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WASHINGTON NAVAL YARD, DC  
SSIC 5000-33a

**FEDERAL FACILITY AGREEMENT FINAL SITE MANAGEMENT PLAN FISCAL  
YEAR 2018 WASHINGTON NAVY YARD DC**

09/01/2017  
CH2M HILL

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FFA Final

**Site Management Plan  
Fiscal Year 2018**

**Washington Navy Yard  
Washington, D.C.**

**Contract Task Order JU21**

**September 2017**

Prepared for

**Department of the Navy  
Naval Facilities Engineering Command  
Washington**

Under the

**NAVFAC CLEAN 9000 Program  
Contract No. N62470-16-D-9000**

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# Acronyms and Abbreviations

AOC	area of concern
AOI	analyte of interest
AOU	accelerated operable unit
AWTA	Anacostia Watershed Toxics Alliance
Baker	Baker Environmental, Inc.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (“Superfund”)
DC	District of Columbia; also known as The District
DCDOH	District of Columbia Department of Health
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DOEE	District of Columbia Department of Energy and Environment
EA	exposure area
EE/CA	Engineering Evaluation/ Cost Analysis
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
FFA	Federal Facility Agreement
FFS	Focused Feasibility Study
FS	Feasibility Study
ft <sup>2</sup>	square feet
FY	fiscal year
GSA	General Services Administration
IFI	Initial Findings Investigation
IR	Installation Restoration
LUC RD	Land Use Control Remedial Design
MC	munitions constituents
MEC	munitions and explosives of concern
MR	munitions response
MRP	Munitions Response Program
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NFA	no further action
NPL	National Priorities List
NTCRA	non-time-critical removal action
OHM	OHM Remediation Services
OU	operable unit
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RA	remedial action
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RD	remedial design

RI	Remedial Investigation
ROD	Record of Decision
SEFC	Southeast Federal Center
SI	Site Investigation
SMP	Site Management Plan
SSA	site screening area
SSP	site screening process
SVOC	semivolatile organic compound
TCE	trichloroethylene
TCRA	time-critical removal action
UST	underground storage tank
VOC	volatile organic compound
WNY	Washington Navy Yard
WWII	World War II

# Introduction

This Site Management Plan (SMP) for the Washington Navy Yard (WNY), Washington, D.C.,<sup>1</sup> fulfills the requirements for an SMP, as described in Section XII of the Federal Facility Agreement (FFA) (U.S. Environmental Protection Agency [EPA], 1999). Additional information regarding the FFA is presented in Section 1.5.

Naval Facilities Engineering Command (NAVFAC) Washington and CH2M HILL have prepared this SMP for use by the NAVFAC Washington, EPA Region III, the District Department of Energy and Environment (DOEE), and the WNY Restoration Advisory Board (RAB).

## 1.1 Purpose of the Site Management Plan

The purpose of this SMP and each of its annual amendments is to provide the Department of the Navy (Navy), EPA, and DOEE personnel with a management tool for planning, scheduling, and setting priorities for environmental remedial response activities to be conducted at WNY. This SMP addresses all activities, both completed and planned, associated with successfully implementing the Environmental Restoration (ER) and Munitions Response (MR) programs at WNY as follows:

- A description of actions necessary to mitigate any immediate threat to human health or the environment.
- A listing of all currently identified areas of concern (AOCs), site screening areas (SSAs), ER sites, operable units (OUs), MR Program (MRP) sites, interim remedial actions (RAs), supplemental response actions, and critical and non-time-critical removal actions (NCRAs).
- Activities and schedules for response actions covered by the SMP, including identification of primary actions, project end dates, and deadlines and milestones agreed to by EPA, DOEE, and the Navy. The deadlines and milestones consist for this SMP of the following:
  - Near-term milestones for the current fiscal year (FY) 2018, the next FY, or “budget year” (FY+1); and the year for which the budget is being developed, or “planning year” (FY+2)
  - Out-year milestones for the years after the planning year until the completion of the cleanup or a phase of it (FY+3 through the project end date)
  - Project end dates for the completion of major parts of the cleanup or for the cleanup as a whole
  - Only near-term milestones for work performance and deliverables submissions within the current FY are enforceable and subject to stipulated penalties under the FFA.

As ordered in the FFA, the SMP will be updated, and an amended FFA Draft SMP is due to EPA and DOEE by June 15 each year. The Navy, EPA, and DOEE will attempt to agree on milestones before the submittal of the annual amendment; inability to reach agreement may result in the initiation of the dispute resolution process.

The drafting of this SMP was completed in June 2017 with concurrence from EPA and DOEE. However, according to the FFA, this SMP will not be considered a final document until funds authorized and appropriated by Congress are received by the Navy so that planned work for this FY, as defined in this SMP, can be accomplished. The SMP is a working document that is updated yearly to maintain current documentation and summarize the environmental actions at WNY. It presents the rationale for the sequence of environmental investigations and remedial response activities to be completed for each site, as well as the detailed schedule for completion of these activities. This SMP updates and supersedes the FY2017 SMP.

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<sup>1</sup> Also known as D.C., The District of Columbia, and The District

## 1.2 Facility Description

The Navy has always owned WNY, the Navy's oldest shore station and the oldest continuously operated federal facility in the United States. It was established on October 2, 1799, as a shipbuilding yard on land set aside by a presidential order (EPA, 1999).

WNY is located on approximately 63 acres in southeastern Washington, DC. At its largest, WNY occupied approximately 129 acres. After World War II (WWII), WNY's role began to shift from primarily manufacturing to administration, which gradually resulted in the need for fewer facilities and less land. In the early 1960s, 63 acres were sold to the General Services Administration (GSA) for the Southeast Federal Center (SEFC).

