2-2-9	3	DS	18	
					D	15-18-20	4	DS	14	
				10		11-23-23	5	DS	15	
	Bottom of Boring at 11.5 Feet									
				15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION ______ FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 5.9 FT.
CAVED AT 7.5 FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-8
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.01 Ft.
Date Started 7/8/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/8/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
5.5	Brown, small black CLAY, little gravel (FILL)	1.5			D/I	19-18-5-2	1	DS	8	1. Encountered water at 7.5 feet.
	Greenish gray, moist, soft CLAY, trace black vegitation				I	2-1-2-2	2	DS	18	
				5						
					I	2-1-2-2	3	DS	18	
-1.5		8.5			I/D	14-10-7	4	DS	18	
	Greenish gray to yellowish orange, moist to wet, medium dense, gravelly SAND to sandy GRAVEL, some clay			10						
-4.5		11.5			D	7-11-14	5	DS	18	
	Yellowish orange, wet, medium dense, sandy GRAVEL, trace clay									
	Bottom of Boring at 11.5 Feet			15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 4.75 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 3.6 FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-9
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.01 Ft.
Date Started 7/9/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/9/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
4.0	Brown, silty SAND, trace gravel, plastic (FILL)	2.0			D/I	7-11-7-6	1	DS	18	1. Encountered water at 9.0 feet.
	Greenish gray, moist, medium stiff to very soft CLAY, little fine sand				I	2-2-3-3	2	DS	18	
				5						
					I	WOH/6"-1-1-2	3	DS	18	
					I	WOH/6"-1-2	4	DS	18	
				10						
					I	WOH/6"-1-2	5	DS	18	
				15	I	WOH/18"	6	DS	18	
				20	I	1-2-2	7	DS	18	
-18.0		24.0								
-20.0	Greenish gray, dry, PEAT	28.0		25	I	2-1-4	8	DS	18	
-24.0	Greenish gray, moist, soft CLAY, trace wood pieces	30.0		30		WOH/6"-2-2	9	DS	18	
	Bottom of Boring at 30.0 Feet			35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 25.5 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 2.4 FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-10
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 5.22 Ft.
Date Started 7/14/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/14/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Dark brown, silty CLAY with wood (FILL)				D	3-5-4-3	1	DS	5	1. Encountered water at 7.0 feet.
	Brown SILT, little plastic (FILL)				D	4-4-2-3	2	DS	2	
-.3		5.5		5						
	Greenish gray, moist, soft to very soft CLAY				I	1-1-3-1	3	DS	12	
					I	2-2-2	4	DS	10	
				10						
					I	WOH/18"	5	DS	18	
-6.3		11.5								
	Bottom of Boring at 11.5 Feet									
				15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 8.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS Boring # SB-11
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.07 Ft.
Date Started 7/14/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/14/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, sandy SILT with wood, gravel, plastic (FILL)				D	1-3-11-4	1	DS	5	1. Encountered water at 5.0 feet.
					D	51/3"	2	DS	3	
				5						
-1.9	Brown, silty SAND with gravel, asphalt (FILL)	8.0			D	28-11-7-7	3	DS	3	
	Greenish gray, moist to wet, medium stiff to very soft CLAY				D/I	4-3-4	4	DS	8	
				10						
					I	1-1-3	5	DS	18	
-8.9		15.0		15	I	1-1-1	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 8.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS Boring # SB-12
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.15 Ft.
Date Started 7/14/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/14/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Gray to black, silty SAND with asphalt, glass, plastic, wood (FILL)				D	1-2-8-15	1	DS	3	
.7		5.5		5	D	27-9-2-2	2	DS	5	
	Greenish gray, moist, soft CLAY, little wood				I	2-1-2-2	3	DS	12	
-2.3	Greenish gray, some black to greenish brown, moist, medium stiff, sandy CLAY	8.5		10	I/D	3-3-3	4	DS	18	
-4.8	Greenish gray, wet to moist, sandy CLAY	11.0			D/I	WOH/18"	5	DS	17	
-8.9	Greenish gray, moist, very soft CLAY	15.0		15	I	WOH/12"-1	6	DS	16	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 7.0 FT
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-13
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 5.70 Ft.
Date Started 7/11/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/11/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown, sandy SILT (FILL) Brown and gray, gravelly CLAY, wood (FILL)				D	4-8-5-4	1	DS	7	1. Encountered water at 6.0 feet.
				5	D	20-2-1-1	2	DS	9	
-.3		6.0								
-1.8	Gray, wet, loose, fine SAND, little clay	7.5			I/D	1-3-4-3	3	DS	18	
	Greenish gray, moist, very soft CLAY				I	WOH/18"	4	DS	18	
				10	I	WOH/18"	5	DS	18	
-9.3		15.0		15		WOR/12"- WOH/12"	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
S - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 7.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 2.8 FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-14
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 4.98 Ft.
Date Started 7/10/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/10/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
2.5	Black HUMUS, trace sand (FILL)	2.5			D	1-4-4-10	1	DS	18	1. Encountered water at 5.0 feet.
	Brown to gray, moist, medium stiff CLAY, some silt			5	I	5-3-4-6	2	DS	20	2. 6 inch fine sand layer at 6.0 feet.
	Dark gray to greenish brown, moist to wet, very soft, sandy CLAY				I/D	2-1-1-1	3	DS	16	3. 2 inch wood layer 3 inches from end of spoon at 11.5 feet.
	Greenish gray, moist, very soft CLAY, trace wood			10	I	WOH/18"	4	DS	18	
-6.5		11.5				WOH/18"	5	DS	18	
	Bottom of Boring at 11.5 Feet									
				15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 8.0 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 2.7 FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-17
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.65 Ft.
Date Started 7/11/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/11/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown to black, sandy CLAY with brick, gravel (FILL)				D	4-9-5-4	1	DS	16	
	Yellowish orange, sandy GRAVEL (FILL)				D	1-3-3-2	2	DS	18	
1.1		5.5		5						
	Greenish gray, moist, medium stiff to very soft CLAY, trace gravel, trace fine sand, trace organics				I	2-2-2-4	3	DS	22	
					I	2-1-2	4	DS	18	
				10						
					I	1-1-4	5	DS	5	
-8.4		15.0		15	I	WOH/18"	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 13.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 3.0 FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30";COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS Boring # SB-18
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Hunter
Surf. Elev. 6.13 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 7/10/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/10/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Grayish brown, moist, clayey SILT, little vegitation, wood, trash (FILL)				I	1-2-1-1	1	DS	12	1. Encountered water at 6.0 feet. 2. 9 inches of fine sand at 5.5 feet.
1.8		4.5		5	D	1-1-1-3	2	DS	4	
	Greenish gray, some brown, moist, soft to very soft CLAY, some fine sand, trace wood, white shells and organic material				I	1-1-2-3	3	DS	20	
					I	WOH/12"-1	4	DS	18	
				10	I	1-2-2	5	DS	18	
-8.9		15.0		15	I	WOH/18"	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 7.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 3.8 FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-19
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum ______
Surf. Elev. 6.58 Ft.
Date Started 7/10/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/10/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Gray and brown, moist **SILT**, little clay and wood **(FILL)**				D	2-7-7-6	1	DS	17	
1.1		5.5		5	I	1-2-2-3	2	DS	22	
	Greenish gray, moist, medium stiff to very soft **CLAY**, thin vegitation layer at 6.0 feet				I	2-1-3-3	3	DS	22	
					I	2-1-1	4	DS	12	
-4.9		11.5		10	I	WOH/12"-1-1	5	DS	17	
	Bottom of Boring at 11.5 Feet			15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 6.1 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 4.6 FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-20
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Hunter
Surf. Elev. 6.13 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 7/11/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/11/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, dry SILT, little clay (FILL)				D	2-8-14-13	1	DS	20	1. Encountered water at 6.5 feet.
	Brown, moist, clayey SAND, little gravel (FILL)			5	D	10-7-6-10	2	DS	20	
	Brown, moist SILT, trace asphalt (FILL)				D	7-4-3-3	3	DS	5	
-4.4	Black, wet, gravelly SAND, trace cinder, brick (FILL)	10.5		10	D	10-8-4	4	DS	8	
	Greenish gray to greenish brown, moist to wet, soft to very soft CLAY, little sand, trace wood				I	2-2-3	5	DS	5	
-8.9		15.0		15		WOH/6"-2-1	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 4.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 3.5 FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-21
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 4.81 Ft.
Date Started 7/8/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/8/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, gravelly SAND, little clay (FILL)				D	10-10-11-13	1	DS	8	1. Encountered water at 2.5 feet.
	Brown to white, sandy GRAVEL, little clay (FILL)				D	39-41-51/4"	2	DS	16	
				5						
	Black, cinder-like material (FILL)				D	34-30-17-8	3	DS	18	
-3.2		8.0								
	Dark gray, moist to wet, soft to very soft CLAY, trace fill				I	3-2-2	4	DS	13	
				10						
					I	2-2-2	5	DS	13	
-10.2		15.0		15	I	WOH/6"-1-2	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

- DS - DRIVEN SPLIT SPOON
- PT - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

SAMPLE CONDITIONS

- D - DISINTEGRATED
- I - INTACT
- U - UNDISTURBED
- L - LOST

GROUNDWATER DEPTH

AT COMPLETION 4.3 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 1.9 FT.
CAVED AT ____ FT.

BORING METHOD

- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-22
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Hunter
Surf. Elev. 5.41 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 7/1/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/1/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, moist, SILT, some gravel (FILL)				D	3-7-5-6	1	DS	11	1. Encountered water between 5.0 and 5.5 feet.
	Brown, moist, gravelly SAND (FILL)			5	D	9-6-11-12	2	DS	8	
-2.1	Brown, wet GRAVEL, little brick (FILL)	7.5			D	2-2-24-51/5"	3	DS	11	
-5.1	Brown, wet, very loose, sandy GRAVEL	10.5		10	D	10-3-2	4	DS	4	
	Brown, moist, very soft CLAY, trace organics					1-2-1	5	DS	18	
-9.6		15.0		15		WOH/12"-1	6	DS	18	
	Bottom of Boring at 15.0 Feet			20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 2.5 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works – BTCS
Boring # SB-23
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.43 Ft.
Date Started 7/7/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/7/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, sandy SILT, trace gravel (FILL)				D	5-9-12-10	1	DS	17	1. Encountered running sand while trying to take sample at 23.5 feet.
				5	D	10-5-6-17	2	DS	10	
	Dark brown to light brown, sandy CLAY, trace brick (FILL)				D	6-5-6-7	3	DS	8	
-3.6	Brown, sandy CLAY, trace gravel (FILL)	11.0		10	D/I	5-5-4	4	DS	3	
-6.4	Gray, moist, stiff CLAY, little fill, trace vegitation	13.8			I	3-3-9	5	DS	7	
-9.6	Gray, wet, medium dense, gravelly SAND, trace clay	17.0		15	D	6-7-5	6	DS	17	
-14.1	Gray, moist, very soft to medium stiff CLAY, trace gravel and sand and vegitation	21.5		20	I I	WOH/12"-3 3-2-4	7 8	DS DS	18 18	
	Bottom of Boring at 21.5 Feet			25						
				30						
				35						
				40						

SAMPLER TYPE

JS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

SAMPLE CONDITIONS

D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

GROUNDWATER DEPTH

AT COMPLETION 6.2 FT.
AFTER 15 HRS. 5.8 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA – HOLLOW STEM AUGERS
CFA – CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-24
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 5.66 Ft.
Date Started 7/11/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/11/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Dark brown, moist CLAY, some gravel (FILL)				D	1-5-3-1	1	DS	5	1. Encountered water at 2.5 feet. 2. Encountered 5.0 inches of concrete.
1.7		4.0			I	1-1-1-1	2	DS	8	
	Greenish gray, moist, very soft CLAY			5	I	1-1-1-1	3	DS	12	
-3.8		9.5			I	WOH/12"-1-2	4	DS	12	
	Bottom of Boring at 9.5 Feet			10						
				15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 3.0 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 2.3 FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-25
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Hammer Wt. 140 Lbs.
Hole Diameter 8.0 In.
Foreman W. Massey
Surf. Elev. 6.48 Ft.
Hammer Drop 30 In.
Rock Core Dia. N/A
Inspector N. Richardson
Date Started 7/3/97
Spoon Size 3.0 In.
Boring Method HSA
Date Completed 7/3/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	HUMUS									1. Encountered water at 3.0 feet.
	Brown, clayey SAND, some gravel (FILL)				D	3-4-6-4	1	DS	10	
					D	1-3-51/2"	2	DS	14	
	Brown to gray, clayey GRAVEL trace brick (FILL)			5						
-1.0		7.5			D	11-8-5-5	3	DS	7	
	Grayish brown, moist, very soft CLAY, thin vegitation layer at 8.0 feet				I	1-1-1-2	4	DS	24	
				10	I	1-1-1	5	DS	18	
-8.5		15.0		15	I	1-1-2	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 5.0 FT.
AFTER 6 HRS. 4.1 FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works – BTCS
Boring # SB-26

Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009

Location Southeast, Washington, D.C.

SAMPLER

Datum

Surf. Elev. 4.91 Ft.

Date Started 7/1/97

Hammer Wt. 140 Lbs.

Hammer Drop 30 In.

Spoon Size 3.0 In.

Hole Diameter 8.0 In.

Rock Core Dia. N/A

Boring Method HSA

Foreman W. Hunter

Inspector N. Richardson

Date Completed 7/1/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, moist, sandy GRAVEL, some clay, trace brick (FILL)				I	1-3-3-6	1	DS	14	1. Encountered water at 5.0 feet.
-1.1	Gray to brown, moist, CLAY, trace tile (FILL)	6.0		5	I	2-3-3-12	2	DS	19	
-3.1	Tan to grayish brown, moist, soft, sandy CLAY, little gravel	8.0			I	3-3-2-3	3	DS	18	
	Gray to brown to greenish gray, moist, very soft to soft CLAY			10	I	1-1-2	4	DS	18	
					I	1-1-3	5	DS	18	
-10.1		15.0		15	I	WOH/12"-1	6	DS	18	
	Bottom of Boring at 15.0 Feet			20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

GROUNDWATER DEPTH
AT COMPLETION 13.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD
HSA – HOLLOW STEM AUGERS
CFA – CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works – BTCS   Boring # SB-27
Project Name Anacostia Station Regional Parking Lot and Access Road   Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Hunter
Surf. Elev. 10.13 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 7/2/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/2/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown, some gray, sandy **CLAY**, trace gravel **(FILL)**		×		D	3-5-6-4	1	DS	6	1. Encountered water at 10.0 feet.
			×	5	I	6-5-8-11	2	DS	18	2. Hydrocarbon odor during drilling at 8.0 feet.
	Brown to red, sandy **CLAY** **(FILL)**		×		D/I	4-5-6-8	3	DS	16	3. Encountered concrete at 8.0 feet.
	Brown to black, gravelly **CLAY** **(FILL)**		×	10	D/I	4-5-18	4	DS	7	
−3.4	Dark gray, clayey **GRAVEL** trace brick **(FILL)**	13.5	×		D/I	3-3-3	5	DS	8	
	Gray to brownish gray, moist, very soft **CLAY**; trace fine to coarse sand		▤	15	I	2-1-2	6	DS	18	
−9.9		20.0	▤	20	I	WOH/6"-1-2	7	DS	18	
	Bottom of Boring at 20.0 Feet			25						
				30						
				35						
				40						

SAMPLER TYPE

DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

SAMPLE CONDITIONS

D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

GROUNDWATER DEPTH

AT COMPLETION 15.0 FT.
AFTER 20 HRS. 5.3 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA – HOLLOW STEM AUGERS
CFA – CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-28
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.78 Ft.
Date Started 7/3/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/3/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Greenish brown to brown SILT, little gravel, (FILL)				D/I	2-1-2-3	1	DS	15	1. Encountered water at 8.5 feet.
	Light brown, clayey SAND, little concrete (FILL)			5	D	18-28-35-18	2	DS	20	
	Brown and gray CLAY, trace gravel (FILL)				I	8-5-6-10	3	DS	18	
	Brown, little white, gravelly CLAY (FILL)			10	D/I	2-2-2	4	DS	12	
					D	4-4-3	5	DS	13	
-5.7	Brown to gray CLAY (FILL)	14.5		15	D	2-2-2	6	DS	17	
	Greenish brown, moist, very soft CLAY									
-11.2		20.0		20	I	2-1-2	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 4.1 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS Boring # SB-29
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Hunter
Surf. Elev. 8.45 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 7/1/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/1/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown to gray, silty SAND, trace brick, asphalt (FILL)				D/I	3-9-8-8	1	DS	8	1. Encountered water at 4.5 feet.
	Brown GRAVEL, trace asphalt (FILL)			5	D/I	5-10-11-22	2	DS	13	2. Possible sheen on water.
	Brown GRAVEL, little clay (FILL)				D/I	22-24-16-13	3	DS	12	
	Brown to red GRAVEL, little clay, brick, asphalt (FILL)				D/I	18-19-15	4	DS	12	
	Brown, clayey GRAVEL (FILL)			10						
-3.5		12.0			I	7-4-5	5	DS	6	
	Brown, moist, very soft CLAY									
				15	I	WOH/6"-1-2	6	DS	18	
-11.6		20.0		20	I	WOH/12"-2	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 3.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS Boring # SB-30
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.03 Ft.
Date Started 7/1/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/1/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown to greenish, moist SILT, trace gravel (FILL)				D	1-7-13-13	1	DS	12	1. Encountered water at 9.0 feet.
	Gray to reddish brown, moist, fine SAND, some clay (FILL)			5	D	5-4-5-8	2	DS	15	
	Brown to black, moist, sandy CLAY, little gravel (FILL)				D/I	1-3-5-5	3	DS	13	
-.5	Brown, clayey SAND, some vegitation (FILL)	9.5		10	D/I	6-5-5	4	DS	4	
	Gray to brown, moist, very soft, sandy CLAY, trace gravel, black wood				D/I	1-2-1	5	DS	18	
-5.0	Greenish gray to brown, moist, loose, clayey, fine SAND, trace gravel	14.0		15	I	2-3-3	6	DS	18	
	Brownish gray, moist, very soft CLAY									
-11.0		20.0		20	I	WOH/12"-3	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 10.5 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-31
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum		Hammer Wt.	140 Lbs.	Hole Diameter	8.0 In.
Surf. Elev.	7.71 Ft.	Hammer Drop	30 In.	Rock Core Dia.	N/A
Date Started	7/1/97	Spoon Size	3.0 In.	Boring Method	HSA

Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/1/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown to black, sandy **SILT** (FILL)				I	2-3-4-5	1	DS	12	1. Encountered water at 8.0 feet.
	Black to red, moist, silty **SAND** (FILL), trace brick			5	D	7-11-13-12	2	DS	14	
1.7		8.0								
	Brown, moist, medium dense, sandy **GRAVEL**				I/D	4-6-14-15	3	DS	18	
				10	D	13-7-4	4	DS	10	
-3.3		11.0			D/I	4-4-2	5	DS	18	
	Brown, moist, loose, clayey, fine **SAND**, trace gravel									
	Brown, moist to wet, soft to very soft **CLAY**			15	I	1-2-3	6	DS	15	
-12.3		20.0		20		WOR/6"- WOH/6"-2	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE

- DS - DRIVEN SPLIT SPOON
- PT - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