WNY's original mission was the construction and maintenance of naval vessels. The prevalent activities at WNY from its establishment were industrial development and ordnance production. Ordnance production became WNY's mission by the 1860s. By WWII, the Yard served as the primary naval ordnance plant. The weapons designed and built there were used in every war in which the United States fought until the 1960s. At its peak, WNY consisted of 188 buildings and employed nearly 25,000 people. Small components for optical systems and enormous 16-inch battleship guns were all manufactured there. In December 1945, the Navy Yard was renamed the U.S. Naval Gun Factory. In 1959, WNY was redesignated the United States Naval Weapons Plant. After WWII, administrative activities continued to replace industrial work as the primary function of the facility. Some industrial activities continued for some years after WWII until finally being phased out in 1961. In July 1962, the installation became the Washington Navy Yard Annex. On 1 July 1964, it reverted to its traditional name of Washington Navy Yard. The deserted factory buildings began to be converted to office use.<sup>2</sup>

Simultaneous with WNY's development, additional property was added by filling a shallow embayment of the Anacostia River. The source of the material used to fill the embayment was not documented (EPA, 1999). Archival records indicate that the hulls of five ships scuttled during the 1812 British invasion are buried in the fill material. Cannons have been found during excavations, and a small quantity of elemental mercury was found and removed (refer to Site 16 discussion in Section 2.1).

Currently, WNY consists of administrative, supply, and storage buildings; residences; training facilities; and museums. Many former industrial and storage buildings have been converted to office buildings. Several buildings were renovated for office space to accommodate approximately 4,000 employees who, in 2001, were reassigned to WNY from leased offices in northern Virginia. Figure 1-1 shows WNY boundaries and existing structures at the facility.

## 1.3 Site Characteristics and Environmental Setting

This section describes WNY's site characteristics and environmental setting—including the land topography and use, climate, geology, hydrogeology, and hydrology.

### 1.3.1 Topography

WNY lies on naturally placed deposits and filled areas of the Anacostia River, and slopes generally southward from the facility's northern part to the river. The land slopes generally northeast to the south and southwest, with ground surface elevations ranging from approximately 50 to 55 feet above mean sea level in WNY's northeastern part to less than 10 feet above mean sea level along the bulkhead adjacent to the Anacostia River.

### 1.3.2 Land Use

WNY covers 63 acres and borders the Anacostia River in southeastern Washington, DC. (Figure 1-1). Adjacent land use includes occupied and vacant commercial properties across M Street to the north, a former industrial area

<sup>2</sup> Naval Historical Center Home Page, History of the Washington Navy Yard (<http://www.history.navy.mil/faqs/faq52-1.htm>)

(Washington Gas East Station property)<sup>3</sup> and commercial buildings across the 11th Street bridge alignment to the east, the SEFC<sup>4</sup> to the west, and the Anacostia River to the south. Several streets perpendicular and adjacent to M Street contain single-family townhouses. Industrial, commercial, and residential properties are within a 1-mile radius of the facility.

Currently, WNY contains administrative, supply, and storage buildings; residences; training facilities; and museums. Buildings and other impervious surfaces cover approximately 95 percent of WNY, with 2.7 acres of parkland (for example, Leutze Park, located in the north-central area) being the only substantially vegetated area in a largely urban setting (EPA, 1999).

Access to, and interaction of, the WNY and the neighboring communities have been restricted by the 10-foot-high brick walls encircling WNY. The walls were constructed in the early 1800s, and their height was raised to 10 feet after the fire of 1814 to further secure the facility. In addition, WNY's physical location along the Anacostia River and near several major highways, roads, and the 11th Street Bridge tends to limit the community's access to WNY. However, the proposed Anacostia Riverwalk Trail, a completed portion of which traverses the WNY waterfront, has provided higher public visibility of the Yard. The riverwalk, one feature of the District of Columbia's Anacostia Waterfront Initiative, is a comprehensive trail system extending on the east side of the Anacostia River from South Capitol Street to the Bladensburg Trail in Maryland and on the west side of the Anacostia River from 11th Street to Benning Road. Its construction is currently underway through partnership between the District of Columbia Department of Transportation and the National Park Service, with 15 of the planned 28 miles currently open and heavily used<sup>5</sup>.

Events at WNY, located in the District's Ward 6, have the potential to affect the communities of Wards 2, 6, 7, and 8 (CH2M HILL, 2004d). The neighborhoods around WNY comprise of a culturally diverse population. Capitol Hill, one of the most politically significant areas in the world, is only a few blocks from WNY, in Ward 6. Adjacent neighborhoods west of South Capitol Street and east of the Anacostia River are also diverse, but have more low-income residents (CH2M HILL, 2004d).

Ongoing redevelopment of SEFC (enabled by the *Southeast Federal Center Public-Private Development Act of 2000*) is dramatically changing the area immediately west of the WNY and is attracting younger, more affluent residents. The SEFC — or “The Yards” — redevelopment includes government office buildings (U.S. Department of Transportation, completed in 2007), as well as residential (apartments and condominiums), commercial (retail and office buildings), cultural/community space, public utilities (DC sewage pumping stations), and open space/recreational (waterfront park). To the west of SEFC is the Washington Nationals baseball stadium, which opened in 2008 and has contributed to the pace of redevelopment.

According to the DC Office of Tax and Revenue, Real Property Tax Administration's real property database, more than half of the area surrounding WNY west of the river consists of parks, recreation, and open space. The remainder is primarily commercial and federal (including WNY), with a growing percentage of medium and moderate density residential, and small areas of local public facilities. Nearly half of the area surrounding WNY east of the river consists of moderate density residential. The remainder is a mix of commercial; parks, recreation, and open space; production and technical employment; and small areas of federal and local public facilities<sup>6</sup>.

Other military installations and reservations located along the banks of the Anacostia River or on the Potomac River, within a short distance to the WNY, include Fort Lesley J. McNair, the U.S. Marine Corps Barracks, Joint Base Bolling (Air Force) and Anacostia (Navy), Naval Research Laboratory, and Camp Simms (DC National Guard).

The Anacostia River is used for boating or other recreational purposes by residents throughout the District, as well as those from suburban Maryland and Virginia. Access to the river for boating is provided by ramps in Anacostia Park, as well as through the Washington Yacht Club, Eastern Power Boat Club, Anacostia Yacht Club, Seafarers

<sup>3</sup> The Washington Gas property is a CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System)—listed site.

<sup>4</sup> SEFC is currently a Resource Conservation and Recovery Act (RCRA) Corrective Action Site and was formerly part of WNY.