SAMPLE CONDITIONS

- D - DISINTEGRATED
- I - INTACT
- U - UNDISTURBED
- L - LOST

GROUNDWATER DEPTH

AT COMPLETION 16.0 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-32
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.09 Ft.
Date Started 7/2/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/2/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Light brown, moist TOPSOIL (FILL)				I	1-5-7-6	1	DS	16	1. Encountered water at 8.0 feet.
	Brown, wet, sandy GRAVEL, some clay (FILL)				I	4-4-4-6	2	DS	16	
				5						
	Brown, clayey SAND, some gravel, trace brick (FILL)				I/D	40-42-15-15	3	DS	18	
-2.4	Yellowish brown, sandy GRAVEL, trace brick (FILL)	9.5			I/D	2-1-2	4	DS	12	
	Brown, moist, medium stiff CLAY			10		3-3-3	5	DS	13	
-7.9		15.0		15		1-2-4	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 15.0 FT.
AFTER 18 HRS. 3.1 FT.
AFTER 24 HRS. _____ FT.
CAVED AT _____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-33
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Massey
Surf. Elev. 4.18 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 7/3/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/3/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
1.7	Gray CINDER and SAND, little clay FILL	2.5			I	4-2-4-3	1	DS	20	1. Encountered water at 9.5 feet.
	Gray to greenish gray, moist, very soft CLAY, trace wood, some silt, little fine sand			5	I	WOH/18"-1	2	DS	24	
					I	1-1-1-2	3	DS	24	
					I	WOH/18"	4	DS	18	
				10	I	WOH/18"	5	DS	18	
				15	I	WOH/18"	6	DS	18	
-14.3		18.5								
	Greenish gray to dark brown, moist PEAT, little clay			20	D	WOH/6"-1-2	7	DS	18	
					D	1-2-2	8	DS	18	
-19.8		24.0								
-20.8	Greenish gray, some dark brown, moist, very soft CLAY, little peat	25.0		25		WOH/12"-2	9	DS	18	
	Bottom of Boring at 25.0 Feet									
				30						
				35						
				40						

SAMPLER TYPE

- DS - DRIVEN SPLIT SPOON
- PT - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

SAMPLE CONDITIONS

- D - DISINTEGRATED
- I - INTACT
- U - UNDISTURBED
- L - LOST

GROUNDWATER DEPTH

AT COMPLETION 19.8 FT.
AFTER 2 HRS. 3.45 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-34
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Hammer Wt. 140 Lbs.
Hole Diameter 8.0 In.
Foreman W. Massey
Surf. Elev. 6.95 Ft.
Hammer Drop 30 In.
Rock Core Dia. N/A
Inspector N. Richardson
Date Started 7/3/97
Spoon Size 3.0 In.
Boring Method HSA
Date Completed 7/3/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Black SAND and ASPHALT (FILL)				D	10-4-4-4	1	DS	2	1. Encountered water at 8.0 feet. 2. Boring filled with bentonite upon completion.
3.0		4.0		5	I	WOH/18"-2	2	DS	24	
	Grayish brown, moist, very soft CLAY, trace gravel and vegitation				I	WOH/6"-2-1-2	3	DS	24	
-1.0		8.0			D	18-19-20	4	DS	18	
	Gray to tan to yellowish orange, wet, dense to medium dense, sandy GRAVEL, trace clay			10	D	15-15-18	5	DS	18	
				15	D	11-12-6	6	DS	12	
-12.1		19.0								
	Gray to red, moist to wet, stiff to medium stiff, mottled CLAY, some sandy gravel, trace sand			20	D/I	4-5-9	7	DS	18	
-14.5		21.5				3-4-6	8	DS	18	
	Bottom of Boring at 21.5 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 6.0 FT.
AFTER 5 HRS. 3.3 FT.
AFTER 24 HRS ____ FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

TLB THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-35
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.16 Ft.
Date Started 7/3/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/3/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
3.7	Black, sandy **GRAVEL**, some asphalt, brick (FILL)	3.5	×		D	7-6-10-5	1	DS	7	1. Encountered water at 8.0 feet. 2. Boring filled with bentonite upon completion.
-1.3	Greenish gray to tan, moist to wet, very soft to very stiff **CLAY**, little fill, thin vegitation layer at 6.5 feet	8.5	☰	5	I	2-2-2-3	2	DS	15	
					I	WOH/12"-2-	3	DS	12	
					I/D	5-16-7	4	DS	10	
-8.3	Dark gray to light gray to red, moist to wet, medium dense, sandy, clayey **GRAVEL**	15.5	○	10	D/I	11-9-8	5	DS	12	
				15	D/I	5-6-7	6	DS	13	
-14.3	Reddish brown, some gray, moist to wet, very stiff to hard, gravelly, mottled **CLAY**	21.5	☰	20	D/I	9-12-16	7	DS	16	
						14-19-25	8	DS	12	
	Bottom of Boring at 21.5 Feet			25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 6.5 FT.
AFTER 2.5 HRS. 4.27 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-36
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 10.05 Ft.
Date Started 7/7/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/7/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown, fine, sandy SILT, trace brick FILL				D	7-11-14-12	1	DS	15	1. Encountered water at 4.0 feet.
	Brown, sandy GRAVEL, trace asphalt, little brick (FILL)				D	6-4-51/4"	2	DS	7	2. Yellow clay between 6.5 and 8.0 feet.
				5						
	Yellow, red, and brown, clayey GRAVEL (FILL)				D	10-9-13-12	3	DS	15	
	Brown, sandy CLAY, some gravel (FILL)				D	7-11-10	4	DS	13	
				10						
-2.5	Brown to black, sandy GRAVEL, some clay (FILL)	12.5			D	1-2-2	5	DS	12	
	Gray, moist to wet, very soft to soft CLAY			15	I	2-1-1	6	DS	18	
-9.9		20.0		20	I	1-2-2	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 4.3 FT.
AFTER 19 HRS. 3.7 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-36A
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 8.0 In.	Foreman W. Massey
Surf. Elev. 11.75 Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 7/7/97	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 7/7/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, sandy GRAVEL, trace brick (FILL)				D	6-9-9-7	1	DS	7	1. Encountered water at 2.5 feet.
					D	4-3-4-10	2	DS	8	2. Auger refusal at about 13.0 feet.
				5	D	4-10-10-8	3	DS	8	3. Steel cable found in hole.
					D	4-5-7	4	DS	2	4. Oil sheen on water after removal of augers.
				10	D	7-3-5	5	DS	5	
-1.2		13.0								
	Bottom of Boring at 13.0 Feet									
				15						
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 6.8 FT.
AFTER 17 HRS. 4.2 FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-37
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.24 Ft.
Date Started 7/2/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/2/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, sandy **GRAVEL**, some humus (FILL)		☒		D	8-5-12-25	1	DS	15	1. Encountered water at 4.0 feet.
	Brown, some gray, clayey **SAND** (FILL)		☒		D	26-45-30-3	2	DS	16	
	Brown **GRAVEL** (FILL)		☒	5	D	12-51/3"	3	DS	3	
-.8	Brown, sandy **GRAVEL** (FILL)	9.0	☒		D	11-18-21	4	DS	7	
	Dark greenish gray to brown, moist to wet, soft to very soft **CLAY**, little fine sand		▤	10		1-1-3	5	DS	13	
-6.8		15.0	▤	15		1-1-2	6	DS	18	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE	SAMPLE CONDITIONS	GROUNDWATER DEPTH	BORING METHOD
DS - DRIVEN SPLIT SPOON	D - DISINTEGRATED	AT COMPLETION 3.5 FT.	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER ____ HRS. ____ FT.	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER 24 HRS. ____ FT.	DC - DRIVING CASING
RC - ROCK CORE	L - LOST	CAVED AT ____ FT.	MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-38 / (MW-11)
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.20 Ft.
Date Started 7/8/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 6/30/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown to black SILT, some sandy gravel and clay, trace brick (FILL)			5	D	2-10-10-35	1	DS	3	1. Encountered water at 11.0 feet. 2. Installed a 17.0-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 10.0-ft casing -Sand from 17.5 to 6.0 ft. -Bentonite chips from 6.0 to 3.0 ft. -Grout from 3.0 to 0.0 ft. -Installed stick-up manhole cover.
					D	37-24-15	2	DS	13	
	Brown, sandy GRAVEL some clay (FILL)			10	D/I	5-6-6	3	DS	12	
-5.8		15.0		15	D	3-5-4	4	DS	8	
	Dark gray, wet to moist, soft to medium stiff CLAY				I	3-3-2-4	5	DS	7	
-10.8		20.0		20	I	1-2-2	6	DS	17	
	Bottom of Boring at 20.0 Feet			25 30 35 40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 7.5 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 5.5 FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-39
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.65 Ft.
Date Started 6/27/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/27/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown, moist to wet, medium dense, fine to medium **SAND**, some clay, trace brick **(FILL)**				D	6-3-3	1	DS	5	1. Encountered water between 5.5 and 6.0 feet.
					D	9-10-7	2	DS	3	2. No hydrocarbon odor.
				5	D	40-51/4"	3	DS	7	3. Possible thin gravel layer between 33.0 and 34.0 feet.
					D	5-18-8	4	DS	8	4. Possible gravel layer between 38.0 and 39.0 feet.
				10	D	11-18-13	5	DS	11	
-2.3		12.0								
	Grayish brown, moist, very soft to medium stiff **CLAY**, trace vegitation			15	I	WOH/12"-2	6	DS	17	
				20	I	2-2-3	7	DS	18	
				25	I	WOH/6"-2-2	8	DS	18	
				30	I	2-2-4	9	DS	18	
				35	I	WOH/6"-2-3	10	DS	18	
-30.3		40.0		40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 0.58 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS Boring # SB-39
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.65 Ft.
Date Started 6/27/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/27/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
-30.3		40.0								
	Greenish gray, moist, soft **CLAY**, trace white fossil				I	WOR/6"- WOH/6"-3	11	DS	18	
-35.8		45.5		45						
	Dark brown to light brown, moist, medium dense, fine **SAND**, some clay, little gravel				I/D	4-5-8	12	DS	18	
	Light gray, moist, dense, sandy **GRAVEL**			50	D	15-18-31	13	DS	18	
	Light gray to tan, wet, very dense, fine, sandy **GRAVEL**, trace clay			55	D	15-30-45	14	DS	14	
-49.3		59.0								
-50.3	Gray, some brown, moist, hard **CLAY**, little gravel	60.0		60	I	9-16-21	15	DS	18	
	Bottom of Boring at 60.0 Feet									
				65						
				70						
				75						
				80						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 0.58 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-40
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.04 Ft.
Date Started 7/7/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 2.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/7/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Red, clayey material (FILL), little sand				D	5-6-7-4	1	DS	10	1. Encountered water at 5.0 feet.
	Brown to red, sandy SILT, some brick (FILL)			5	D/I	8-8-8-6	2	DS	11	2. Red clayey layer between 8.5 and 10.5 feet.
	Brown, sandy CLAY, little gravel (FILL)				I/D	7-9-8-5	3	DS	13	
	Yellow to red CLAY, little sand (FILL)				I/D	3-4-4	4	DS	5	
	Red to gray CLAY, some sand, trace pebbles (FILL)			10	I/D	2-3-3	5	DS	18	
-5.0		14.0								
	Greenish gray, moist, soft to very soft CLAY			15	I/D	3-2-3	6	DS	18	
-11.0		20.0		20	I	1-1-1	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION ______ FT.
AFTER 1.5 HRS. 6.3 FT.
AFTER 24 HRS. 4.4 FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-41
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.26 Ft.
Date Started 7/7/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector N. Richardson
Date Completed 7/7/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown, sandy **GRAVEL**, little clay, brick (**FILL**)				D	1-5-19-22	1	DS	18	1. Encountered water at 4.5 feet.
	Dark gray, clayey **GRAVEL** (**FILL**)				D	7-13-17-36	2	DS	20	2. Gravel at 6.0 feet at 10.0 feet.
				5						
	Dark gray **GRAVEL**, brick (**FILL**)									
	Brown, clayey **GRAVEL**, asphalt, cinder (**FILL**)				D	36-20-17-10	3	DS	13	
					D	15-17-13	4	DS	9	
-1.7	Brown and yellow, sandy **GRAVEL** (**FILL**)	11.0		10						
	Greenish gray, moist, very soft to soft **CLAY**, trace fine sand				D/I	15-4-4	5	DS	11	
				15	I	1-1-2	6	DS	18	
-10.7		20.0		20	I	2-1-3	7	DS	14	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE
S - DRIVEN SPLIT SPOON
T - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 4.75 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 4.4 FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-42
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.33 Ft.
Date Started 7/1/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/1/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown, silty **SAND** with brick, gravel **(FILL)**				D	2-10-13-17	1	DS	10	1. Encountered water at 3.5 feet.
	Green to brown to black, moist to wet, clayey **SILT**, some gravel, brick, glass **(FILL)**			5	D	24-28-22-34	2	DS	18	
					D/I	3-8-8-51/4"	3	DS	16	
				10	D/I	6-4-10	4	DS	11	
-4.2		12.5			I/D	2-4-5	5	DS	17	
	Brown, moist, very soft **CLAY**, trace black wood			15	I	1-2-1	6	DS	18	
-11.7		20.0		20	I	WOH/6"-1-2	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 3.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-43
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.22 Ft.
Date Started 7/8/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/8/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, gravelly **CLAY**, little cinder **(FILL)**				D	6-12-8-7	1	DS	16	1. Encountered water at 9.0 feet.
					D	12-8-6-10	2	DS	18	
	Greenish brown, gravelly **CLAY** **(FILL)**			5	D	1-2-4-15	3	DS	8	
					I/D	3-8-15	4	DS	15	
-3.3	Brown, sandy **GRAVEL**, little clay **(FILL)**	11.5		10	D	11-8-6	5	DS	10	
	Gray, moist to wet, medium dense, gravelly **SAND**, trace fill									
-6.8	Brown, wet, medium dense **GRAVEL** Brown to yellowish orange, wet, very loose **SAND**, little gravel	15.0		15	D	2-1-3	6	DS	15	
	Bottom of Boring at 15.0 Feet									
				20						
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 8.5 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 7.5 FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-44
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.02 Ft.
Date Started 7/9/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/8/97

ELEV.	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
5.5	Brown, humus CLAY (FILL)	1.5								
	Grayish brown, moist, medium stiff CLAY, some fine sand				D/I	WOH/6"-2-1-3	1	DS	15	
				5	I	3-3-3-3	2	DS	18	
					I	2-2-4-5	3	DS	18	
	Greenish brown to brown to greenish gray, moist to wet, very soft to stiff CLAY, trace to little sand				I/D	1-2-2	4	DS	18	
				10	I	WOH/12"-1	5	DS	18	
-7.5		14.5		15	I	2-6-5	6	DS	15	
	Yellowish orange to tan, wet, medium dense SAND, little gravel									
-13.0		20.0		20		5-5-3	7	DS	16	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 8.5 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 5.4 FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # SB-45
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.08 Ft.
Date Started 7/2/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 7/2/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Greenish brown SILT, little gravel (FILL)				I	2-12-9-8	1	DS	15	1. Encountered water at 7.5 feet.
	Brown, clayey SAND (FILL)				I	3-4-7-8	2	DS	14	
	Brown CLAY, some sand and gravel (FILL)			5						
	Yellowish brown SAND and GRAVEL, some clay (FILL)					4-10-13-13	3	DS	9	
-.4		9.5				1-1-2	4	DS	18	
	Brown, moist, very soft to soft CLAY, trace roots, trace silt			10		3-1-1	5	DS	18	
				15		WOH/12"-2	6	DS	18	
-10.9		20.0		20		WOH/6"-2-2	7	DS	18	
	Bottom of Boring at 20.0 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 9.0 FT.
AFTER _____ HRS. _____ FT.
AFTER 24 HRS. _____ FT.
CAVED AT _____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

APPENDIX B - SECTION 2

Records of Soil Exploration
- Monitoring Wells -

TLB **THOMAS L. BROWN ASSOCIATES, P.C.**
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS Boring # MW-1
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.32 Ft.
Date Started 6/24/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/24/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Topsoil, brown, silty **CLAY** with gravel, little brick **(FILL)**				D	9-10-18	1	DS	8	1. Encountered water at 10.5 feet. 2. Installed a 38.5-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 31.5-ft casing -Sand from 38.5 to 28.0 ft. -Bentonite chips from 28.0 to 24.0 ft. -Grout from 24.0 to 0.0 ft. -Installed stick up manhole cover.
					D	9-15-25	2	DS	14	
3.3		6.0		5						
	Dark gray, moist, soft to very soft **CLAY**, trace gravel, trace wood				D/I	1-2-2	3	DS	7	
					D/I	2-2-2	4	DS	18	
				10						
	Gray, moist, very soft **CLAY**				I	2-1-2	5	DS	18	
				15						
	Dark brown, moist, medium stiff **CLAY**, trace mica				I	1-1-2	6	DS	18	
				20						
					I	2-3-4	7	DS	18	
-15.7		25.0		25						
	Dark gray to black, moist to wet, medium stiff **CLAY**, some vegitation, little gravel				I	3-4-4	8	DS	18	
-21.7		31.0		30						
	Dark gray to brown, moist, hard **CLAY**, some gravel				I/D	4-14-26	9	DS	18	
	Light tan, wet, medium dense, fine **SAND**			35						
					I	4-11-16	10	DS	18	
-29.2		38.5								
	Light gray, little brown, moist, hard **CLAY**			40						
-32.2		41.5				7-15-21	11	DS	18	
	Bottom of Boring at 41.5 Feet									
				45						

SAMPLER TYPE

S - DRIVEN SPLIT SPOON
T - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 14.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

Page 1 of

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works – BTCS Boring # MW-2
Project Name Anacostia Station Regional Parking Lot and Access Road Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum		Hammer Wt.	140 Lbs.	Hole Diameter	12.0 In.	Foreman	W. Hunter
Surf. Elev.	6.27 Ft.	Hammer Drop	30 In.	Rock Core Dia.	N/A	Inspector	N. Richardson
Date Started	6/24/97	Spoon Size	3.0 In.	Boring Method	HSA	Date Completed	6/26/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Grayish brown, **SILT**, little fine sand, trace brick, trace gravel **(FILL)**				D	1-3-3	1	DS	7	1. Encountered water at 6.0 feet.
					D	6-5-5	2	DS	10	2. Installed a 53.5-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 45.0-ft casing -Sand from 53.5 to 40.0 ft. -Bentonite chips from 40.0 to 38.0 ft. -Grout from 38.0 to 0.0 ft. -Installed stick-up manhole cover.
				5	D	2-5-14	3	DS	7	
					D	4-5-5	4	DS	18	
-2.2		8.5								
-4.7	Light brown, moist to wet, very loose, sandy **GRAVEL**	11.0		10						
	Grayish brown to dark brown, moist, very soft to soft **CLAY**				I	1-1-1	5	DS	18	
				15	I	1-1-1	6	DS	14	
				20	I	WOH/6"-1-3	7	DS	18	
				25	I	2-2-2	8	DS	18	
				30	I	WOH/6"-2-2	9	DS	18	
				35	I	WOH/12"-2	10	DS	18	
				40	I	WOH/12"-3	11	DS	18	
-38.7		43.0								
	Dark brown to light brown, moist, soft **CLAY**, some fine sand, trace coarse sand			45						

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

GROUNDWATER DEPTH
AT COMPLETION 5.2 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD
HSA – HOLLOW STEM AUGERS
CFA – CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-2
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.27 Ft.
Date Started 6/24/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/26/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
-39.7		48.0			I	2-2-3	12	DS	18	
	Light brown, wet, dense GRAVEL			50	D	17-22-28	13	DS	14	
-47.2		53.5								
	Gray, brown and red, moist, hard, mottled CLAY			55	I	20-30-41	14	DS	18	
-50.2		56.5								
	Bottom of Boring at 56.5 Feet									
				60						
				65						
				70						
				75						
				80						
				85						
				90						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 5.2 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-2A
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum		Hammer Wt.	140 Lbs.	Hole Diameter	12.0 In.	Foreman	W. Hunter
Surf. Elev.	6.59 Ft.	Hammer Drop	30 In.	Rock Core Dia.	N/A	Inspector	N. Richardson
Date Started	6/26/97	Spoon Size	3.0 In.	Boring Method	HSA	Date Completed	6/26/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
-1.4	Grayish brown SILT with trace sand, brick and gravel (FILL)	8.0		5						1. Augered without sampling to 12.5 feet. 2. Installed a 13.0-ft deep 2.0-inch diam. monitoring well: - Used 5.0-ft screen - Used 11.0-fr casing - Sand from 13.0 to 5.0 ft. - Bentonite chips from 5.0 to 3.0 ft. - Grout from 3.0 to 0.0 ft. - Installed Stick Up manhole cover.
-5.9	Brown, sandy GRAVEL	12.5		10						
	Bottom of Boring at 12.5 Feet			15 20 25 30 35 40 45						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION ______ FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

TLB THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-3
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.96 Ft.
Date Started 6/23/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/23/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Black to brown, moist to wet, very dense, silty **GRAVEL**, little clay, hydrocarbon staining at 5.0 feet (FILL)				D	2-2-2	1	DS	5	1. Encountered water at 6.0 feet.
					D	2-2-2	2	DS	9	2. Petroleum odor at 7.5 feet.
				5	D	51/3"	3	DS	3	3. Well installed in former UST pit.
0.0		9.0			D	22-18-15	4	DS	12	4. Installed a 19.0-ft deep 4.0-inch diam. monitoring well: -Used 15.0-ft screen -Used 10.0-ft casing -Sand from 19.0 to 3.0 ft. -Bentonite chips from 3.0 to 1.0 ft. -Grout from 1.0 to 0.0 ft. -Installed stick-up manhole cover.
	Gray to brown, moist, soft to very soft **CLAY**, little gravel			10	I	1-2-3	5	DS	9	
				15	I	1-2-2	6	DS	8	
-10.0		19.0			I	1-2-1	7	DS	14	
	Bottom of Boring at 19.0 Feet			20						
				25						
				30						
				35						
				40						
				45						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 6.2 FT.
AFTER 16 HRS. 2.9 FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-4
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 6.81 Ft.
Date Started 6/20/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/20/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	ASPHALT, BRICK **(FILL)**				D	1-3-11	1	DS	13	1. Encountered water at 6.5 feet.
2.8		4.0			I	2-2-1	2	DS	12	2. Installed a 16.0-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 9.0-ft casing -Sand from 18.0 to 5.0 ft. -Bentonite chips from 5.0 to 2.0 ft. -Grout from 2.0 to 0.0 ft. -Installed stick-up manhole cover.
	Brown, moist, very soft, mottled **CLAY**			5	I	WOH/1"-1-1	3	DS	18	
	Brown to dark gray, moist, very soft **CLAY**, trace organics				I	WOH/6"-2-2	4	DS	18	
-4.2	Dark gray to dark brown, wet, soft **CLAY**, trace gravel, organic layer at 8.0 feet	11.0		10	I	2-5-6	5	DS	17	
	Gray to dark tan, wet, stiff **CLAY**, some fine sand, wood pieces									
-8.7		15.5		15						
-9.7	Gray to reddish brown, moist, stiff, mottled **CLAY**	18.5			D/I	5-5-10	6	DS	18	
	Bottom of Boring at 16.5 Feet									
				20						
				25						
				30						
				35						
				40						
				45						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 5.0 FT.
AFTER 72 HRS. 4.5 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-5
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum		Hammer Wt.	140 Lbs.	Hole Diameter	12.0 In.	Foreman	W. Hunter
Surf. Elev.	8.79 Ft.	Hammer Drop	30 In.	Rock Core Dia.	N/A	Inspector	N. Richardson
Date Started	6/20/97	Spoon Size	3.0 In.	Boring Method	HSA	Date Completed	6/20/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SAMPLE Cond	Blows/6"	No.	Type	Rec
	Black, brown, gray, moist, **SILT** (FILL)		I	1-2-6	1	DS	9
4.8		4.0	I	51/4"	2	DS	3
2.3	Gray to orange, moist to wet, stiff, some mottled, fine, sandy **SILT**, some clay, trace gravel	6.5	I	4-4-8	3	DS	18
-.7	Gray, wet, loose, fine **SAND**, little gravel	9.5	D	3-1-7	4	DS	9
-4.2	Gray to light brown, wet, soft, silty **CLAY**, little gravel	13.0	I	4-3-2	5	DS	18
	Bottom of Boring at 13.0 Feet						

BORING & SAMPLING NOTES

1. Encountered water at 0.5 feet.
2. Installed a 13.0-ft deep 2.0-inch diam. monitoring well:
   - -Used 5.0-ft screen
   - -Used 10.0-ft casing
   - -Sand from 13.0 to 7.0 ft.
   - -Bentonite chips from 7.0 to 4.0 ft.
   - -Grout from 4.0 to 1.0 ft.
   - -Installed stick-up manhole cover.
3. Upon completion of well, surface (city) water continues to flow.

DEPTH SCALE: 5 10 15 20 25 30 35 40 45

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 2.5 FT.
AFTER 72 HRS. 3.5 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

TLB **THOMAS L. BROWN ASSOCIATES, P.C.**
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-6
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Hammer Wt. 140 Lbs.
Hole Diameter 12.0 In.
Foreman W. Hunter
Surf. Elev. 7.03 Ft.
Hammer Drop 30 In.
Rock Core Dia. N/A
Inspector N. Richardson
Date Started 6/20/97
Spoon Size 3.0 In.
Boring Method HSA
Date Completed 6/20/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, moist, silty, fine SAND, trace gravel, brick (FILL)				I	2-3-5	1	DS	10	1. Encountered water at 6.0 feet.
					D	12-8-9	2	DS	16	2. Installed a 16.0-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 10.0-ft casing -Sand from 16.0 to 5.0 ft. -Bentonite chips from 5.0 to 3.0 ft. -Grout from 3.0 to 1.0 ft. -Installed stick-up manhole cover.
				5						
1.0		6.0			I	2-7-4	3	DS	17	
-.5	Gray, moist to wet, stiff, gravelly CLAY	7.5								
	Dark gray to tan, moist, very soft to medium stiff CLAY, trace plant fragments near bottom				I	1-1-1	4	DS	18	
				10						
					I	3-3-3	5	DS	18	
				15						
-8.5		15.5								
-9.5	Dark gray to tan, moist, soft CLAY	16.5			I	1-2-3	6	DS	18	
	Bottom of Boring at 16.5 Feet									
				20						
				25						
				30						
				35						
				40						
				45						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 5.0 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 4.5 FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works – BTCS
Boring # MW-7
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.50 Ft.
Date Started 6/23/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/23/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Clay, concrete, brick, asphalt, plastic (FILL)				D	1-5-4	1	DS	12	1. Encountered water at 9.5 feet. 2. Installed a 35.0-ft deep 4.0-inch diam. monitoring well: -Used 30.0-ft screen -Used 10.0-ft casing -Sand from 35.0 to 4.0 ft. -Bentonite chips from 4.0 to 2.0 ft. -Grout from 2.0 to 1.0 ft. -Installed stick-up manhole cover.
4.5		5.0		5	D	8-7-10	2	DS	13	
	Brown, moist, very loose to loose, fine SAND, little silt and clay, trace coarse sand				I	2-2-2	3	DS	18	
-1.0		10.5		10	I	3-4-5	4	DS	14	
	Light brown, wet, very dense to loose, sandy GRAVEL and gravelly SAND				I	8-21-24	5	DS	9	
				15	D	22-51/4"	6	DS	18	
				20	D	22-51/6"	7	DS	18	
				25	D	2-1-7	8	DS	18	
-25.5		35.0		30	D	19-17-29	9	DS	18	
	Gray and brown, moist, hard to very stiff, mottled CLAY			35	I	8-20-29	10	DS	17	
-30.5		40.0		40	I	WOH/6"-8-18	11	DS	12	
	Bottom of Boring at 40.0 Feet			45						

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

GROUNDWATER DEPTH
AT COMPLETION 12.0 FT.
AFTER 18 HRS. 8.9 FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD
HSA – HOLLOW STEM AUGERS
CFA – CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

TLB **THOMAS L. BROWN ASSOCIATES, P.C.**
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works – BTCS
Boring # MW-8
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 10.23 Ft.
Date Started 6/19/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/19/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Gray, brown, moist, very stiff to stiff, mottled **SILT**, some clay, brick **(FILL)**				D	1-4-6	1	DS	9	1. Encountered water at 7.0 feet.
				5	D/I	6-7-11	2	DS	15	2. First time no sample second collection after lunch, water at 13.0 ft * Possibility of two aquifers. * Decided to evaluate lower aquifer.
3.2		7.0			D	4-1-3	3	DS	9	
	Brown to red, moist to wet, very loose to loose, sandy, clayey **GRAVEL**, some red clay				D	WOH/12"-1	4	DS	3	
-.8		11.0		10	I/D	4-2-5	5	DS	17	3. Installed a 22.0-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 15.0-ft casing -Sand from 22.0 to 11.0 ft. -Bentonite chips from 11.0 to 9.0 ft. -Grout from 9.0 to 0.0 ft. -Installed stick-up manhole cover.
	Dark greenish gray, moist, soft **CLAY**, some to trace silt			15	I	2-2-2	6	DS	18	
-11.3		21.5		20	I	WOH/6"-2-2	7	DS	18	
	Bottom of Boring at 21.5 Feet									
				25						
				30						
				35						
				40						
				45						

SAMPLER TYPE

DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

SAMPLE CONDITIONS

D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

GROUNDWATER DEPTH

AT COMPLETION 11.0 FT.
AFTER 16 HRS. 7.0 FT.
AFTER 24 HRS. ____ FT.
CAVED AT 5.0 FT.

BORING METHOD

HSA – HOLLOW STEM AUGERS
CFA – CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

TLB THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-9
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.82 Ft.
Date Started 6/19/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/19/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
	Brown, moist red brick, glass (FILL)				I	2-3-5	1	DS	12	1. Encountered water at 2.5 feet.
					D	24-24-23	2	DS	16	2. Encountered obstruction at 4.5 feet and continued boring in a 4-foot offset location.
				5	D	34-32-39	3	DS	9	
-.2		8.0								
	Red, moist, medium stiff CLAY, little to some gravel, some black gravel			10	I	4-2-4	4	DS	13	3. Installed a 17.0-ft deep 4.0-inch diam. monitoring well: -Used 15.0-ft screen -Used 5.0-ft casing -Sand from 17.0 to 2.0 ft. -Bentonite chips from 2.0 to 1.0 ft. -Grout from 1.0 to 0.0 ft.
					I	15-4-4	5	DS	12	
-6.2		14.0								
	Gray, moist, very soft SILT			15	I	WOH/6"-1-2	6	DS	18	
-9.2		17.0								
	Bottom of Boring at 17.0 Feet			20						4. Installed stick-up manhole cover.
				25						
				30						
				35						
				40						
				45						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 2.5 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 2.0 FT.
CAVED AT ____ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-10/SB-39
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.30 Ft.
Date Started 6/27/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/27/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, moist to wet, fine to medium **SAND**, some clay, brick (FILL)				D	6-3-3	1	DS	5	1. Encountered water between 5.5 and 6.0 feet. 2. No hydrocarbon odor. 3. Possible thin gravel layer between 33.0 and 34.0 feet. 4. Possible gravel layer between 38.0 and 39.0 feet. 5. Installed a 58.5-ft deep 4.0-inch diam. monitoring well: -Used 15.0-ft screen -Used 47.0-ft casing -Sand from 58.5 to 40.0 ft. -Bentonite chips from 40.0 to 37.0 ft. -Grout from 37.0 to 0.0 ft. -Installed stick-up manhole cover.
					D	9-10-7	2	DS	3	
				5	D	40-51/4"	3	DS	7	
					D	5-18-8	4	DS	8	
				10	D	11-18-13	5	DS	11	
-3.7		12.0								
	Grayish brown, moist, very soft to medium stiff **CLAY**, trace vegitation			15	I	WOH/12"-2	6	DS	17	
				20	I	2-2-3	7	DS	18	
				25	I	WOH/6"-2-2	8	DS	18	
				30	I	2-2-4	9	DS	18	
				35	I	WOH/6"-2-3	10	DS	18	
-31.7		40.0		40						
	Greenish gray, moist, soft **CLAY**, trace white fossil				I	WOR/6"-WOH/6"-3	11	DS	18	
				45						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION ______ FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-10/SB-39
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

SAMPLER

Datum		Hammer Wt.	140 Lbs.	Hole Diameter	12.0 In.	Foreman	W. Hunter
Surf. Elev.	8.30 Ft.	Hammer Drop	30 In.	Rock Core Dia.	N/A	Inspector	N. Richardson
Date Started	6/27/97	Spoon Size	3.0 In.	Boring Method	HSA	Date Completed	6/27/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec	BORING & SAMPLING NOTES
-37.2		45.5								
	Dark brown to light brown, moist, medium dense, fine **SAND**, some clay, little gravel				I/D	4-5-8	12	DS	18	
	Light gray, wet, dense, sandy **GRAVEL**			50	D	15-18-31	13	DS	18	
	Light gray to tan, wet, very dense, fine, sandy **GRAVEL**, trace clay			55	D	15-30-45	14	DS	14	
-50.7		59.0								
-51.7	Gray, some brown, moist, hard **CLAY**, little gravel	60.0		60	I	9-16-21	15	DS	18	
	Bottom of Boring at 60.0 Feet									
				65						
				70						
				75						
				80						
				85						
				90						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION ______ FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

APPENDIX B - SECTION 3

Well Installation Reports

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With District of Columbia Department of Public Works - BTCS
Boring # MW-10A
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 9.65 Ft.
Date Started 6/30/97
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/30/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Brown, moist to wet, medium dense, fine to medium **SAND**, some clay, trace brick **(FILL)**				D	16-6-9	3	DS	11	1. Encountered water at 5.5 feet. 2. Possible concrete at 5.5 feet. 3. Installed a 14.0-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 7.0-ft casing -Sand from 14.5 to 3.0 ft. -Bentonite chips from 3.0 to 1.0 ft. -Grout from 1.0 to 0.0 ft. -Installed stick-up manhole cover.
					D	4-7-7	4	DS	16	
				5	D	5-18-51/3"	5	DS	8	
					D/I	5-1-2	6	DS	12	
				10						
-2.3		12.0			I	2-1-2	7	DS	18	
-4.3	Grayish brown, moist, very soft to medium stiff **CLAY**, trace vegitation	14.0			I	5-5-3	8	DS	18	
	Bottom of Boring at 14.0 Feet			15						
				20						
				25						
				30						
				35						
				40						
				45						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 3.58 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.
CAVED AT ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30";COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

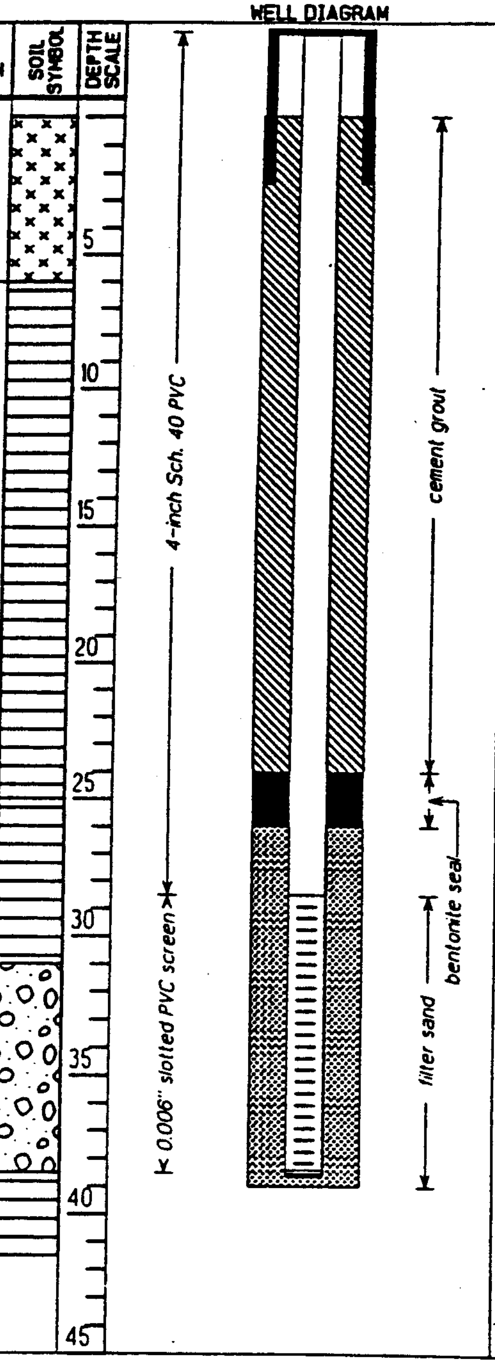
WELL INSTALLATION REPORT

Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-1
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 9.32 Ft.
Date Started 6/24/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/24/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
3.3	Topsoil, brown, silty **CLAY** with gravel, little brick **(FILL)**	6.0
−15.7	Dark gray, moist, soft to very soft **CLAY**, trace gravel, trace wood Gray, moist, very soft **CLAY** Dark brown, moist, medium stiff **CLAY**, trace mica	25.0
−21.7	Dark gray to black, moist to wet, medium stiff **CLAY**, some vegitation, little gravel	31.0
−29.2	Dark gray to brown, moist, hard **CLAY**, some gravel Light tan, wet, medium dense, fine **SAND**	38.5
−32.2	Light gray, little brown, moist, hard **CLAY**	41.5
	Bottom of Boring at 41.5 Feet	



COMMENTS

1. Water encountered at 10.5 feet.
2. Driller report gravelly layer between 23.0 to 25.0 feet.

WELL DETAILS

WELL TIP DEPTH 38.5 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 31.5 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 26.0 TO 39.0 FT.
BENTONITE SEAL:
FROM 24.0 TO 26.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 14.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

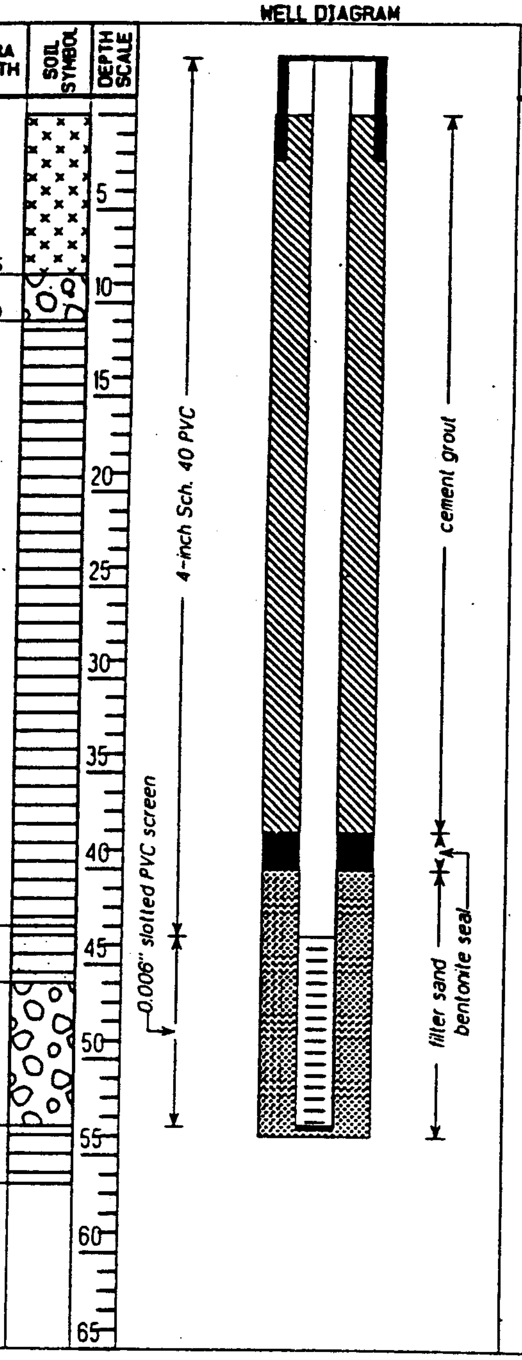
WELL INSTALLATION REPORT

Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-2
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 6.27 Ft.
Date Started 6/24/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/26/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
-2.2	Grayish brown, SILT, little fine sand, trace brick, trace gravel (FILL)	8.5
-4.7	Light brown, moist to wet, very loose, sandy GRAVEL	11.0
-36.7	Grayish brown to dark brown, moist, very soft to soft CLAY	43.0
-39.7	Dark brown to light brown, moist, soft CLAY, some fine sand, trace coarse sand	46.0
-47.2	Light brown, wet, dense GRAVEL	53.5
-50.2	Gray, brown and red, moist, hard, mottled CLAY	56.5
	Bottom of Boring at 56.5 Feet	