<sup>5</sup> Information accessed on June 16, 2017, at <https://anacostiawaterfront.org/awi-transportation-projects/anacostia-riverwalk-trail/>

<sup>6</sup> Information accessed on June 15, 2017, at <http://otr.cfo.dc.gov/>

Yacht Club, and the Anacostia Community Boathouse, and the Capital Yacht Club, all of which are located within approximately 1 mile upstream or downstream of WNY.

Although there are currently no legal restrictions on fishing in the Anacostia River, both DOEE and Maryland Department of the Environment have issued fish consumption advisories that warn against eating certain bottom-dwelling fish from the Anacostia River; DOEE encourages catch and release of all fish. However, a 2011 study found that thousands of local anglers do eat the fish they catch in the Anacostia River, often share their catch with neighbors, and are generally unaware of the fish advisories. The study has been followed by a public awareness campaign to inform anglers, their families and friends about the risks of consuming the fish<sup>7</sup>.

### 1.3.3 Climate

Warm and humid summers and mild winters characterize the climate of Washington, DC. Because of its urban setting, its average temperature is generally several degrees higher than in the surrounding Maryland and Virginia suburbs and rural areas. July is generally the warmest month, with average daily temperatures in the upper 80s. The lowest temperatures are recorded generally in late January and early February, when average high temperatures are in the middle 40s. Average annual precipitation is 41 inches (Johnston, 1964).

### 1.3.4 Physiography, Hydrology, Geology, and Hydrogeology

A summary of WNY's physiography, surface water hydrology, geology, and hydrogeology is presented below and is based on information presented in the *FFA Revised Draft Operable Unit 1 Facility-wide Groundwater Remedial Investigation Report*, submitted in 2015 (CH2M HILL, 2015).

#### 1.3.4.1 Physiography

WNY is located near the western boundary of the Atlantic Coastal Plain physiographic province, which is characterized by relatively low, flat, deeply dissected topography. The facility is less than 5 miles east of the Fall Line, which marks the western extent of unconsolidated sediments overlying the crystalline rocks of the Piedmont Plateau physiographic province.

WNY is partially constructed on areas reclaimed from the Anacostia River. Since the late 1700s, the facility has grown through a series of shoreline expansions into the Anacostia River. Most land reclamation activities took place before 1900. The only areas of the WNY filled in after 1900 were the eastern extension (bounded by Parsons Avenue to the west, 11th Street to the east, and extending from the Anacostia River north to O Street) and former Slips 2, 3, and 4.

#### 1.3.4.2 Hydrology

WNY lies along the Anacostia River floodplain, 2 miles northeast, or upstream, of its confluence with the Potomac River. WNY's southern border covers approximately 2,400 feet (0.45 mile) of Anacostia River shoreline. The Anacostia River is approximately 1,050 feet (0.2 mile) wide at WNY and tidally influenced (CH2M HILL, 2002d). The Anacostia River directly adjacent to WNY is relatively deep, ranging from about 10 to 15 feet. No other surface water bodies are located on or near the facility.

The two major tributaries to the Anacostia River are the Northwest and Northeast Branches, which together drain 129 square miles, or 73 percent, of the Anacostia River watershed. Numerous tributaries feed into each of these branches. Sligo Creek is the primary tributary entering the Northwest Branch. The primary tributaries entering the Northeast Branch are Paint Branch, Little Paint Branch, Indian Creek, and Beaverdam.

Asphalt, concrete, and buildings cover the vast majority of WNY land surface. Therefore, most precipitation exits the site as surface runoff, with very little infiltration into the underlying soils. The overall surface drainage at WNY is toward catch basins and to the south toward the Anacostia River. There are a few areas of steep slopes in WNY,

<sup>7</sup> The subsistence fishing study and public awareness campaign were conducted in partnership by the Anacostia Riverkeeper, EPA, the Chesapeake Bay Trust (CBT), National Oceanic and Atmospheric Administration (NOAA), and the US Fish & Wildlife Service (FWS), Information accessed October 1, 2014, at <http://www.anacostiariverkeeper.org/subsistence-fishing>.

with the most evident located north of the original shoreline. Steeply sloping areas are found near the facility's southeastern corner, south of Warrington Avenue, and in the park area north of Building 76 (Figure 1-1). Runoff collected in catch basins is currently routed through eight stormwater lines to Outfalls 1, 5, 6, 7, 8, 9, 10, and 13—all of which discharge to the Anacostia River. Two District combined sewers (Outfalls 0014 and 0015) and one District separate storm sewer (Outfall 0001) traverse WNY and discharge to the Anacostia River at the WNY shoreline.

#### 1.3.4.3 Geology

WNY is immediately underlain by heterogeneous fill placed in stages over the last 200 years. The fill is generally thickest near the river and in the western areas of WNY, where a former embayment of the river had previously existed (approximately 20 to 30 feet thick), and thinnest (approximately 5 to 10 feet thick) at the northern boundary of WNY. The fill is underlain by organic silty clay (alluvium), coarser-grained sand, and gravel materials of the sand and gravel deposits and/or the silt and clay of the Potomac Group, depending on the location at WNY. The geologic formations that underlie WNY and their characteristics are summarized in Table 1-1 and consist of a heterogeneous sequence of unconsolidated gravel, sand, silt, clay, and anthropogenic fill.

#### 1.3.4.4 Hydrogeology

The water table occurs in the fill hydrogeologic unit in most of WNY and generally slopes south and southwest toward the river. The water table is typically present between 5 and 15 feet below ground surface. The alluvium hydrogeologic unit appears to serve as a semiconfining unit between the groundwater in the fill and an underlying localized sand and gravel hydrogeologic unit by virtue of its lower hydraulic conductivity and fine-grained character. The underlying Potomac silt and clay (below the localized sand and gravel) serve as a relatively impermeable lower limit to the groundwater system underlying WNY. The general groundwater flow direction for the semiconfined sand and gravel unit is south. Tidal fluctuations in the Anacostia River influence the groundwater levels in wells near the shore in all three water-bearing units; however, the influence does not appear to extend farther than about 150 to 200 feet inland.