COMMENTS

1. Encountered water at 6.0 feet.

WELL DETAILS

WELL TIP DEPTH 53.5 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 46.5 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 40.0 TO 54.0 FT.
BENTONITE SEAL:
FROM 38.0 TO 40.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 5.2 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

WELL INSTALLATION REPORT

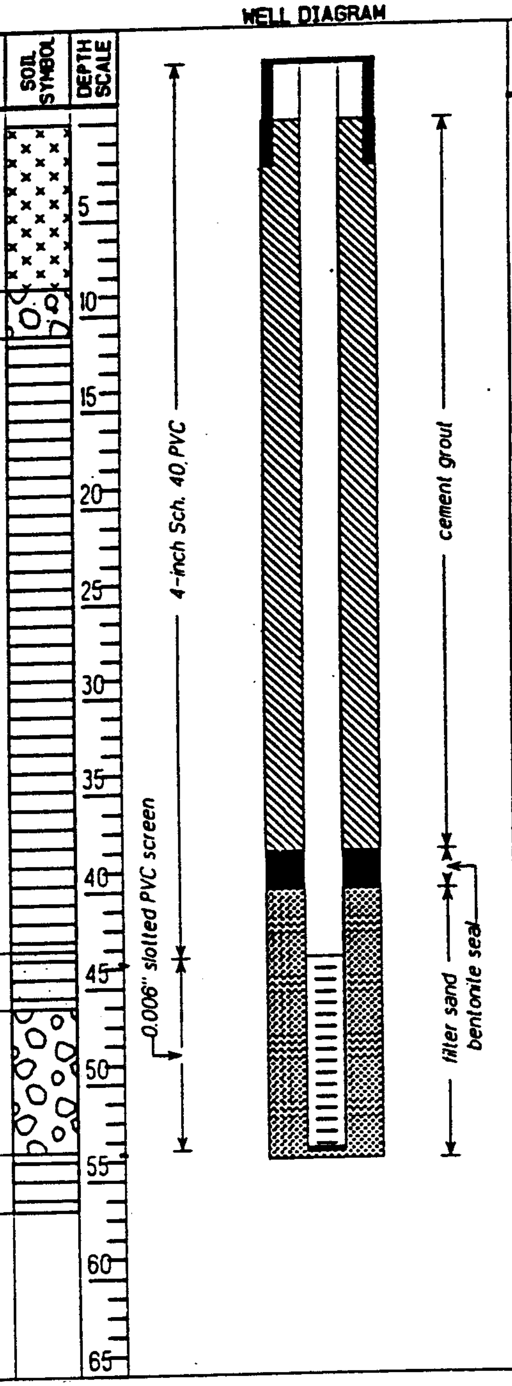
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-2
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 6.27 Ft.
Date Started 6/24/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/26/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
-2.2	Grayish brown, SILT, little fine sand, trace brick, trace gravel (FILL)	8.5
-4.7	Light brown, moist to wet, very loose, sandy GRAVEL	11.0
-36.7	Grayish brown to dark brown, moist, very soft to soft CLAY	43.0
-39.7	Dark brown to light brown, moist, soft CLAY, some fine sand, trace coarse sand	46.0
-47.2	Light brown, wet, dense GRAVEL	53.5
-50.2	Gray, brown and red, moist, hard, mottled CLAY	56.5
	Bottom of Boring at 56.5 Feet	

WELL DIAGRAM



COMMENTS

1. Encountered water at 6.0 feet.

WELL DETAILS

WELL TIP DEPTH 53.5 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 46.5 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 40.0 TO 54.0 FT.
BENTONITE SEAL:
FROM 38.0 TO 40.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 5.2 FT.
AFTER ___ HRS. ___ FT.
AFTER 24 HRS. ___ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

WELL INSTALLATION REPORT

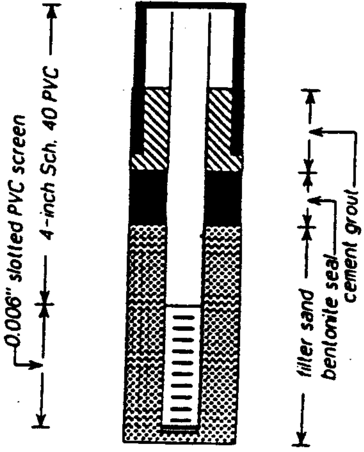
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-2A
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum		Well Diameter	4.0 In.	Hole Diameter	12.0 In.	Foreman	W. Hunter
Surf. Elev.	6.59 Ft.	Boring Method	HSA	Rock Core Dia.	N/A	Inspector	N. Richardson
Date Started	6/26/97	Mud Type	N/A	Casing Diameter	N/A In.	Date Completed	6/26/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
-1.4	Grayish brown SILT with trace sand, brick and gravel (FILL)	8.0		5
-5.9	Brown, sandy GRAVEL	12.5		10
	Bottom of Boring at 12.5 Feet			15 20 25 30 35 40 45

WELL DIAGRAM



COMMENTS

WELL DETAILS

WELL TIP DEPTH 12.5 FT.
DEPTH TO TOP OF RISER -3.0 FT
SCREEN LENGTH 5.0 FT.
RISER LENGTH 11.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 5.0 TO 13.0 FT.
BENTONITE SEAL:
FROM 3.0 TO 5.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION ______ FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-3
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

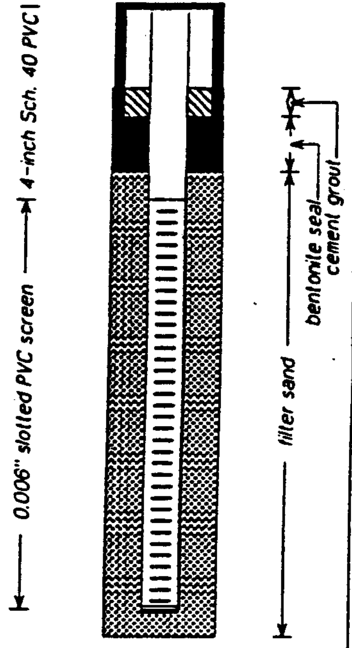
BOREHOLE

Datum
Surf. Elev. 8.96 Ft.
Date Started 6/23/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/23/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL
0.0	Black to brown, moist to wet, very dense, silty **GRAVEL**, little clay, hydrocarbon staining at 5.0 feet (FILL)	9.0	× × ×
-10.0	Gray to brown, moist, soft to very soft **CLAY**, little gravel	19.0	☰
	Bottom of Boring at 19.0 Feet		

DEPTH SCALE: 5, 10, 15, 20, 25, 30, 35, 40, 45

WELL DIAGRAM



COMMENTS

1. Encountered water @ 6.0 feet.
2. This well is installed in the former UST pit.
3. Hydrocarbon odor encountered during drilling at 7.5 feet.

WELL DETAILS

WELL TIP DEPTH 19.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 15.0 FT.
RISER LENGTH 7.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 3.0 TO 19.5 FT.
BENTONITE SEAL:
FROM 1.0 TO 3.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 6.2 FT.
AFTER 16 HRS. 2.9 FT.
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

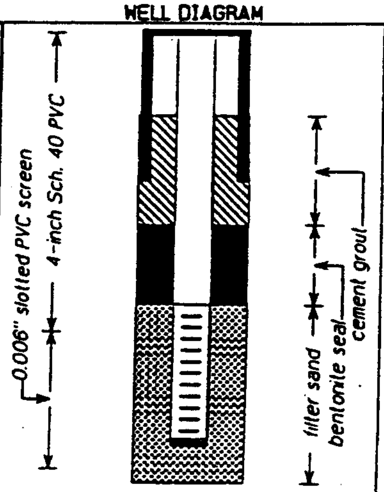
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-5
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 8.79 Ft.
Date Started 6/20/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/20/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	COMMENTS
4.8	Black, brown, gray, moist, **SILT** (FILL)	4.0			
2.3	Gray to orange, moist to wet, stiff, some mottled, fine, sandy **SILT**, some clay, trace gravel	8.5		5	
-.7	Gray, wet, loose, fine **SAND**, little gravel	9.5			
-4.2	Gray to light brown, wet, soft, silty **CLAY**, little gravel	13.0		10	
	Bottom of Boring at 13.0 Feet			15 20 25 30 35 40 45	

WELL DIAGRAM



WELL DETAILS

WELL TIP DEPTH 13.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 5.0 FT.
RISER LENGTH 10.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 7.0 TO 13.0 FT.
BENTONITE SEAL:
FROM 4.0 TO 7.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 2.5 FT.
AFTER 72 HRS. 3.5 FT.
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

WELL INSTALLATION REPORT

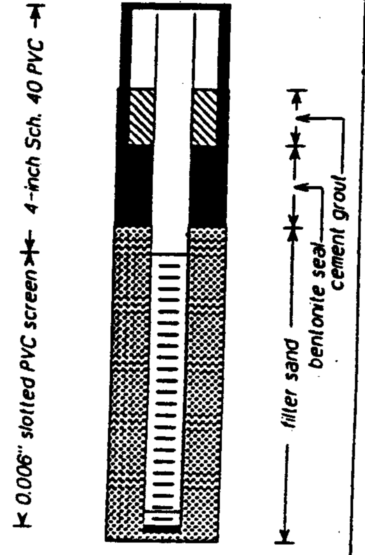
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-4
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 6.81 Ft.
Date Started 6/20/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/20/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
	ASPHALT, BRICK (FILL)			
2.8		4.0		5
	Brown, moist, very soft, mottled **CLAY** Brown to dark gray, moist, very soft **CLAY**, trace organics Dark gray to dark brown, wet, soft **CLAY**, trace gravel, organic layer at 8.0 feet			10
-4.2		11.0		
	Gray to dark tan, wet, stiff **CLAY**, some fine sand, wood pieces			15
-8.7		15.5		
-9.7	Gray to reddish brown, moist, stiff, mottled **CLAY**	18.5		
	Bottom of Boring at 16.5 Feet			20
				25
				30
				35
				40
				45

WELL DIAGRAM



COMMENTS

1. Encountered water @ 6.5 feet.

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 9.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 5.0 TO 16.5 FT.
BENTONITE SEAL:
FROM 2.0 TO 5.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 5.0 FT.
AFTER 72 HRS. 4.5 FT.
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

WELL INSTALLATION REPORT

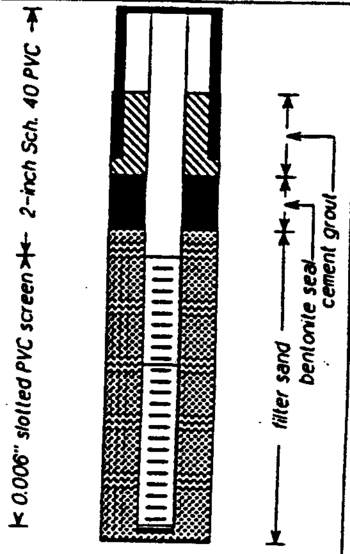
Contracted With District of Columbia Department of Public Works – BTCS
Well # MW-6
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 7.03 Ft.
Date Started 6/20/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/20/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	COMMENTS
	Brown, moist, silty, fine **SAND**, trace gravel, brick **(FILL)**		1. Encountered water at 6.0 feet.
1.0		6.0	
-.5	Gray, moist to wet, stiff, gravelly **CLAY**	7.5	
	Dark gray to tan, moist, very soft to medium stiff **CLAY**, trace plant fragments near bottom		
-8.5		15.5	
-9.5	Dark gray to tan, moist, soft **CLAY**	16.5	
	Bottom of Boring at 16.5 Feet		

WELL DIAGRAM



WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 9.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 5.0 TO 16.5 FT.
BENTONITE SEAL:
FROM 3.0 TO 5.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 5.0 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. 4.5 FT.

BORING METHOD

HSA – HOLLOW STEM AUGERS
CFA – CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

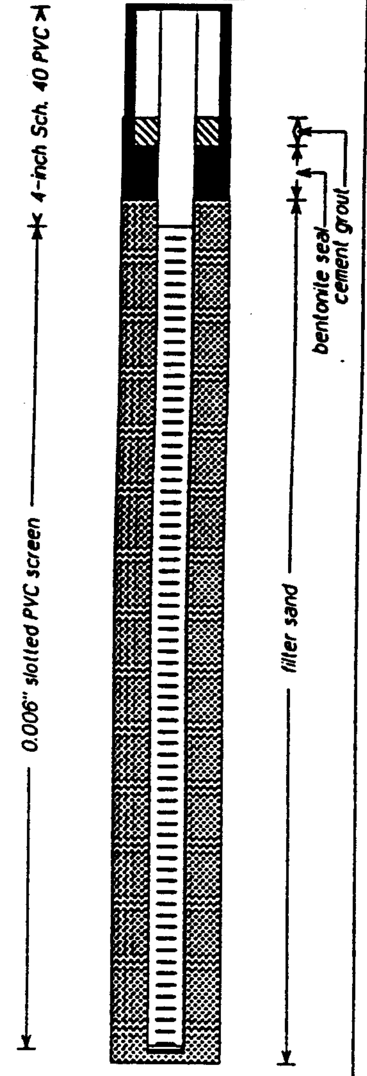
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-7
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum	Well Diameter 4.0 In.	Hole Diameter 12.0 In.	Foreman W. Hunter
Surf. Elev. 9.50 Ft.	Boring Method HSA	Rock Core Dia. N/A	Inspector N. Richardson
Date Started 6/23/97	Mud Type N/A	Casing Diameter N/A In.	Date Completed 6/23/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
4.5	Clay, concrete, brick, asphalt, plastic (FILL)	5.0		5
-1.0	Brown, moist, very loose to loose, fine SAND, little silt and clay, trace coarse sand	10.5		10
-25.5	Light brown, wet, very dense to loose, sandy GRAVEL and gravelly SAND	35.0		15 20 25 30 35
-30.5	Gray and brown, moist, hard to very stiff, mottled CLAY	40.0		40
	Bottom of Boring at 40.0 Feet			45

WELL DIAGRAM



COMMENTS

1. Encountered water at 9.5 feet.

WELL DETAILS

WELL TIP DEPTH 35.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 30.0 FT.
RISER LENGTH 8.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 4.0 TO 35.5 FT.
BENTONITE SEAL:
FROM 2.0 TO 4.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 12.0 FT.
AFTER 18 HRS. 8.9 FT.
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

WELL INSTALLATION REPORT

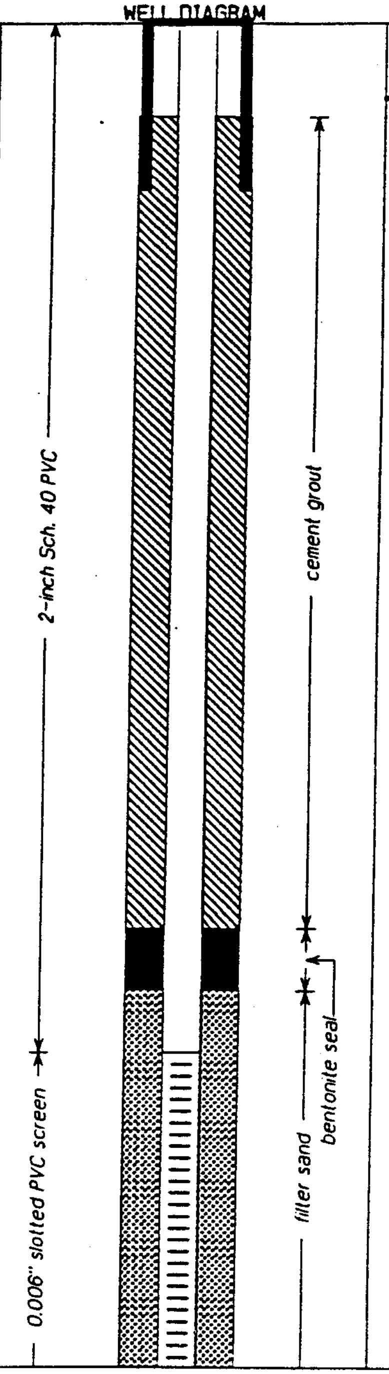
Contracted With DC-DPW - Department of Transportation
Well # MW-23B
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

BOREHOLE

Datum		Well Diameter	In.	Hole Diameter	8.0 In.	Foreman	W. Massey
Surf. Elev.	8.05 Ft.	Boring Method	HSA	Rock Core Dia.	N/A	Inspector	
Date Started	1/25/99	Mud Type	N/A	Casing Diameter	N/A In.	Date Completed	1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
7.8	**TOPSOIL**	0.25		
.6	Dark brown to grayish brown, medium dense to loose, silty, fine to coarse **SAND**, little brick, concrete, trace roots, asphalt, gravel (FILL)	7.5		5
-27.0	Brown, moist to wet, dense to medium dense to very dense, coarse to fine **SAND**, little fine to medium gravel, trace silt	35.0		10 15 20 25 30 35
	Gray and brown to red, wet, hard, **CLAY** to clayey **SILT**, trace to some fine to medium sand, trace sand pockets			40

WELL DIAGRAM



COMMENTS

1. Encountered 3.0 inches of topsoil at the surface.
2. Encountered water at 6.0 feet.

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 20.0 FT.
RISER LENGTH 33.0 FT
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 28.6 TO 60.0 FT.
BENTONITE SEAL:
FROM 26.0 TO 28.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 6.75 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-8
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

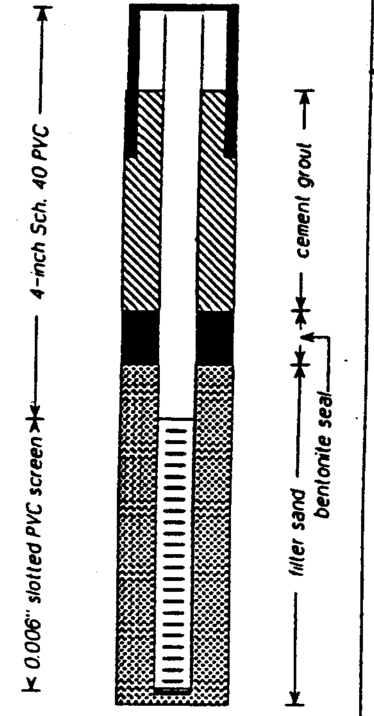
BOREHOLE

Datum
Surf. Elev. 10.23 Ft.
Date Started 6/19/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/19/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
3.2	Gray, brown, moist, very stiff to stiff, some mottled **SILT**, some clay, brick **(FILL)**	7.0
-.8	Brown to red, moist to wet, very loose to loose, sandy, clayey **GRAVEL**, some red clay	11.0
-11.3	Dark greenish gray, moist, soft **CLAY**, some to trace silt	21.5
	Bottom of Boring at 21.5 Feet	

DEPTH SCALE: 5, 10, 15, 20, 25, 30, 35, 40, 45

WELL DIAGRAM



COMMENTS

1. Encountered water @ 7.0 feet.
2. Hole caved at 5.0 ft.

WELL DETAILS

WELL TIP DEPTH 22.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 15.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 10.0 TO 22.5 FT.
BENTONITE SEAL:
FROM 8.0 TO 10.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 11.0 FT.
AFTER 16 HRS. 7.0 FT.
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

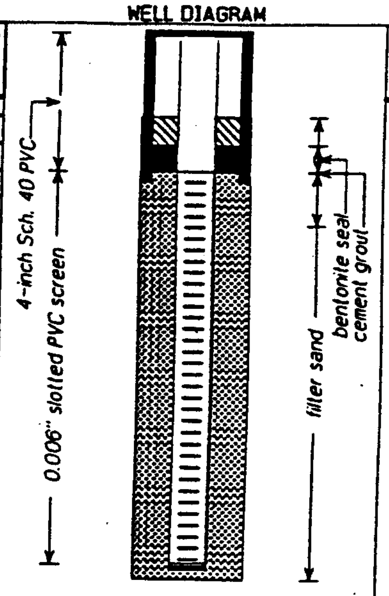
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-9
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 7.82 Ft.
Date Started 6/19/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/19/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
-.2	Brown, moist red brick, glass (FILL)	8.0		5
-6.2	Red, moist, medium stiff CLAY, little to some gravel, some black gravel	14.0		10
-9.2	Gray, moist, very soft SILT	17.0		15
	Bottom of Boring at 17.0 Feet			20 25 30 35 40 45

WELL DIAGRAM



COMMENTS

WELL DETAILS

WELL TIP DEPTH 17.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 15.0 FT.
RISER LENGTH 5.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 2.0 TO 17.0 FT.
BENTONITE SEAL:
FROM 1.0 TO 2.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 2.5 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. 2.0 FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

WELL INSTALLATION REPORT

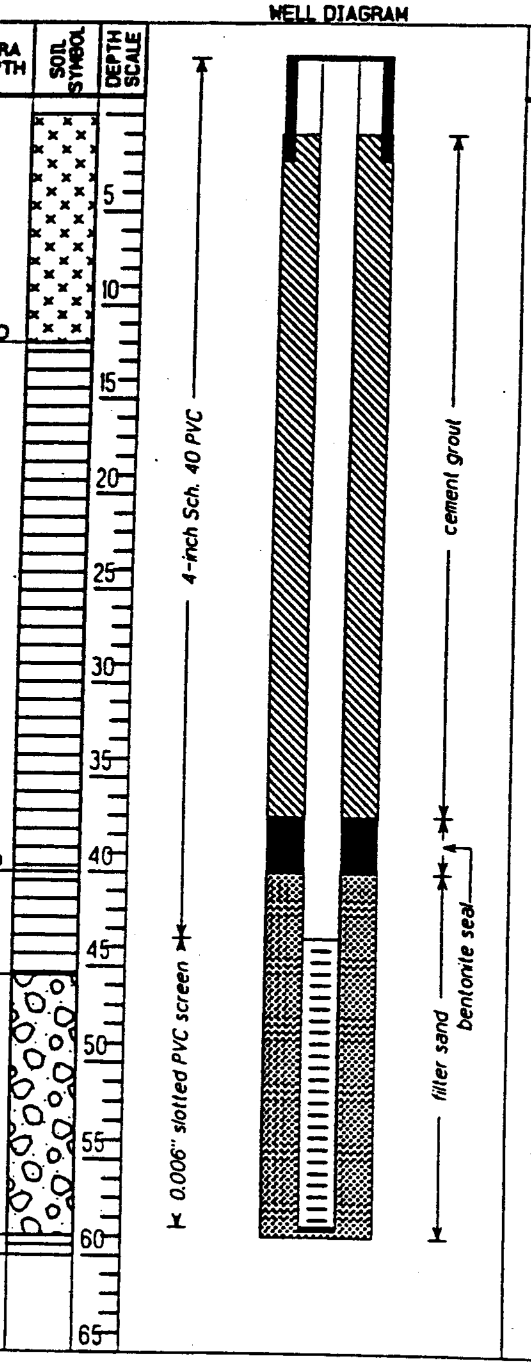
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-10/SB-39
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 8.30 Ft.
Date Started 6/27/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/27/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
-3.7	Brown, moist to wet, fine to medium **SAND**, some clay, brick (FILL)	12.0
-31.7	Grayish brown, moist, very soft to medium stiff **CLAY**, trace vegitation	40.0
-37.2	Greenish gray, moist, soft **CLAY**, trace white fossil	45.5
-50.7	Dark brown to light brown, moist, medium dense, fine **SAND**, some clay, little gravel Light gray, wet, dense, sandy **GRAVEL** Light gray to tan, wet, very dense, fine, sandy **GRAVEL**, trace clay	59.0
-51.7	Gray, some brown, moist, hard **CLAY**, little gravel	60.0
	Bottom of Boring at 60.0 Feet	

WELL DIAGRAM



COMMENTS

1. Encountered water between 5.5 to 6.0 feet.
2. Possible thin gravel layers between 33.0 to 34.0 and 38.0 to 39.0 feet.

WELL DETAILS

WELL TIP DEPTH 58.5 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 15.0 FT.
RISER LENGTH 46.5 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER: FROM 41.0 TO 59.0 FT.
BENTONITE SEAL: FROM 37.0 TO 41.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION ______ FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

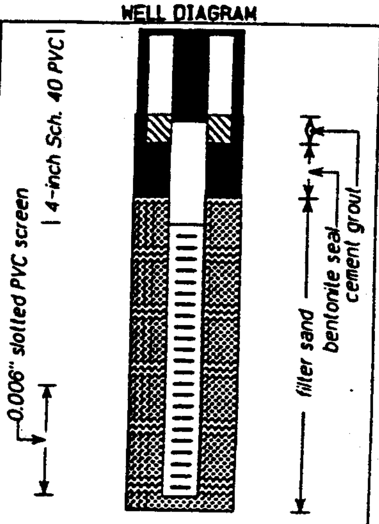
Contracted With District of Columbia Department of Public Works - BTCS
Well # MW-10A
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 9.65 Ft.
Date Started 6/30/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Hunter
Inspector N. Richardson
Date Completed 6/30/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
	Brown, moist to wet, medium dense, fine to medium **SAND**, some clay, trace brick **(FILL)**			5 10
-2.3	Grayish brown, moist, very soft to medium stiff **CLAY**, trace vegitation	12.0		
-4.3	Bottom of Boring at 14.0 Feet	14.0		15 20 25 30 35 40 45

WELL DIAGRAM



COMMENTS

1. Encountered water @ 5.5 feet.
2. Possible concrete layer at 5.5 feet.

WELL DETAILS

WELL TIP DEPTH 14.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 7.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 3.0 TO 14.5 FT.
BENTONITE SEAL:
FROM 1.0 TO 3.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 3.58 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D.C.

WELL INSTALLATION REPORT

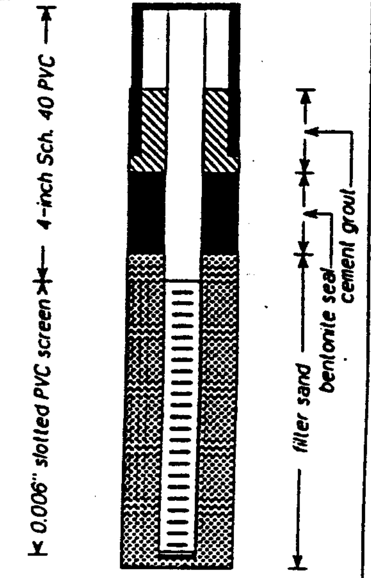
Contracted With District of Columbia Department of Public Works - BTCS
Well # SB-38 / (MW-11)
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97-009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 9.20 Ft.
Date Started 7/8/97
Well Diameter 4.0 In.
Boring Method HSA
Mud Type N/A
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector N. Richardson
Date Completed 6/30/97

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
-5.8	Brown to black **SILT**, some sandy gravel and clay, trace brick (FILL) Brown, sandy **GRAVEL**, some clay (FILL)	15.0		5 10 15
-10.8	Dark gray, wet to moist, soft to medium stiff **CLAY**	20.0		20
	Bottom of Boring at 20.0 Feet			25 30 35 40 45

WELL DIAGRAM



COMMENTS

1. Encountered water at 11.0 feet.
2. This location may represent a pit.

WELL DETAILS

WELL TIP DEPTH 17.5 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 10.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 6.0 TO 17.5 FT.
BENTONITE SEAL:
FROM 3.0 TO 6.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 7.5 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

WELL INSTALLATION REPORT

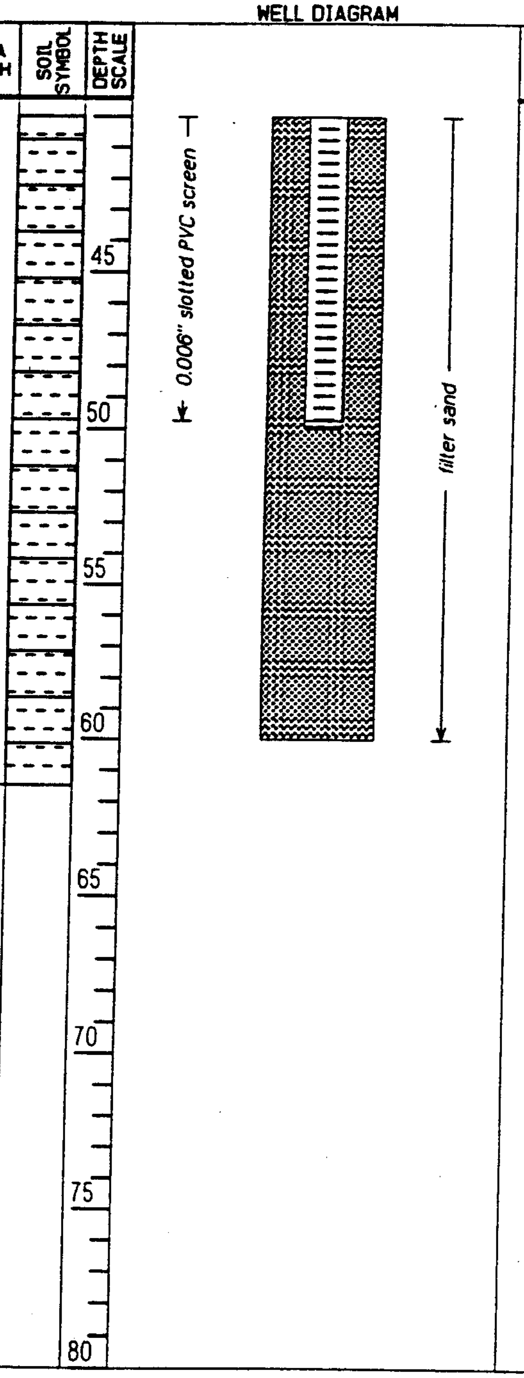
Contracted With DC-DPW - Department of Transportation
Well # MW-23B
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 8.05 Ft.
Date Started 1/25/99
Well Diameter In.
Boring Method HSA
Mud Type N/A
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector
Date Completed 1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	COMMENTS
	Gray to brown to red, moist to wet, hard, **CLAY**, little silt		
-53.4	Bottom of Boring at 61.5 Feet	61.5	

WELL DIAGRAM



WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT
SCREEN LENGTH 20.0 FT
RISER LENGTH 33.0 FT
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 28.6 TO 60.0 FT.
BENTONITE SEAL:
FROM 26.0 TO 28.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 6.75 FT.
AFTER ___ HRS. ___ FT.
AFTER 24 HRS. ___ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

APPENDIX B - SECTION 4

Logs and Photos of Test Pits

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With DC-DPW - Department of Transportation
Boring # MW-20
Project Name Anacostia Stn.'s Reg. Parking Lot & Access Rd-Phase II Final ESA Study
Job # 98-051
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 7.95± Ft.
Date Started 1/27/99
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector
Date Completed 1/27/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
7.7		0.25								
	ASPHALT Brown, red, moist, very dense, gravelly, coarse to fine SAND, little brick, trace clay				D	22-46-48	1	DS	18	1. Encountered 3.0 inches of asphalt at the surface. 2. Encountered water at 8.0 feet.
3.0	(FILL)	5.0		5						
	Dark brown to brown, trace black, wet, medium dense, clayey, fine to coarse SAND, little gravel, roots				D	7-9-11	2	DS	11	3. Installed a 21.5-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 10.0-ft casing -Sand from 21.5 to 5.0 ft.
-2.5	(POSSIBLE FILL)	10.5		10						
	Greenish brown to dark gray, wet, very soft, organic SILT, trace clay				I/D	7-2-3	3	DS	0	-Bentonite chips from 5.0 to 3.0 ft. -Grout from 3.0 to 0.0 ft. -Installed stick-up manhole cover.
				15	I	2-2-3	4	DS	18	4. Samples PPM Readings: S-1 7.7 PPM S-2 8.8 PPM S-3 8.0 PPM* S-4 8.9 PPM S-5 9.5 PPM *From cutting while drilling
				20	I	1-1-1	5	DS	18	
-13.5		21.5								
	Bottom of Boring at 21.5 Feet									5. Background was 6.5 PPM.
				25						
				30						
				35						
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 2.5 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With DC-DPW - Department of Transportation
Boring # MW-21
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 10.49± Ft.
Date Started 1/28/99
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector
Date Completed 1/28/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE				
					Cond	Blows/6"	No.	Type	Rec
10.2		0.25							
9.5	TOPSOIL	1.0			I/D	1-2-6	1	DS	12
	Dark gray, moist, very soft, organic **SILT**, trace brick, roots (FILL)								
	Brown, moist, loose to medium dense, silty, fine **SAND**, trace fine gravel			5	I/D	5-8-6	2	DS	18
3.5	(FILL)	7.0							
	Brown, gray, black, brick red, wet, dense, fine to coarse **SAND**, some concrete, trace brick, silt			10	D	13-16-29	3	DS	18
-2.5	(FILL)	13.0							
	Greenish brown to dark gray, wet, soft to very soft, organic **SILT**			15	I	3-3-2	4	DS	14
				20	I	2-2-2	5	DS	18
-11.0		21.5							
	Bottom of Boring at 21.5 Feet								
				25					
				30					
				35					
				40					

BORING & SAMPLING NOTES

1. Encountered 3.0 inches of topsoil at the surface.
2. Encountered water at 6.5 feet.
3. Installed a 21.5-ft deep 4.0-inch diam. monitoring well:
   - Used 10.0-ft screen
   - Used 10.0-ft casing
   - Sand from 21.5 to 5.0 ft.
   - Bentonite chips from 5.0 to 3.0 ft.
   - Grout from 3.0 to 0.0 ft.
   - Installed stick-up manhole cover.
4. Sample PPM Readings:
   S-1 7.3 PPM
   S-2 7.7 PPM
   S-3 8.2 PPM
   S-4 8.0 PPM
   S-5 8.3 PPM
5. Background was 6.5 PPM.

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 5.5 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With DC-DPW - Department of Transportation
Boring # MW-22
Project Name Anacostia Stn.'s Reg. Parking Lot & Access Rd - Phase II Final ESA Study
Job # 98-051
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.92± Ft.
Date Started 1/27/99
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector
Date Completed 1/27/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
8.7	TOPSOIL	0.25								
	Dark brown, moist to wet, loose to medium dense, clayey, fine to coarse **SAND**, little gravel, trace to little brick, trace asphalt in S-1, trace silt (FILL)				D	1-4-5	1	DS	10	1. Encountered 3.0 inches of topsoil at the surface. 2. Encountered water at 2.0 feet. 3. Installed a 21.5-ft deep 4.0-inch diam. monitoring well: -Used 10.0-ft screen -Used 10.0-ft casing -Sand from 21.5 to 3.0 ft. -Bentonite chips from 3.0 to 1.0 ft. -Grout from 1.0 to 0.0 ft. -Installed stick-up manhole cover. 4. Sample PPM Readings: S-1 6.8 PPM S-2 7.2 PPM S-3 7.5 PPM S-4 8.0 PPM S-5 8.2 PPM 5. Background was 6.5 PPM.
				5	D	11-9-9	2	DS	18	
-.1		9.0								
	Dark gray, black, wet, medium stiff to soft, organic **SILT**, trace clay			10	I	3-3-4	3	DS	18	
				15	I	2-2-3	4	DS	16	
				20	I	1-3-2	5	DS	18	
-12.6		21.5								
	Bottom of Boring at 21.5 Feet									
				25						
				30						
				35						
				40						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 1.5 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With DC-DPW - Department of Transportation
Boring # MW-23A
Project Name Anacostia Stn.'s Reg. Parking Lot & Access Rd - Phase II Final ESA Study
Job # 98-051
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.32± Ft.
Date Started 1/26/99
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector
Date Completed 1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec
8.1	TOPSOIL	0.25							
.8	Dark brown, moist to wet, silty, fine to medium SAND, wood and concrete (POSSIBLE FILL)	7.5							
-11.7	Brown, wet, fine to coarse SAND, little fine to medium gravel	20.0							
	Bottom of Boring at 20.0 Feet								

BORING & SAMPLING NOTES

1. Encountered 3.0 inches of topsoil at the surface.
2. Augered with out sampling to 20.0 Ft.
3. Encountered water at 7.5 feet.
4. Installed a 20.0-ft deep 4.0-inch diam. monitoring well:
   - -Used 10.0-ft screen
   - -Used 10.0-ft casing
   - -Sand from 20.0 to 5.0 ft.
   - -Bentonite chips from 5.0 to 3.0 ft.
   - -Grout from 3.0 to 0.0 ft.
   - -Installed stick-up manhole cover.
5. PPM Readings through Auger:

   0.0 - 5.0 ft: 8.8 PPM
   5.0 - 10.0 ft: 8.9 PPM
   10.0 - 15.0 ft: 8.8 PPM
   15.0 - 20.0 ft: 8.8 PPM
6. Background was 7.0 PPM.

Note: Had trouble with running sand when plug was knocked out of augers.

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 6.83 FT
AFTER ____ HRS. ____ FT
AFTER 24 HRS. ____ FT
CAVED AT ____ FT

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With DC-DPW - Department of Transportation
Boring # MW-23B
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

SAMPLER

Datum
Surf. Elev. 8.05± Ft.
Date Started 1/25/99
Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Spoon Size 3.0 In.
Hole Diameter 12.0 In.
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Massey
Inspector
Date Completed 1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
7.8		0.25								
	TOPSOIL Dark brown to grayish brown, medium dense to loose, silty, fine to coarse **SAND**, little brick, concrete, trace roots, asphalt, gravel **(FILL)**				D	5-12-15	1	DS	14	1. Encountered 3.0 inches of topsoil at the surface.
					D	12-9-8	2	DS	16	2. Encountered water at 7.5 feet.
				5	D	4-2-3	3	DS	14	3. Installed a 60.0-ft deep 4.0-inch diam. monitoring well: -Used 20.0-ft screen -Used 33.0-ft casing -Sand from 80.0 to 28.0 ft. -Bentonite chips from 28.0 to 26.0 ft. -Grout from 26.0 to 0.0 ft. -Installed stick-up manhole cover.
.6		7.5								
	Brown, moist to wet, dense to medium dense to very dense, coarse to fine **SAND**, little fine to medium gravel, trace silt				D	10-13-27	4	DS	18	
				10	D	19-18-14	5	DS	16	
					D	10-10-10	6	DS	14	
				15	D	5-5-8	7	DS	16	4. Began having problems with running sand at 12.5 feet.
					D	10-50-51/3"	8	DS	16	5. Began filling auger with water at 15.0 feet.
				20	D	16-23-31	9	DS	18	6. Reamed boring to 60.0 feet with 6 5/8" augers.
				25	D	44-51/4"	10	DS	10	7. Sample PPM Readings: S-1 8.5 PPM S-2 11.5 PPM S-3 14.5 PPM S-4 8.1 PPM S-5 7.9 PPM S-6 8.3 PPM S-7 8.3 PPM S-8 8.3 PPM S-9 8.3 PPM S-10 8.1 PPM S-11 8.1 PPM S-12 8.7, PPM S-13 8.8 PPM S-14 8.6 PPM S-15 8.8 PPM S-16 8.5 PPM S-17 8.8 PPM
				30	D	19-18-27	11	DS	18	
-27.0		35.0		35						
	Gray and brown to red, wet, hard, **CLAY** to clayey **SILT**, trace to some fine to medium sand, trace sand pockets				I	15-17-23	12	DS	16	
				40						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION 6.75 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

RECORD OF SOIL EXPLORATION

Contracted With DC-DPW - Department of Transportation — Boring # MW-23B

Project Name Anacostia Station Regional Parking Lot and Access Road — Job # 97009

Location Southeast, Washington, D.C.