### 1.3.5 Regional and Facility Water Usage

The U.S. Army Corps of Engineers, Washington Aqueduct Division's Dalecarlia and McMillan Water Treatment Plants—located in Washington, DC—provide potable water for WNY and most of the District and Arlington and Falls Church, VA. The current source of water to the District public water supply system is surface water from the Potomac River. DOEE believes there are private wells that may exist in the District, according to the Johnston (1964) report. However, the District did not begin to maintain well records until the 1990s. The nearest known private well is located at a private residence in the Palisades section of the District, approximately 5 miles northwest of WNY (District of Columbia Department of Health [DCDOH], 2003). DOEE is not aware of any public potable water supply wells in the Washington, DC, area. Groundwater in the District of Columbia is used for other non-potable purposes.

A production well was installed at the WNY in 1954 at the present-day location of Building 291, just south of Warrington Avenue (Johnston, 1964). Building 291 is identified on the map of the U.S. Naval Gun Factory, March 8, 1959, as the Deep Well and Pumphouse Building (Navy, 1959). The production well was reportedly 367 feet deep and screened across the Patuxent Formation (Johnston, 1964). According to Naval District Washington, this well was closed in the late 1960s and covered by the current Building 291 (Miller, 1999). The method of abandonment of this well is not known. No other production wells (industrial or potable supply) are known to exist at or adjacent to WNY (EPA, 1999).

### 1.3.6 Habitats and Biota

As noted earlier, approximately 95 percent of WNY is covered with buildings or other impervious surfaces. Approximately 2.7 acres of lawns and parkland, including Leutze Park, located in the north-central part of the facility, are the only substantially vegetated areas of the largely industrial facility. Therefore, there is little habitat available for ecological receptors at the facility, with the exception of the limited habitat in the lawns and park.

Because WNY abuts the Anacostia River, the near-shore sediments and water column immediately adjacent to WNY represent the only other habitat present for receptor species. Although the Anacostia is a tidally influenced river, the waters of the Anacostia River adjacent to WNY are freshwater and support a warm-water fish community.

#### 1.3.6.1 Flora

The urbanized area near WNY contains minimal vegetation cover. Ground surfaces are covered by buildings, pavement, and sidewalks, with few occurrences of bare ground and grass patches emerging between pavement sections. Vegetation in the area consists primarily of planted street trees (American elm, red maple, and pin oak), ornamental shrubs and flowers, and grass in the park areas (Navy, 2000).

The Anacostia River directly adjacent to WNY is relatively deep, ranging from about 10 feet to 15 feet deep, and therefore does not support submerged aquatic vegetation.

#### 1.3.6.2 Fauna

Wildlife present in the surrounding area is limited to species that thrive in and around urban areas. WNY itself is likely to have relatively few species given the scale of development at the Yard (Katju, 2003). Typical bird species expected at WNY include pigeons and doves (Family *Columbidae*), European starlings (*Sturnus vulgaris*) house sparrows (*Passer domesticus*), and gulls (Family *Laridae*) from the Anacostia River. However, piscivorous birds such as cormorants and osprey are common in the area, as are mallards, which may be seen foraging in the river. Many birds in this area are accustomed to human activities and do not appear to be bothered by noise and movement nearby. As an example, at least three osprey nests are on the South Capitol Street Bridge, a major transportation link to downtown DC. This bridge is approximately 800 yards from WNY. A list of known bird species found in the Lower Anacostia River watershed in the vicinity of WNY is presented in Table 1-2.

Fish species found in the Anacostia River include those listed in Table 1-3. In addition to fish, freshwater mussels are also likely found in the river.

#### 1.3.6.3 Rare, Threatened, and Endangered Species

Bald eagles have been observed in the vicinity of WNY, but have never been observed on WNY.

## 1.4 Regulatory Background

The discussion of the regulatory background begins with the establishment of the ER Program, previously known as the Installation Restoration (IR) Program. This is followed by the impacts of the integration of RCRA and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or "Superfund") regulatory agreements (and the FFA) on WNY.

### 1.4.1 Environmental Restoration Program

In 1975, the Department of Defense (DoD) began an ER Program (known as the IR Program at that time) to assess past hazardous and toxic materials storage and disposal activities at military installations. The goals of the ER Program were to:

- Identify environmental contamination resulting from past hazardous materials management practices
- Assess the impacts of the contamination on public health and the environment
- Provide corrective measures as required to mitigate adverse impacts to public health and the environment

In 1976, Congress passed RCRA to address potentially adverse human health and environmental impacts of hazardous waste management and disposal practices. RCRA was legislated to manage the present and future disposal of hazardous wastes. In 1980, CERCLA (or "Superfund") was passed to investigate and remediate areas affected by past hazardous waste management practices. This program is administered by EPA and/or state agencies.

In 1981, the DoD’s ER Program was reissued, with additional responsibilities and authorities specified in CERCLA, and delegated to the Secretary of Defense. The Navy subsequently restructured the ER Program to match the terminology and structure of CERCLA. The current ER Program is consistent with CERCLA and applicable state environmental laws.

### 1.4.2 RCRA-CERCLA Integration and Legal Settlement

On February 13, 1985, the Navy submitted a “Notification of Hazardous Waste Activity” to the EPA, identifying itself as a generator of hazardous wastes, specifically polychlorinated biphenyls (PCBs).

In July 1996, the Earth Justice Legal Defense Fund filed a class-action lawsuit against the Navy and GSA, seeking remedy for contamination at WNY, SEFC, and the Anacostia River. In April 1998, the Navy, U.S. Department of Justice, and Earth Justice Legal Defense Fund negotiated a Consent Decree to accelerate the timetable for specific cleanup activities at WNY.

On July 16, 1997, EPA and the Navy entered into a Consent Order to perform a RCRA Facility Investigation at WNY to determine the nature and extent of potential releases of hazardous wastes, solid wastes, and/or hazardous constituents at or from the facility (Section 1.6) (CH2M HILL, 1999). EPA’s jurisdiction to issue the Consent Order derived from authority vested in EPA by Section 7003 of RCRA, as amended by the Hazardous and Solid Waste Amendments of 1984, which also mandates compliance by generators of solid and/or hazardous waste (which includes the Navy).

On March 6, 1998, EPA proposed WNY for listing on the Federal Facilities section of the National Priorities List (NPL) by publishing a proposed rule in the *Federal Register* (volume 63, number 44, pages 11,339–11,345). The *Federal Register* notice announced EPA’s public comment period for the proposed listing of WNY (and several other sites) from March 6, 1998, through May 5, 1998. The addition of WNY on the NPL was effective on August 27, 1998 (EPA, 1999). The NPL, established by CERCLA, is EPA’s list of the highest-priority hazardous waste sites in the nation. It is updated at least once a year. There are currently 1,336 final sites and 53 proposed sites on the NPL, of which 157 final sites and 3 proposed sites are Federal facilities.<sup>8</sup> Under CERCLA rules, federal agencies are responsible for investigating and carrying out most cleanup actions at their own facilities. Subsequently, EPA, DCDOH (the predecessor to the DOEE), and the Navy negotiated an interagency agreement (that is, an FFA).

## 1.5 Scope and Objectives of Federal Facility Agreement

An FFA between EPA Region III, DOEE (at that time, the DCDOH), and the Navy was signed on June 30, 1999. The FFA created an agreement covering the “investigation, development, selection, and implementation of response actions for all releases (or threatened releases) of hazardous substances, contaminants, hazardous wastes, hazardous constituents, or pollutants at or from the Site” (EPA, 1999). With the final FFA in place, the Navy functions as the lead agency, and EPA functions in an oversight role for the management and cleanup of WNY sites. DOEE’s role is to provide regulatory oversight and represent the District’s interest.

Effective on September 27, 1999, the FFA supersedes the RCRA Final Administrative Order of Consent signed on July 16, 1997 (Section 1.4). As ordered in the FFA, response activities conducted under RCRA auspices and described in the 1997 consent order will continue under the auspices of CERCLA and the Defense Environmental Restoration Program (DERP). The objectives of the 1997 RCRA Consent Order (which are now under CERCLA auspices) were to:

- Establish procedures and a schedule for appropriate response actions
- Conduct a RCRA Facility Investigation (now called a Remedial Investigation [RI] under CERCLA) to fully determine the presence, magnitude, extent, direction, and rate of movement of any hazardous wastes, solid wastes, or hazardous constituents identified at the facility

<sup>8</sup> As of May 16, 2017; information accessed on June 16, 2017, at <http://www.epa.gov/superfund/sites/npl/index.htm>.

- Perform a Corrective Measures Study (now called a Feasibility Study [FS] under CERCLA) to identify and evaluate alternatives for the necessary corrective actions (*Note: Corrective actions specifically described for WNY in the 1997 RCRA Consent Order included removal actions at Sites 6, 10, 14, 16, and stormwater outfalls [Section 1.6.2]*)

Additional requirements for the Navy from the 1997 RCRA Consent Order included the following:

- Complying with all applicable DC laws and regulations
- Providing the District (that is, DOEE) with copies of all deliverables submitted to EPA

Under the FFA, all decision documents, work plans, and other reports must be submitted for approval by both DOEE and EPA. The FFA intentionally outlines a partnership among EPA, DOEE, and the Navy so that the Navy can ensure that DOEE has the opportunity and means to become fully involved in the remedial process, allowing for the Navy's CERCLA responsibilities to be met. Pursuant to DERP, the Navy has established a RAB, composed of community members, that provides a mechanism for substantial community input in the remediation process.

## 1.6 Previous Investigations and Corrective Actions at WNY

This section presents a summary of the previous investigations and corrective actions completed at WNY. Several investigations, notifications, and/or reports (resulting from historical review of practices and/or documents, as well as previous investigations) led to the RCRA Consent Order and, subsequently, the FFA at WNY. Table 1-4 summarizes the significant ER Program-related investigations and removal actions performed at WNY, beginning with the Preliminary Assessment (PA). An overview of the CERCLA process activities (for example, RI/FS framework) is presented in Section 4.

### 1.6.1 Previous Investigations

A PA is the process of collecting and reviewing available information about a known or suspected waste disposal site or release. EPA or state governments use it to determine whether the sites require further study.

In 1988, the Naval Energy and Environmental Support Activity prepared a PA report that indicated the presence of petroleum releases in soil and groundwater at WNY. In 1993, Baker Environmental, Inc. (Baker) prepared another PA report that used historical documents, personnel interviews, and consultation with state and federal agencies to identify 16 AOCs at WNY requiring further study.

In 2006, Malcolm Pirnie conducted a PA to evaluate the potential for the presence of munitions-related impacts from a former Civil War-era experimental battery that was active at WNY between approximately 1844 and 1872.

A Site Inspection, or Site Investigation (SI), is the study phase that follows a PA. Its purpose is to collect more extensive information for a particular waste disposal or release site. The information is used to determine whether a site requires no further action (NFA), additional (that is, more-detailed) investigation, or a removal action. A removal action is an immediate action that is taken over the short term to address a release, or threatened release, of hazardous substances.

In 1996, Baker prepared a report titled *Final Site Investigation — Washington Navy Yard, Washington D.C.* The SI report presented the investigation results of 13 sites and two AOCs at WNY. Groundwater, surface soil, subsurface soil (more than 6 inches below ground surface), and river sediments samples were collected and analyzed from 1995 to 1996. The analytical data were compared to risk-based screening criteria in order to assess the potential risks to human health and the environment from exposure to both carcinogenic (cancer-causing) and noncarcinogenic contaminants. In addition, groundwater quality measurements were collected from a number of groundwater monitoring wells distributed throughout WNY, and sediment samples were collected at the end of several piers.

The Baker (1996) SI report concluded that the primary routes for human exposure to contaminants at WNY were incidental ingestion (accidental swallowing) of surface soil, subsurface soil, or groundwater. Neither groundwater nor surface water from the Anacostia River is used as a public potable water supply in the District. The SI report

also concluded that the risk of exposure was limited in several areas by the pavement that prevents accidental human contact with contaminated soil and groundwater. The District rejected this position (that is, DCDOH did not accept the SI Report) and informed the Navy that bioaccumulation of contaminants in fish must be considered a human health pathway.