SAMPLER

Datum	Hammer Wt. 140 Lbs.	Hole Diameter 12.0 In.	Foreman W. Massey
Surf. Elev. 8.05± Ft.	Hammer Drop 30 In.	Rock Core Dia. N/A	Inspector
Date Started 1/25/99	Spoon Size 3.0 In.	Boring Method HSA	Date Completed 1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLING NOTES
					Cond	Blows/6"	No.	Type	Rec	
	Gray to brown to red, moist to wet, hard, CLAY, little silt		- - -		I	15-20-30	13	DS	18	8. Background was ' 7.0 PPM.
			- - -	45	I	48-23-26	14	DS	18	
			- - -	50	I	18-23-35	15	DS	18	
			- - -	55	I	25-17-26	16	DS	18	
			- - -	60	I	25-40-51	17	DS	18	
-53.4		61.5								
	Bottom of Boring at 61.5 Feet			65						
				70						
				75						
				80						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION 6.75 FT.
AFTER ______ HRS. ______ FT.
AFTER 24 HRS. ______ FT.
CAVED AT ______ FT.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30" ;COUNT MADE AT 6" INTERVALS

APPENDIX E SECTION 2

1999 Well Installation Reports

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

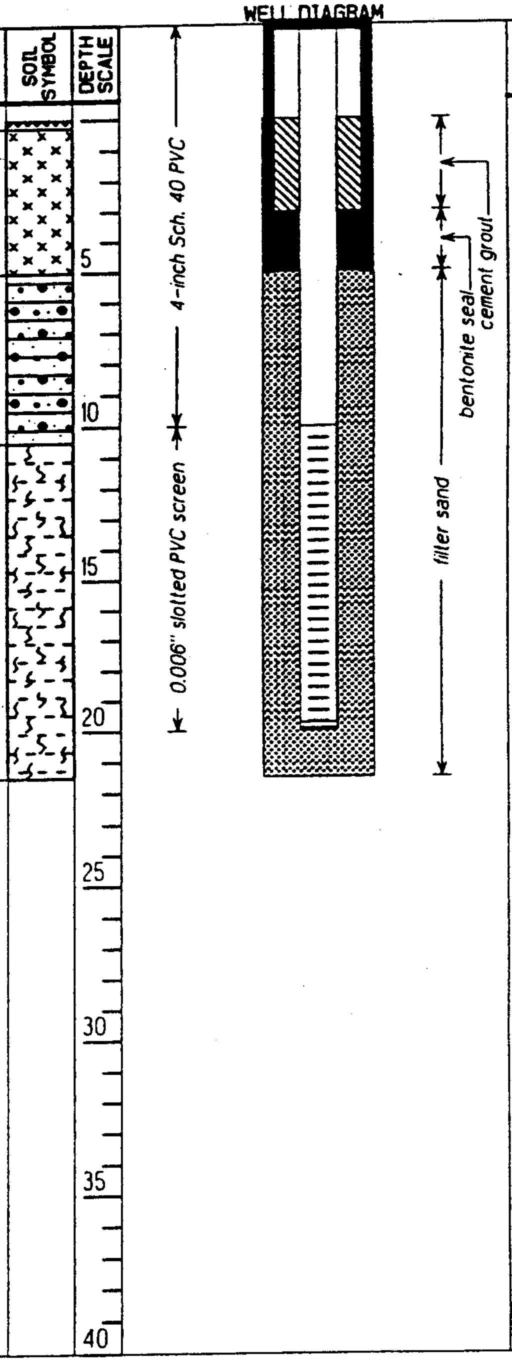
WELL INSTALLATION REPORT

Contracted With DC-DPW - Department of Transportation
Well # MW-20
Project Name Anacostia Stn.'s Reg. Parking Lot & Access Rd-Phase II Final ESA Study
Job # 98-051
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 7.95 Ft.
Date Started 1/27/99
Well Diameter In.
Boring Method HSA
Mud Type N/A
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector
Date Completed 1/27/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
7.7	**ASPHALT**	0.25
	Brown, red, moist, very dense, gravelly, coarse to fine **SAND**, little brick, trace clay	
3.0	(FILL)	5.0
	Dark brown to brown, trace black, wet, medium dense, clayey, fine to coarse **SAND**, little gravel, roots	
-2.5	(POSSIBLE FILL)	10.5
	Greenish brown to dark gray, wet, very soft, organic **SILT**, trace clay	
-13.5		21.5
	Bottom of Boring at 21.5 Feet	



COMMENTS

1. Encountered 3.0 inches of asphalt at the surface.
2. Encountered water at 8.0 feet.

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT
SCREEN LENGTH 10.0 FT.
RISER LENGTH 10.0 FT
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 5.0 TO 21.5 FT.
BENTONITE SEAL:
FROM 3.0 TO 5.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 2.5 FT.
AFTER ___ HRS. ___ FT.
AFTER 24 HRS. ___ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

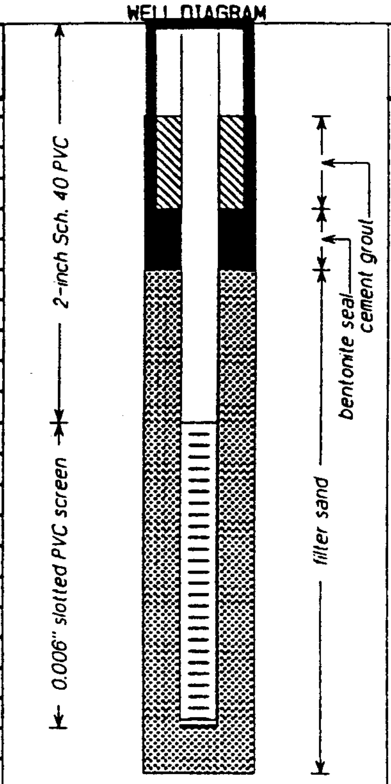
Contracted With DC-DPW - Department of Transportation
Well # MW-21
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 10.49 Ft.
Date Started 1/28/99
Well Diameter In.
Boring Method HSA
Mud Type N/A
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector
Date Completed 1/28/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
10.2		0.25
9.5	TOPSOIL	1.0
	Dark gray, moist, very soft, organic **SILT**, trace brick, roots (FILL)	
3.5	Brown, moist, loose to medium dense, silty, fine **SAND**, trace fine gravel (FILL)	7.0
-2.5	Brown, gray, black, brick red, wet, dense, fine to coarse **SAND**, some concrete, trace brick, silt (FILL)	13.0
-11.0	Greenish brown to dark gray, wet, soft to very soft, organic **SILT**	21.5
	Bottom of Boring at 21.5 Feet	

WELL DIAGRAM



COMMENTS

1. Encountered 3.0 inches of asphalt at the surface.
2. Encountered water at 6.0 feet.

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT
SCREEN LENGTH 10.0 FT
RISER LENGTH 10.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER: FROM 5.0 TO 21.5 FT.
BENTONITE SEAL: FROM 3.0 TO 5.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 5.5 FT.
AFTER HRS. FT
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

TLB THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

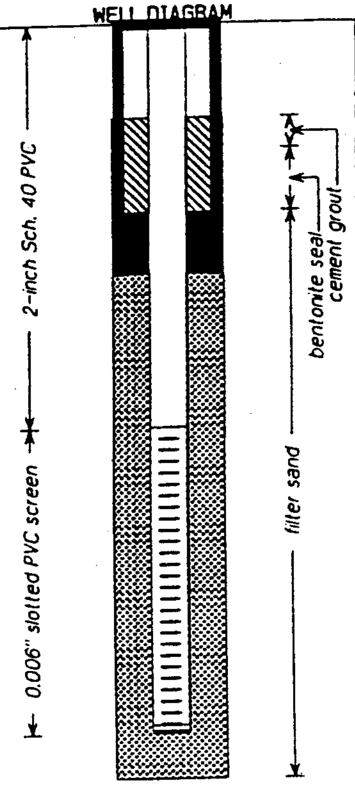
Contracted With DC-DPW - Department of Transportation
Well # MW-22
Project Name Anacostia Stn.'s Reg. Parking Lot & Access Rd - Phase II Final ESA Study
Job # 98-051
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 8.92 Ft.
Date Started 1/27/99
Well Diameter In.
Boring Method HSA
Mud Type N/A
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector
Date Completed 1/27/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
8.7		0.25		
	TOPSOIL Dark brown, moist to wet, loose to medium dense, clayey, fine to coarse **SAND**, little gravel, trace to little brick, trace asphalt in S-1, trace silt (FILL)			5
-.1		9.0		10
	Dark gray, black, wet, medium stiff to soft, organic **SILT**, trace clay			15 20
-12.6		21.5		
	Bottom of Boring at 21.5 Feet			25 30 35 40

WELL DIAGRAM



COMMENTS

1. Encountered 3.0 inches of topsoil at the surface.
2. Encountered water at 6.0 feet.

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT
SCREEN LENGTH 10.0 FT
RISER LENGTH 10.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 3.0 TO 21.5 FT.
BENTONITE SEAL:
FROM 1.0 TO 3.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 1.5 FT.
AFTER HRS. FT.
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

TLB **THOMAS L. BROWN ASSOCIATES, P.C.**
Washington, D. C.

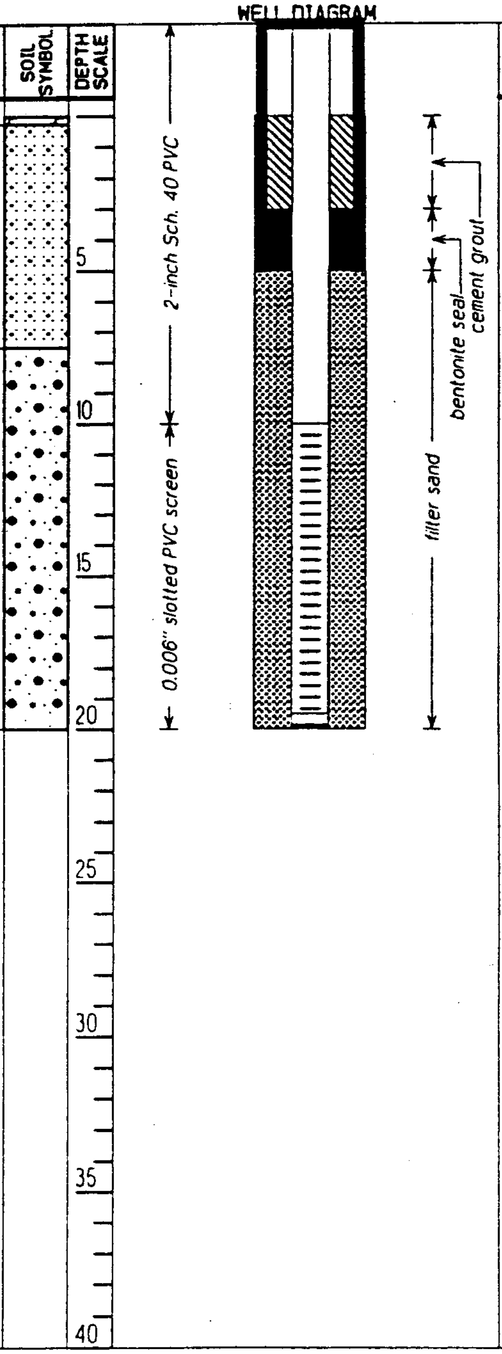
WELL INSTALLATION REPORT

Contracted With DC-DPW - Department of Transportation
Well # MW-23A
Project Name Anacostia Stn.'s Reg. Parking Lot & Access Rd - Phase II Final ESA Study
Job # 98-051
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 8.32 Ft.
Date Started 1/26/99
Well Diameter In.
Boring Method HSA
Mud Type N/A
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector
Date Completed 1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH
8.1	TOPSOIL	0.25
	Dark brown, moist to wet, silty, fine to medium **SAND**, wood and concrete (POSSIBLE FILL)	
.8	Brown, wet, fine to coarse **SAND**, little fine to medium gravel	7.5
-11.7	Bottom of Boring at 20.0 Feet	20.0



COMMENTS

1. Encountered 3.0 inches of topsoil at the surface.
2. Encountered water at 6.0 feet.

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 10.0 FT.
RISER LENGTH 10.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 5.0 TO 20.0 FT.
BENTONITE SEAL:
FROM 3.0 TO 5.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 6.83 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

THOMAS L. BROWN ASSOCIATES, P.C.
Washington, D. C.

WELL INSTALLATION REPORT

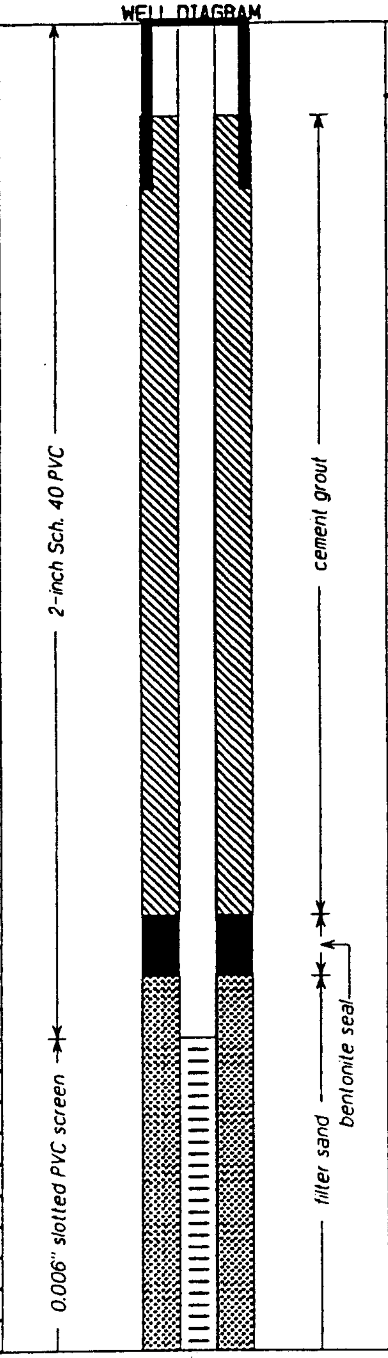
Contracted With DC-DPW - Department of Transportation
Well # MW-23B
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 8.05 Ft.
Date Started 1/25/99
Well Diameter In.
Boring Method HSA
Mud Type N/A
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector
Date Completed 1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
7.8		0.25		
	TOPSOIL Dark brown to grayish brown, medium dense to loose, silty, fine to coarse **SAND**, little brick, concrete, trace roots, asphalt, gravel (FILL)			5
.6		7.5		
	Brown, moist to wet, dense to medium dense to very dense, coarse to fine **SAND**, little fine to medium gravel, trace silt			10 15 20 25 30
-27.0		35.0		35
	Gray and brown to red, wet, hard, **CLAY** to clayey **SILT**, trace to some fine to medium sand, trace sand pockets			40

WELL DIAGRAM



COMMENTS

1. Encountered 3.0 inches of topsoil at the surface.
2. Encountered water at 6.0 feet.

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 20.0 FT.
RISER LENGTH 33.0 FT.
TYPE OF WELL COVER Stick Up
LOCK NUMBER

SAND FILTER:
FROM 28.6 TO 60.0 FT.
BENTONITE SEAL:
FROM 26.0 TO 28.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 6.75 FT.
AFTER ____ HRS. ____ FT.
AFTER 24 HRS. ____ FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

WELL INSTALLATION REPORT

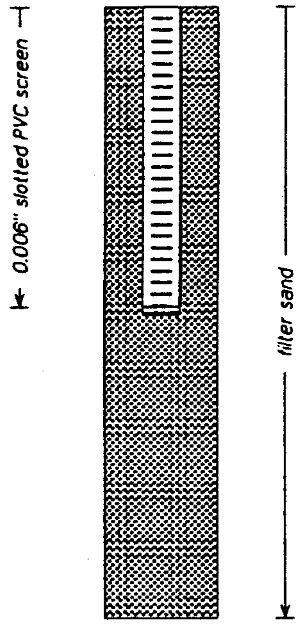
Contracted With DC-DPW - Department of Transportation
Well # MW-23B
Project Name Anacostia Station Regional Parking Lot and Access Road
Job # 97009
Location Southeast, Washington, D.C.

BOREHOLE

Datum
Surf. Elev. 8.05 Ft.
Date Started 1/25/99
Well Diameter In.
Boring Method HSA
Mud Type N/A
Hole Diameter 8.0 In.
Rock Core Dia. N/A
Casing Diameter N/A In.
Foreman W. Massey
Inspector
Date Completed 1/26/99

ELEV	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH	SOIL SYMBOL	DEPTH SCALE
	Gray to brown to red, moist to wet, hard, **CLAY**, little silt		- - -	
				45
				50
				55
				60
-53.4		61.5		
	Bottom of Boring at 61.5 Feet			
				65
				70
				75
				80

WELL DIAGRAM



COMMENTS

WELL DETAILS

WELL TIP DEPTH 16.0 FT.
DEPTH TO TOP OF RISER -3.0 FT.
SCREEN LENGTH 20.0 FT
RISER LENGTH 33.0 FT
TYPE OF WELL COVER Stick Up
LOCK NUMBER

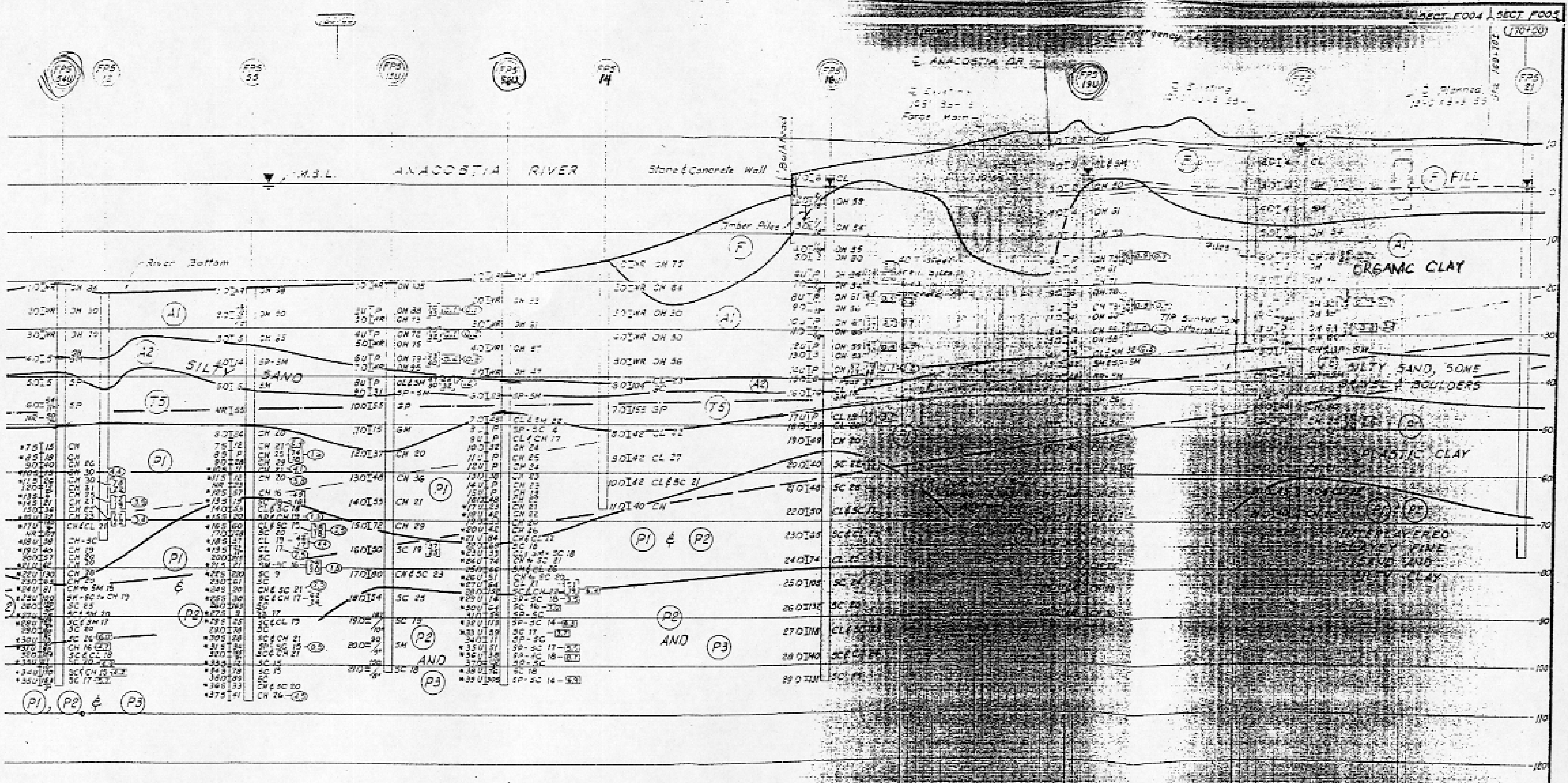
SAND FILTER:
FROM 28.6 TO 60.0 FT.
BENTONITE SEAL:
FROM 26.0 TO 28.0 FT.
WELL PERMIT NO

GROUNDWATER DEPTH

AT COMPLETION 6.75 FT.
AFTER HRS. FT.
AFTER 24 HRS. FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING



Note: ✱ - Indicates 300 lb. hammer used to drive sampler

Note
For additional laboratory data for Borings Nos. FPS-48U, -52U, -54U and FPS-58U see Tables Nos. 2 and 4.