A Final Administrative Order of Consent under Section 7003 of RCRA for WNY became effective on July 16, 1997 (Section 1.4). In the order, EPA “determined that there may be an imminent and substantial endangerment to human health and/or the environment due to releases of hazardous wastes and/or hazardous constituents at/or from the Facility (EPA, 1999).” The following sites and contaminants were recommended for further detailed investigation:

- Site 5 (Building 73, a former gun mount and metal fabricating shop) due to lead contamination in subsurface soil
- Site 6 (Buildings 116 and 118, WNY boiler house and power plant, respectively) due to polycyclic aromatic hydrocarbons (PAHs) and PCBs in subsurface soil and sediment
- Site 8 (Building 211, a former paint, oil, and chemical storage area, now used as a Reception Hall) due to PAHs in subsurface soil
- Site 10 (Admiral’s Row and officers’ housing area) due to lead in surface and subsurface soil, with high levels in some areas
- Site 11 (parking lot south of Building 166, which was a former site of three incinerators demolished in the 1970s) due to PAHs and lead in soil
- Site 14 (Building 292, formerly used to store PCB-containing equipment) due to PCBs in surface soil

DOEE added 28 additional sites/screening areas in a letter dated November 2, 1995.

Through the finalization of the WNY FFA in 1999, 17 sites and one OU were identified and listed in Appendix A of the FFA as requiring investigation through the CERCLA RI/FS process. These sites are discussed in more detail in Section 2.

As presented in Table 1-4, the Navy completed an Initial Findings Investigation (IFI) in 1999 (CH2M HILL, 2000a, 2000b). The IFI was the first investigation performed after the finalization of the FFA. The IFI involved investigation activities at 12 sites, as defined in the *Final Work Plan for the RCRA Facility Investigation* (CH2M HILL, 1999). Because the *Final Work Plan for the RCRA Facility Investigation* met the requirements of an RI work plan as documented in the FFA, it was adopted as the final RI work plan for WNY under the CERCLA auspice.

An RI is the process of evaluating the nature and the extent of contaminant releases (in greater detail than an SI) and collecting data in support of human health and ecological risk assessments and an FS (if required). This process is called “characterization” and typically involves collecting groundwater, soil, and sediment samples and analyzing them for hazardous constituents. Overall, RI project objectives may be divided into three groups:

- Contaminant Source Characterization
  - Identify the constituents of concern at each site
  - Evaluate the nature and extent of contamination
  - Evaluate the potential for present and future releases
  - Assist with the selection and evaluation of remedial alternatives for identified contaminant releases
- Contaminant Release Confirmation
  - Evaluate whether releases have occurred from the sites to soil, groundwater, air, surface water, and/or river sediments
  - Estimate the extent of vertical and horizontal contamination in each of these media

- Health and Environmental Assessment
  - Evaluate exposure pathways in each media and assess bioaccumulation and synergistic effects of contaminants
  - Assess whether contaminant levels exceed health and environmental criteria for study area receptors

RI activities have been completed for soil at 17 sites (Sites 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 16, 17, 22, and 23) and for the near-shore river sediment at one site (OU2), and a revised draft RI has been submitted to the regulatory agencies for review for OU1, as presented in Table 1-4. Additional information on the current RI and other ER Program-related projects at WNY is presented in Section 1.7.

As part of the RI investigation, Vapor Intrusion (VI) Assessments may be conducted to determine whether chlorinated volatile organic compounds (VOCs) in soil/and or groundwater beneath buildings are causing indoor air quality to exceed regulatory target levels as a result of a vapor intrusion pathway. VI Assessments have been conducted at Site 8 (Bldg 211), Site 21 (Bldg 68 and 154), and SSA 14 (Bldg 172), and are in progress at Site 24 (Bldgs 157 and 210).

## 1.6.2 Corrective Actions

On the basis of both the SI (1996) and additional information gathered since, the Navy has conducted the following removal actions (Table 1-4):

- **Storm Sewer Cleanout for WNY Outfalls 5 and 10**—On the basis of the Baker (1993) PA report and the EPA (1995) special sampling investigation report,<sup>9</sup> the Navy conducted a removal action in 1996 to eliminate potential releases of contaminants from two storm sewer lines, which ran from Site 4 to storm sewer Outfall 5 and from Site 6 to storm sewer Outfall 10. Sediments in these storm sewers were found to contain heavy metals and PCBs that may have originated in releases from Sites 4 and 6 or, in the case of Outfall 10, from offsite at the SEFC, which was formerly part of WNY during its industrial period. Elevated levels of PAHs also were detected in the sediment that had accumulated in the storm sewer pipes.
- **Storm Sewer Rehabilitation**—A removal action was completed in December 2000 for removal of contaminated sediments from, and refurbishing and/or replacing, subsurface storm sewer piping and structures throughout the WNY. Ninety-nine percent of the storm sewers located on WNY were replaced or relined (Parsons Engineering Science, Inc., 1999). The storm sewer rehabilitation report is presented in the OHM Remediation Services (OHM) (2001d) Contractor Closeout Report.
- **Site 6 (the former Coal Storage Yard south of Building 116)**— A removal action was performed to abate PCBs, heavy metals, PAHs, and other contaminants found in soil that had accumulated within the concrete-lined coal storage bin. The presence of these contaminants was initially documented in the SI report. The Navy completed the removal action in November 1997 and submitted the final closure report dated July 17, 2000, to EPA (OHM, 2000).
- **Site 6 (Building 118 Trough)**—In May 2001, PCB-contaminated detritus (dirt and other debris that accumulated inside the building sump) was removed from the Building 118 basement sump (trough), as detailed in the OHM (2001c) final closeout bulletin dated July 24, 2001 (OHM, 2001a,b).
- **Site 6 (Building 118)**—During sampling events in March 2006 for the Supplemental Focused RI, elevated concentrations of PCBs were detected in detritus throughout the floor areas of Building 118 and the sump (trough) that had been cleaned in 2001. An Engineering Evaluation/Cost Analysis (EE/CA) (CH2M HILL, 2007c) recommended that a NTCRA be executed to remove the PCB-containing detritus from everywhere within Building 118. The NTCRA was subsequently conducted in October and November 2007 and documented in a closeout report dated February 1, 2008 (AGVIQ/CH2M HILL, 2008).

<sup>9</sup> EPA Region III prepared a report titled *A Brief Review and Analysis of Recent Heavy Metals and PCB Data, Lower Anacostia River, Special Sampling Investigation* in October 1995. This report presented the results of sediment sampling performed in sewers on WNY and SEFC.

- **Site 8 (Building 211)** – In March 2016, a NTCRA for soil was conducted at Site 8 to remove the small volume of trichloroethylene (TCE)-contaminated subsurface soil identified in the *Site 8 Final FFA Supplemental RI Report for Site 8 and 17* (CH2M HILL, 2008), and recommended in the EE/CA for Site 8 Soil (CH2M HILL, 2015). The NTCRA was subsequently conducted in March 2016 and documented in a closeout report that was completed in September 2016.
- **Site 10 (Admiral’s Row housing) abatement of lead in soil**—NTCRAs were completed to remove lead-affected soil at all quarters and buildings at Site 10. These removal actions were performed periodically (as the quarters/buildings became available) at Quarters A, B, C, D, E, F, G, H, L/L-1, M, M-1, N, O, P, R, S, T, U, V, W, Building 1, and Leutze Park between 2003 and 2008. As of February 2008, all Site 10 removal actions had been completed and are documented in the Site 10 removal action master report appendices A through E (CH2M HILL, 2005c, updated May 2008).
- **Site 14 (Building 292)**—The Navy completed a removal action to abate PCBs in the soil around this building in November 1997 and submitted the final closure report dated July 17, 2000 (OHM, 2000), to EPA.
- **Site 16 (Building 71)**—In June 1999, a time-critical removal action (TCRA) for soil was conducted at Site 16 to remove a small amount (estimated at less than 1 cup) of free-phase mercury observed in subsurface soil samples during the Site 16 RI (OHM, 1999a). The removal action activities were summarized in the *Site 16 Mercury Removal Action Closeout Summary* (OHM, 1999b).

In addition, site removal evaluations were conducted at Sites 7, 11, and 13 in 1999, indicating time-critical soil removal actions were not needed at these three sites (but further evaluation for remediation was to be completed at a later date). These evaluations were completed in 2005 and no remediation was warranted.

## 1.7 Proposed Plans and Records of Decision

The purpose of a Proposed Plan is to present the preferred alternative for RA at a site following the RI phase of the environmental restoration process. The Proposed Plan provides the rationale for the proposed recommendation, based on all of the investigative activities performed at the site.

The Proposed Plans for WNY sites are developed by the Navy with input and concurrence by EPA and DOEE. Each plan is also reviewed by the public during a 30-day public comment period. During this period, a public meeting is held at which the Navy, EPA, and DOEE provide an overview of the site, previous investigations, remedial alternatives evaluated, and the Preferred Alternative; answer questions; and listen to and acknowledge public comments.

Following the public comment period, the Navy and EPA, in consultation with the District of Columbia, make a final decision based on the response action for the site after reviewing and considering all information submitted during the 30-day public comment period. Community involvement during this stage of the environmental restoration process is critical and the public is encouraged to review and comment on the Proposed Plans.

After the public comment period has ended and the information submitted during that time has been reviewed and considered, the action elected for the site is documented in a Record of Decision (ROD).

The ROD is prepared following the close of the public comment period for the Proposed Plan. The ROD is a public document that explains the selected remedial alternative on the basis of the technical analysis in the RI/FS and consideration of public comments and community concerns generated during the public comment period for the Proposed Plan.

Proposed Plans and RODs have been completed for Sites 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 16, 17, 22 and 23. Proposed Plans have been developed for Site 8 and SSA 12 as of June 2017, and RODs for these sites are expected to be signed in September 2017 and FY18 respectively.

## 1.8 Current ER Activities

Current ER Program-related projects being performed at WNY are presented in Table 1-4. The main types of current projects are summarized below:

- **AOC Evaluations**—AOCs are locations (for example, building, former building, or former activity area) that undergo a desktop review of existing and/or easily obtainable documentation and information relating to the location. The evaluation of an AOC involves assessing information concerning the handling of hazardous wastes, actions taken at the AOC, or actions that will be occurring under other regulatory programs (EPA, 1999). Based on the evaluation, the AOC may proceed to the site screening process (SSP) as an SSA or may require NFA. AOCs that require NFA can be closed out through a brief AOC closeout document. Based on an AOC evaluation report (CH2M HILL, 2004e), two AOCs were recommended for further investigation (that is, as SSAs) at WNY, AOC 6 (Quarters N/O) and AOC 7 (Quarters U). However, because of the removal action completed for Quarters N/O as part of the Site 10 NTCRA, further investigation at AOC 6 is no longer warranted. AOC 6, which was reassigned as new SSA 13, is now recommended for NFA. AOC 7 (Quarters U) has been advanced to the SSP and re-designated as part of SSA 14. An NFA decision letter was signed for AOC 1 in December 2006.
- **SSA Investigations**—As defined in the FFA, SSAs are areas that require investigation or assessment under the SSP to determine if they warrant ER site status or NFA. Seventeen SSAs have been identified at WNY. SSA investigations have been finalized for SSAs 1, 3, 4, 6, 8, 10, and 11 (CH2M HILL, 2004i), SSA 7 (CH2M HILL, 2002g), and SSAs 9 and 14 (CH2M HILL, 2012a).

A NFA decision letter was signed in December 2006 for SSAs 1, 2, 6, and 11 based on the results of the SSA investigation. A NFA letter was also signed in December 2006 for SSA 13 (Quarters N/O)—formerly AOC 6, because it overlaps with portions of ER Site 10 and was investigated under that site, and for SSA 7, which consists of PCB contamination on the floors of six transformer rooms in Buildings 76, 169, 184, 196, 200, and 218, because they have been remediated as part of housekeeping measures. A NFA decision letter was signed in August 2012 for SSA 9 (former optical shop and laboratory), based on the results of the SSA investigation.