	DATE
G.	1-81
LT. & JPG.	4-81

REFERENCE DRAWINGS

NUMBER	DESCRIPTION
F-1	General Notes and Legend.
F-F-252	Boring Location Plan.

REVISIONS

DATE	BY	DESCRIPTION

No. 7135

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

MUESER · RUTLEDGE · JOHNSTON & DESIMONE
CONSULTING ENGINEERS
415 MADISON AVE., NEW YORK, N. Y. 10017

D. Gould

☒
☐

BRANCH ROUTE (F004)
GEOLOGICAL SECTION
STA.157+00 TO STA.170+00

BORING# SB-01

PERMIT# NA

DATE: 12/13/99

LOGGED BY: ALYSSA GALL

DRILLING CO.: VIRONEX

DRILLER: DAVID WILEY

RIG: GEOPROBE

METHOD: DIRECT PUSH

BORING DIA.: 3"

BORING DEPTH: 12'

DEPTH TO WATER: NA

SURFACE ELEV.: NA

ENVIRON

BORING LOG

PROJECT: AOC IMPLEMENTATION

CASE # 02-7616B

COMMENTS:

F:\027616B\LOGS\7616BLOG1

DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	BLOW COUNTS	FID READINGS	SAMPLE INTERVAL (feet)	DESCRIPTIVE INTERVAL (feet)	DESCRIPTION
0-4'		SOIL			0-4'	0-4'	DARK BROWN & ORANGE, SANDY, WET WITH SOME ORGANIC MATERIAL. SLIGHTLY MOIST. COLLECTED SOIL SAMPLE SB01-SS01 FOR CaPAH, As, TOC ANALYSIS. (SM)
4-8'						4-8'	DARK BROWN SAND AND GRAVEL. MOIST. (SM w/GRAVEL)
8-10'					8-8.5	8-10'	DARK BROWN SAND AND GRAVEL. MOIST. COLLECTED SOIL SAMPLES SB01-SS02 FOR As ANALYSIS. (SM w/GRAVEL)
10-12'					10-10.5	10-12'	DARK BROWN DRY COMPACT SAND AND GRAVEL. COLLECTED SOIL SAMPLES SB01-SS03 FOR CaPAH ANALYSIS. (SMw/ GRAVEL)

BORING# SB-02

PERMIT# NA

DATE: 12/13/99

LOGGED BY: ALYSSA GALL

DRILLING CO.: VIRONEX

DRILLER: DAVID WILEY

RIG: GEOPROBE

METHOD: DIRECT PUSH

BORING DIA.: 3"

BORING DEPTH: 12'

DEPTH TO WATER: 6'

SURFACE ELEV.: NA

ENVIRON

BORING LOG

PROJECT: AOC IMPLEMENTATION

CASE # 02-7616B

COMMENTS:

F:\027616B\LOGS\7616BLOG2

DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	BLOW COUNTS	FID READINGS	SAMPLE INTERVAL (feet)	DESCRIPTIVE INTERVAL (feet)	DESCRIPTION
0-0.75						0-0.75	DARK BROWN ORGANIC SOIL. (OL)
0.75-4'		SOIL			2.-2.5	0.75-2.5	GREY-BROWN SANDY SOIL, SOME GRAVEL. COLLECTED SOIL SAMPLES SB02-SS01 FOR CoPAH, TOC, As ANALYSIS. (SM w/GRAVEL)
4-6'		SOIL				4-6'	ORANGE-BROWN CLAYEY SOIL. (OL)
6-8'						6-8'	GREY-BROWN SILTY-CLAY. SATURATED. (ML)
8-8.5'					8-8.5'	8-8.5'	DARK BROWN SAND AND GRAVEL. COLLECTED SOIL SAMPLES SB02-SS02 FOR CoPAH ANALYSIS. (SM w/GRAVEL)
8.5-10'					8.5-10'	8.5-10'	DARK GREY SILTY CLAY. MOIST. (ML)
10-10.5'					10-10.5	10-10.5'	DARK GREY SILT & FINE SAND. SATURATED. COLLECTED SOIL SAMPLES SB02-SS03 FOR As ANALYSIS. (SM)
10.5-12'						10.5-12'	DARK GREY SILTY CLAY. (ML)

ENVIRON

BORING LOG

BORING# SB-03

PERMIT# NA

DATE: 12/13/99

LOGGED BY: ALYSSA GALL

DRILLING CO.: VIRONEX

DRILLER: DAVID WILEY

RIG: GEOPROBE

METHOD: DIRECT PUSH

BORING DIA.: 3"

BORING DEPTH: 13'

DEPTH TO WATER: 6'

SURFACE ELEV.: NA

PROJECT: AOC IMPLEMENTATION

CASE # 02-7616B

COMMENTS:

F:\027616B\LOGS\7616BLOG3

DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	BLOW COUNTS	FID READINGS	SAMPLE INTERVAL (feet)	DESCRIPTIVE INTERVAL (feet)	DESCRIPTION
0-3'						0-3'	BROWN, DRY ORGANIC SOIL. (OL)
3-3.5'						3-3.5'	GREY DRY GRAVEL. (GW)
3.5-4'						3.5-4'	GREY MOIST GRAVEL. (GW)
4-4.5'					4-4.5'	4-4.5'	ORANGE-BROWN GRAVEL AND SILTY SAND. COLLECTED SAMPLES SB02-SS01 FOR CaPAH, As, TOC ANALYSIS. (SM w/GRAVEL)
4.5-6'						4.5-6'	BROWN, MOIST SILTY GRAVEL.
6-6.5'					6-6.5'	6-6.5'	DARK GREY, WET, SILTY FINE SAND. COLLECTED OIL SAMPLES SB03-SS02 FOR CaPAH ANALYSIS. (SM)
6.5-8'						6.5-8'	DARK GREY, SATURATED SILTY FINE SAND. (SM)
8-10'						8-10'	BROWN, WET SILTY FINE SAND. (SM)
10-12'						10-12'	DARK GREY, SATURATED SILTY FINE SAND. (SM)
12-12.5'						12-12.5'	BROWN GRAVEL. (GW)
12.5-13'						12.5-13'	DARK GREY FINE SILT. COLLECTED SOIL SAMPLE SB03-SS03 FOR As ANALYSIS.

ENVIRON

BORING LOG

BORING# SB-04

PERMIT# NA

DATE: 12/13/99

LOGGED BY: ALYSSA GALL

DRILLING CO.: VIRONEX

DRILLER: DAVID WILEY

RIG: GEOPROBE

METHOD: DIRECT PUSH

BORING DIA.: 3"

BORING DEPTH: 16'

DEPTH TO WATER: 8'

SURFACE ELEV.: NA

PROJECT: AOC IMPLEMENTATION

CASE # 02-7616B

COMMENTS:

F:\027616B\LOGS\7616BLOG4

DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	BLOW COUNTS	FID READINGS	SAMPLE INTERVAL (feet)	DESCRIPTIVE INTERVAL (feet)	DESCRIPTION
0-2'						0-2'	BROWN, DRY SLIGHTLY ORGANIC FINE SAND. (SM)
2-2.5'		SOIL				2-2.5'	BROWN, DRY FINE SILTY SAND. COLLECTED SOIL SAMPLES SB04-SS01 FOR CaPAH ANALYSIS. (SM)
2.5-4'		SOIL				2.5-4'	BROWN, DRY SLIGHTLY ORGANIC FINE SAND. (SM)
4-6'						4-6'	RED-ORANGE DRY GRAVEL. (GW)
6-6.5'		SOIL				6-6.5'	DARK GREY SATURATED FINE SAND & SILT, SOME GRAVEL. COLLECTED SOIL SAMPLES SB04-SS02 FOR CaPAH, As, TOC ANALYSIS. (SM w/GRAVEL)
6.5-8'		SOIL				6.5-8'	DARK GREY SATURATED FINE SANDY SILT.(ML)
8-12'						8-12'	DARK GREY SILT AND FINE SAND. (SM)
12-14'						12-14'	DARK GREY SILT & FINE SAND. (SM)
14-14.5'		SOIL				14-14.5'	DARK GREY SILT & FINE SAND. COLLECTED SOIL SAMPLES SB04-SS03 FOR As ANALYSIS. (SM)
14.5-16'						14.5-16'	DARK GREY SILT & FINE SAND. (SM)

ENVIRON
BORING LOG

BORING# SB-05
PERMIT# NA
DATE: 12/13/99
LOGGED BY: ALYSSA GALL
DRILLING CO.: VIRONEX
DRILLER: DAVID WILEY

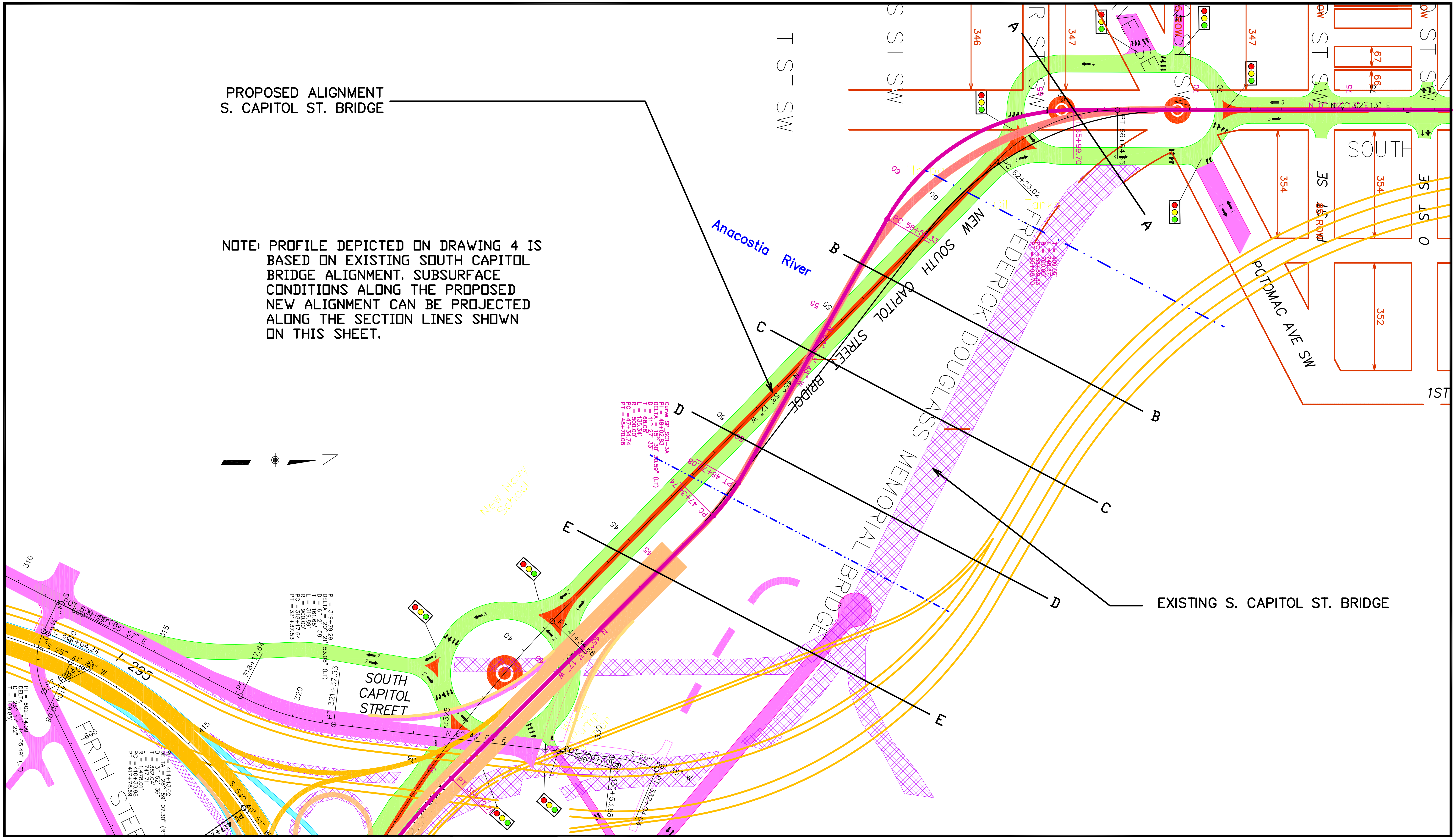
RIG: GEOPROBE
METHOD: DIRECT PUSH
BORING DIA.: 3"
BORING DEPTH: 20'
DEPTH TO WATER: 11.5'
SURFACE ELEV.: NA

PROJECT: AOC IMPLEMENTATION
CASE # 02-7616B

COMMENTS:
F:\027616B\LOGS\7616BLOGS

DEPTH (feet)	GRAPHIC LOG	SAMPLE TYPE	BLOW COUNTS	FID READINGS	SAMPLE INTERVAL (feet)	DESCRIPTIVE INTERVAL (feet)	DESCRIPTION
0-0.5'		SOIL				0-0.5'	BROWN, SLIGHTLY ORGANIC FINE SANDY SILT, SOME SMALL GRAVEL. COLLECTED SOIL SAMPLES SB05-SS01 FOR CaPAH ANALYSIS. (OL)
0.5-4'						0.5-4'	BROWN, SLIGHTLY ORGANIC FINE SANDY SILT, SOME SMALL GRAVEL. (OL)
4-6'						4-6'	BROWN, SLIGHTLY ORGANIC FINE SANDY SILT, SOME SMALL GRAVEL. (OL)
6-7'						6-7'	GRAVELY SILTY SAND. (SM w/GRAVEL)
7-7.5'		SOIL				7-7.5'	GREY SAND. COLLECTED SOIL SAMPLE SB05-SS02 FOR CaPAH, As, TOC ANALYSIS. (SW)
7.5-8'						7.5-8'	GREY SAND. (SW)
8-12'						8-12'	GRAVELLY SAND. 25% RECOVERY. (SM w/GRAVEL)
12-16'						12-16'	NO RECOVERY.
16-16.5'		SOIL				16-16.5'	DARK GREY-BLACK SILT WITH SOME GRAVEL. COLLECTED SOIL SAMPLE SB05-SS03 FOR As ANALYSIS. (OL w/GRAVEL)
16.5-20'						16.5-20'	NO RECOVERY.

FILE :P:\2005 PROJECTS\3551\0567-SOUTH CAPITAL St. BRIDGE\CAD\DWG 3- EXISTING AND PROPOSED PLAN.DWG



PROPOSED ALIGNMENT
S. CAPITOL ST. BRIDGE

NOTE: PROFILE DEPICTED ON DRAWING 4 IS BASED ON EXISTING SOUTH CAPITOL BRIDGE ALIGNMENT. SUBSURFACE CONDITIONS ALONG THE PROPOSED NEW ALIGNMENT CAN BE PROJECTED ALONG THE SECTION LINES SHOWN ON THIS SHEET.

EXISTING S. CAPITOL ST. BRIDGE

MACTEC

MACTEC Engineering and Consulting, Inc.
22455 Davis Drive, Suite 100
Sterling, Virginia 20164

DRAWN BY: NM	CHECKED BY: MIH
DATE: 5/24/05	DATE: 5/24/05
DESIGNED BY:	APPROVED BY: JCG
DATE:	DATE: 5/24/05

REVISIONS

NO.	DESCRIPTION	DATE

PROJECT:
SOUTH CAPITAL ST. BRIDGE

TITLE:
PLAN ON EXISTING & NEW ALIGNMENTS

DATE: 5/24/05
SCALE: 1" = 300'
PROJECT NO.: 3551-05-0567
DRAWING NO.: 3

SCALE: AS SHOWN

MATERIAL LAYERING CODES

- ▨ Fill
- ▨ Low Plasticity Inorganic Clays (CL)
- ▨ High Plasticity Inorganic Clays (CH)
- ▥ Low Plasticity Inorganic Silts (ML)
- Topsoil
- ☐ Poorly Graded Sand (SP)
- Well Graded Sand (SW)
- ▥ Silty Sand (SM)
- High Plasticity Inorganic Silts (MH)
- Peat/Organic Muck
- Poorly Graded Sand with Clay (SP-SC)
- Silty Clayey Sand (SC-SM)
- High Plasticity Organic Soils (OH)
- ▨ Clayey Sand (SC)
- Hard Zone
- ▥ Poorly Graded Sand with Silt (SP-SM)
- Low Plasticity Organic Soils (OL)
- ▤ Very Hard Zone

SOUTH CAPITOL STREET BRIDGE
OVER THE ANACOSTIA RIVER
WASHINGTON, D. C.

PROJECT NO: 3551-05-0567

MACTEC

MACTEC Engineering and Consulting, Inc.
22455 Davis Drive , Suite 100
Sterling, Virginia 20164

PRELIMINARY

DRAWING 4

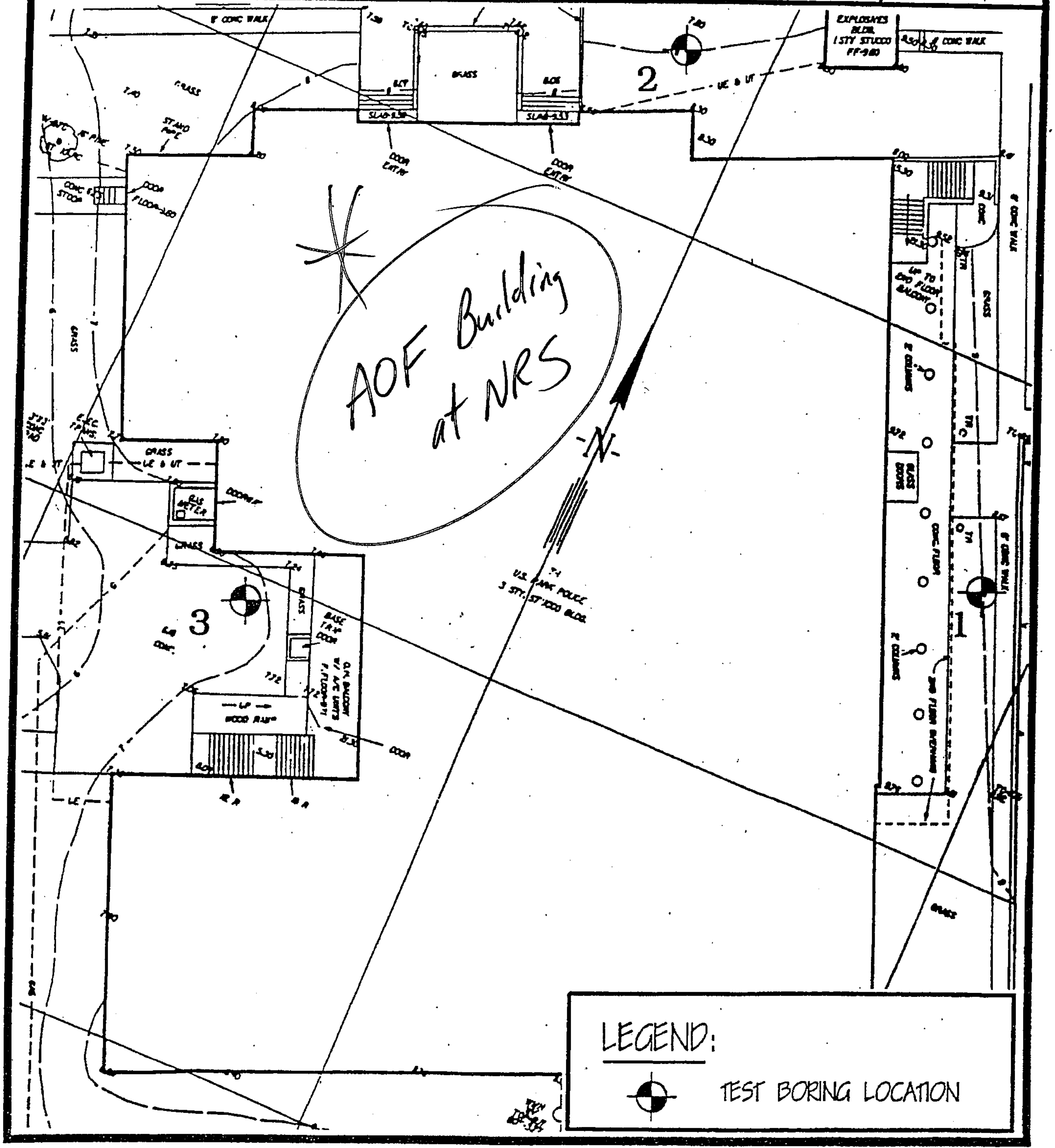
ESTIMATED SUBSURFACE PROFILE
ALONG THE PROPOSED BRIDGE ALIGNMENT

SCHNABEL
ENGINEERING
ASSOCIATES
10215 FERNWOOD RD. SUITE 250
BETHESDA, MD 20817 301-564-9355

ANACOSTIA OPERATIONS FACILITY

TEST BORING LOCATION PLAN

SCALE: 1"=30'
DATE: FEBRUARY, 1995
CONTRACT NO.: 942179
DRAWN BY: C. WICHT
APPROVED BY: PB



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SCHNABEL ENGINEERING ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS
TEST BORING LOG

Project: Anacostia Operations Facility

Contract Number: 942179
Boring Number: B-1
Sheet: 1 of 2

Boring Contractor: STEVENS DRILLING, INC.

Boring Foreman: Thacker
Drilling Method: 2¼" HOLLOW STEM AUGER
Drilling Equipment:

SEA Representative: R.D. Thomas

Dates Started: 08/09/94 Completed: 08/09/94

Location: Anacostia Park, Washington, D.C.

Ground Surface Elevation: 9.0 ±

Groundwater Observations	Date	Time	Depth	Casing	Caved
Encountered	8-9	10:00	10.0		
Completion					
Casing Pulled					
W.O.W.	8-10	10:30	5.0		

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
0.4	topsoil		8.6			5+6+8		
	silty sand, PROBABLE FILL, moist, orange, brown			A		6+9+13	7.0	
					5	1+1+1		
						1+2+4		
9.5	ELASTIC SILT, trace gravel, with pockets of silty sand, moist to wet, gray, brown	MH	-0.5		10	2+1+2		
					15	1+1+1	69.0	
					20	1+1+1		
					25	1+2+2		
				B				
					30	1+2+1		
					35	1+1+1		
38.5	sandy ELASTIC SILT, trace gravel, wet, gray, brown	MH	-29.5					
					40	1+2+4		
					45	5+4+9		
48.5	WELL GRADED SAND, with silt and gravel, wet, brown	SW	-39.5	C				
50.0			-41.0		50			

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: Anacostia Operations Facility	Contract Number: 942179 Boring Number: B-1 Sheet: 2 of 2

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
	FAT CLAY, moist, gray	CH			■	6+8+12		
				D	55			
					■	7+9+11	36.0	
					60			
61.5	BOTTOM OF BORING @ 61.5 FT.		-52.5		■	7+9+12		

Comments:

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: Anacostia Operations Facility	Contract Number: 942179 Boring Number: B-2 Sheet: 1 of 2

Boring Contractor: STEVENS DRILLING, INC.

Boring Foreman: Thacker
Drilling Method: 2¼" HOLLOW STEM AUGER
Drilling Equipment:

SEA Representative: R.D. Thomas

Dates Started: 08/10/94 Completed: 08/10/94

Location: Anacostia Park, Washington, D.C.

Ground Surface Elevation: 8.0 ±

Groundwater Observations	Date	Time	Depth	Casing	Caved
Encountered	8-10	9:30	5.0		
Completion	8-10	11:00	5.0	NONE	27.0
Casing Pulled					

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
0.3	topsoil		7.7			4+7+11		
	silty sand, trace gravel, FILL, trace brick, dry, brown			A		12+16+18		
5.0	silty sand, PROBABLE FILL, moist, gray, brown		3.0		5	4+2+1		
8.0	ELASTIC SILT, trace gravel, with pockets of silty sand, moist, gray	MH	0.0			2+1+1	18.3	
					10	1+1+1		
					15	2+1+2		
					20	2+1+1	63.5	
				B	25	1+1+1		
					30	2+2+1	73.7	
					35	1+1+2		
					40	1+1+1		
43.0	POORLY GRADED SAND, with silt and gravel, wet, brown	SP	-35.0	C	45			Running sand, No sample recovery @ 45.0'
48.0	FAT CLAY, moist, light gray	CH	-40.0		50			

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: Anacostia Operations Facility	Contract Number: 942179 Boring Number: B-2 Sheet: 2 of 2

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
						7+8+11		
				D				
					-55	9+10+12		
					-60			
61.5	BOTTOM OF BORING @ 61.5 FT.		-53.5			9+10+11		

Comments:

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: Anacostia Operations Facility	Contract Number: 942179 Boring Number: B-3 Sheet: 1 of 2

Boring Contractor: STEVENS DRILLING, INC.

Boring Foreman: Thacker
Drilling Method: 2¼" HOLLOW STEM AUGER
Drilling Equipment:

SEA Representative: R.D. Thomas

Dates Started: 08/09/94 Completed: 08/09/94

Location:

Ground Surface Elevation: 7.0 ±

Groundwater Observations	Date	Time	Depth	Casing	Caved
Encountered	8-9	2:00	8.0		
Completion	8-10	7:30	7.0	NONE	37.0
Casing Pulled					

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
0.5	concrete		6.5					
	silty sand, PROBABLE FILL, moist, orange, brown			A	5	4+5+5 1+1+1 1+1+2		
8.0	ELASTIC SILT, trace gravel, with pockets of silty sand, moist to wet, gray	MH	-1.0	B	10 15 20 25 30 35 40	2+1+2 1+2+2 WOH+1+1 1+2+2 2+1+2 1+1+2 2+1+1		
42.0	POORLY GRADED SAND, trace silt and gravel, wet, gray, brown	SP	-35.0	C	45	2+3+5		
48.0	FAT CLAY, moist, brown	CH	-41.0		50	8+10+11	42.1	

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	Project: Anacostia Operations Facility	Contract Number: 942179 Boring Number: B-3 Sheet: 2 Of 2

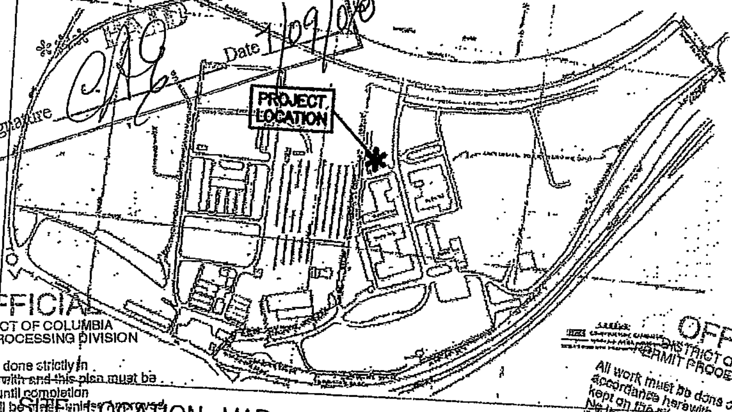
DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
				D	55	8+11+12	35.5	
						9+9+10		
60.0	BOTTOM OF BORING @ 60.0 FT.		-53.0		60			

Comments:

REMOVE UNDERGROUND STORAGE TANK AND PUMP

USPP - AOF

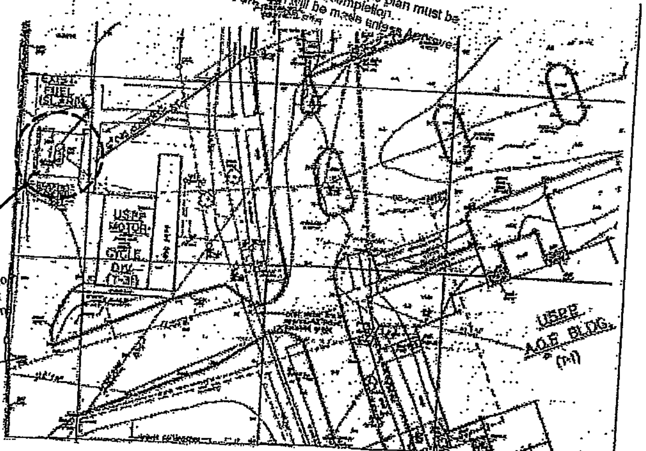
Government of the District of Columbia
Environmental Health Administration
Watershed Protection Division
☑ Erosion/Sediment control. ☐ Stormwater Management
Review fees
Signature CAE Date 7/09/08



OFFICIAL
DISTRICT OF COLUMBIA
PERMIT PROCESSING DIVISION
All work must be done strictly in accordance herewith and this plan must be kept on the site until completion. No inspection will be made unless Approved Plans are on job site.

SITE LOCATION MAP
NOT TO SCALE

OFFICIAL
DISTRICT OF COLUMBIA
PERMIT PROCESSING DIVISION
All work must be done strictly in accordance herewith and this plan must be kept on the site until completion. No inspection will be made unless Approved Plans are on job site.



EXISTING SITE PLAN
NOT TO SCALE

DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH ADMINISTRATION
WATERSHED PROTECTION DIVISION
SEDIMENT CONTROL APPROVAL

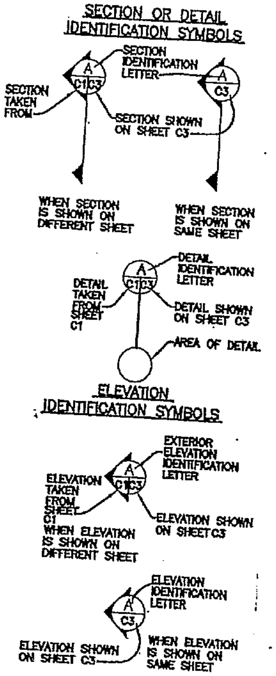
PLAN NUMBER: ______

PROJECT LOCATION

NOTICE: This approval is for the Grading and Sedi[illegible] permit. The applicant is required to construct design features as shown [illegible] plans. The applicant must notify this office by phone (see below) at least 24 hours prior to the start of grading activity and within two (2) weeks after completion of project to request final inspection. If there is need to make any changes or modification in the approved design, this office must be notified immediately.

Approved by: 7/09/08 Date
Phone: (202)- 535-2240

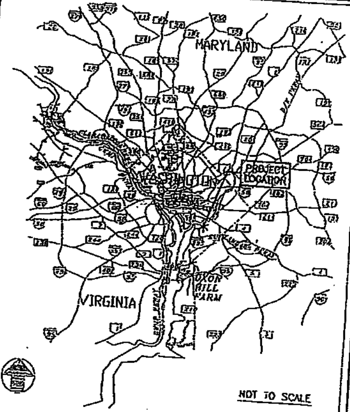
OFFICIAL
DISTRICT OF COLUMBIA
PERMIT PROCESSING DIVISION
All work must be done strictly in accordance herewith and this plan must be kept on the site until completion. No inspection will be made unless Approved Plans are on job site.



— ACCESS ROUTE
✱ PROJECT SITE LOCATION

DISTRICT OF COLUMBIA
PERMIT PROCESSING DIVISION
STRUCTURAL WORK IN GENERAL APPROVED
SUBJECT TO THE FURTHER
APPROVAL OF CONSTRUCTION
STRUCTURAL ENGR. SECTION
DATE: JUL 0 9 2008

VICINITY MAP



NOT TO SCALE

SHEET INDEX

SHEET	SUBSECTION	SHEET TITLE
1	CS-1	COVER SHEET
2	M-1	AS-BUILT DRAWINGS, PLANS, DETAILS & SCHEMATICS REFLECTING ALL WORK TO BE REMOVED
3	M-2	SILT FENCE & BACKFILL DETAILS

7/5/07
Joseph M. Lardin 10/29/07

CS-1

NO.	BY	DATE	REVISIONS

COVER SHEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE — NATIONAL CAPITAL REGION
[illegible]

REMOVE UNDERGROUND STORAGE TANK AND PUMP
USPP-AOF
ANACOSTIA PARK
NATIONAL CAPITAL [illegible]

BASTA
SUGGS
STAFF
831
84285
6/29/2007

SITE PROFILE
SOIL SAMPLING

Job Number:

Date: 7/30/08

Job Name: N-POWELL COMPANY

Time: 8:30

Site Address: NPS - ANACOSTIA PARK USPP
1900 ANACOSTIA DR. SE
WASHINGTON DC

Personnel: STEVE BURNS.

Observations: (weather, soil type; clay, sand, etc., water in excavation, unusual situations): REMOVED ONE 10,000 GAL DOUBLE WALL FIBERGLASS TANK. GROUND WATER OBSERVED AROUND TANK. PUMPED OUT TANK AND REMOVED FROM GROUND. NO ODOR TO H2O IN PIT. OR TO SOILS. COLLECTED SOIL + H2O SAMPLE AS DIRECTED BY INSPECTOR. NO PERFORATIONS OBSERVED. NO APPARENT SOIL CONTAMINATION.

Excavation Dimensions (LxWxDepth): ~ 32 X 12 X 11

Laboratory Analysis: ✓ GRO 8015B TPH ✓ 8021B BTEX OTHER:

Turnaround Time: 24hr 1 wk 2 wk Other:

Loc	Depth	AA	HS	Sample ID
	FEET			
1	7.5			708-AOF-01
2	7.5			708-AOF-02
3	7.5			708-AOF-03
4	7.5			708-AOF-04
5	8.0			708-AOF-05
↳ H2O SAMPLE				

(Indicate North arrow in box)

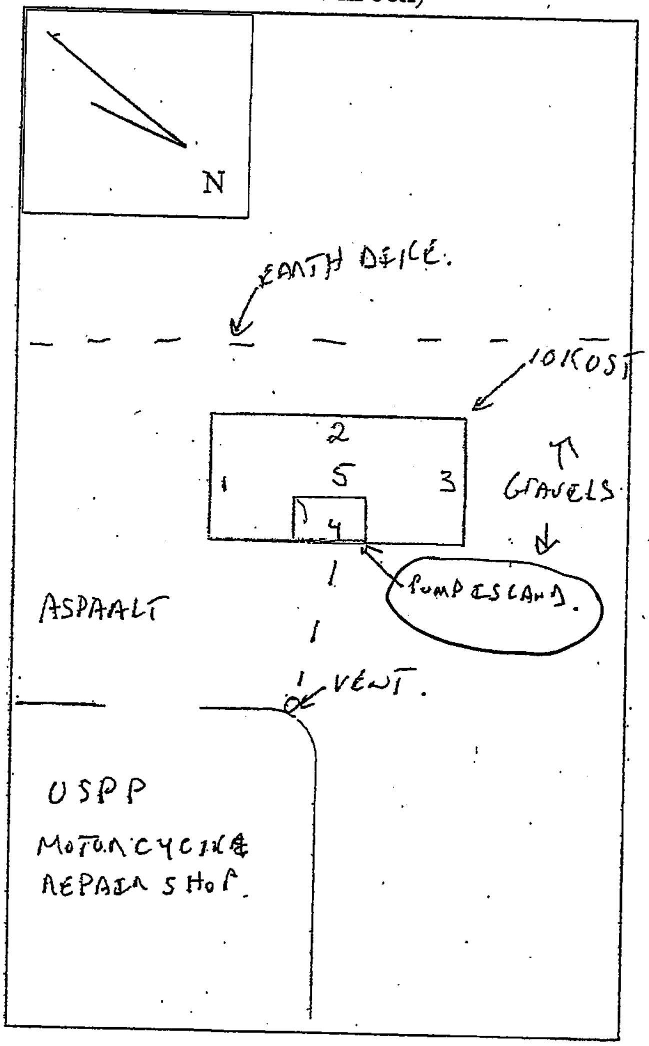


Table 1: Laboratory Analysis Results

Sample ID	Date	Depth (feet)	Matrix	TPH-GRO (mg/kg or mg/L)	Naphthalene ug/kg	BTEX (ug/kg or ug/L)
708-AOF-01	7/30/08	7.5	Soil	BDL	N/A	14.0
708-AOF-02	7/30/08	7.5	Soil	BDL	N/A	19.0
708-AOF-03	7/30/08	7.5	Soil	BDL	N/A	10.2
708-AOF-04	7/30/08	7.5	Soil	BDL	N/A	3.4
708-AOF-05	7/30/08	8.0	Water	BDL	N/A	7.6

ug/kg

ug/L

mg/kg –milligram per kilogram, equivalent units parts per million
ug/kg – micrograms per kilogram, equivalent units parts per billion
mg/L – milligrams per liter, equivalent units parts per million
ug/L – micrograms per liter, equivalent units parts per billion
BDL – Below method detection limits
TPH-GRO analysis by EPA method 8015B modified, Detection limits 0.5 mg/kg
BTEX analysis by EPA method 8021 or 524.2, Detection limits 2 ug/kg and 1 ug/l

The excavation pit was backfilled with clean select fill material and the area restored to original condition. The sample results indicate that very low concentrations of residual soil and ground water hydrocarbon contamination remain in the subsurface at this property at a depth of seven to eight feet below existing grade. The contaminant levels are well below Tier 0 screening levels as assigned by the DC DOH UST Division Technical Guidance document. Therefore, AES is recommending clean closure for the tank removal at this site.

AES has enclosed a UST closure notification form and all supporting documentation (i.e., waste and tank disposal manifest, laboratory results etc.) for the referenced Site. Our client, N-Powell Company is requesting a letter of compliance for the referenced property if the DOH UST Division agrees with our assessment of the situation at the site. The compliance letter should be forwarded to Mr. Will Allison at N-Powell Company, 3831 Main Street, P.O. Box 239, Weirton, WV 26062. Please forward a copy of the letter to AES for our records.