SSAs 3, 8, and 10 have undergone more-extensive evaluation as ER sites (Sites 21, 22, and 23) because contamination has been identified above screening levels.

SSA 14 (Quarters U and Building 172), formerly AOC 7, is undergoing more-extensive evaluation as ER Site 24 because contamination has been identified above screening levels. Building 172 and the area north of Building 172 (where former Buildings 185 and 261 were located) are included in SSA 14 (Site 24) because they were associated with the historical Experimental Ammunition Unit and Mine Laboratory activities.

A two-phase SSA investigation was completed at SSA 12 (Basewide Fill Material) in 2014. SSA 12 was elevated to ER site status, and a Final RI report was completed in 2016.

Finally, SSA 4, which consists of lead-contaminated soil in the crawl space of Building 183, is being considered for an administrative close out, based on extensive renovation activities conducted at Building 183.

- **SIs**—An SI was conducted under the Navy's MRP at MRP Site 1, a former Civil-War era experimental battery. The SI was finalized in June 2011 and it was determined that the site required no action.  
A memorandum to address miscellaneous areas of concern by DOEE related to munitions was submitted in summer 2012.
- **Focused and Supplemental RIs for Soil**—Focused RIs for soil have been conducted and finalized at 17 ER sites at WNY; Sites 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 16, 17, 22, 23, and SSA 12. The Navy is currently conducting or completing RIs at two other sites (Sites 21 and 24).
- **OU RIs**—As defined in the FFA, an OU may address geographical portions of WNY, specific WNY problems, initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of WNY. OUs are addressed according to the National Contingency

Plan, EPA guidance, and the requirements of CERCLA. Investigations are being performed in two defined OUs at WNY: Facility-Wide Groundwater (OU1) and Near-Shore Sediment (OU2). At both OUs, the investigations are being performed similarly to performing a Focused RI, with a focus on groundwater for OU1 and near-shore Anacostia River sediment for OU2. The FFA draft facility-wide groundwater RI (OU1) report (CH2M HILL, 2004i) was originally prepared and submitted by the Navy in 2004 and reviewed and commented on by EPA and DOEE. All parties agreed to collect additional groundwater samples in selected monitoring wells across the facility to provide a more recent snapshot of groundwater conditions at the WNY, and a revised draft RI was prepared and submitted by the Navy in February 2015. A final RI is scheduled to be completed in September 2017. A Phase I OU2 Remedial Investigation (RI) was completed in October 2007 and a Phase II OU2 RI was completed February 2014.

- **FSs**—An FS is part of the CERCLA response action process, following the RI phase. Based on the recommendations in the RI, the FS defines the objectives and the nature of the response, develops alternatives, conducts detailed analysis of the alternatives, and finally recommends an alternative. As defined in the FFA, a Focused FS (FFS) accomplishes the steps described above, but the FFS concentrates on a particular contaminated medium (for example, soil) or a discrete portion of the site (which does not need added investigation in order to progress forward in the remedial process). All site remedial activities (at eight sites) have taken place in the form of non-time-critical or time critical removal actions (see Section 1.6.2). An EE/CA was completed for Site 8 (soil). FFSs have been completed at Site 6 (soil beneath Buildings 116, 118, and 197) and Site 22 (soil beneath Building 112). An FFS has been initiated for OU2 (near-shore sediment). It is anticipated that FFSs also will be prepared for Site 21 and Site 24.
- **NTCRAs**—As discussed in Section 1.6.2, nine NTCRAs have been completed. There are no ongoing NTCRAs.
- **Decision Documents**—As discussed in Section 1.7, Decision Documents (RODs) have been completed and signed for Site 4 (Navy, 2004); Site 14 (Navy, 2005b); Sites 5 and 16 (Navy, 2006a); Sites 1, 2, 3, 7, 9, 11, and 13 (Navy, 2007); Site 10 (Navy, 2009); Site 17 (Navy, 2011); Site 23 (Navy, 2013); Sites 6 and 22 (Navy, 2016). RODs for Site 8 and SSA 12 are scheduled to be signed in September 2017.

The Navy has also signed closeout documents for SSAs 1, 2, 6, 7, 11, and 13, and AOC 1 (Navy, 2006b), and SSA 9 (Navy, 2012).

- **Vapor Intrusion Investigations**—Vapor Intrusion (VI) Assessments have been completed at sites 8 and 21. A VI assessment is currently underway at Site 24 (Bldg 157 and 210). All VI assessments will be reported in the sites respective RIs.
- **Land Use Control Remedial Design (LUC RD)** – In compliance with a Record of Decision (ROD) signed for Institutional Controls (ICs) by the Navy and the U.S. Environmental Protection Agency (USEPA) Region 3, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and concurred by the District of Columbia Department of Energy and Environment (DOEE), a Land Use Control (LUC) is required to be implemented at Site 6 and 22. The LUCs will restrict activities that would result in unacceptable risks to human receptors from direct exposure to soil. A Final LUC RD will be completed for Site 6 and 22 in September 2017.

Additional details regarding the ER sites, SSAs, OUs, and AOCs are presented in Section 2 and Appendices A and B.

## 1.9 Format of the Site Management Plan

This SMP consists of three sections following this introduction:

- **Section 2, Site, SSA, and AOC Descriptions**, provides specific information regarding each of the sites, SSAs, and/or AOCs in the SMP. Site-specific information includes site physical characteristics, a description of past activities conducted at the site, and known contaminants in each site medium.
- **Section 3, CERCLA Process Activities**, provides a summary of the processes of RI, FS, and RA for CERCLA sites.
- **Section 4, Site Management Plan Schedules**, provides scheduling assumptions and SMP project schedules.

**Table 1-1**  
 Summary of Atlantic Coastal Plain Geologic Formations and  
 General Lithologies Underlying the Washington Navy Yard  
 Site Management Plan  
 Washington Navy Yard, Washington, DC

Physiographic Province	Chronostratigraphic Units <sup>1,2</sup>	Subunits	Age	Lithostatigraphic Units <sup>3</sup>		Lithology	Hydrostratigraphic Units <sup>4</sup>
Atlantic Coastal Plain	NA	NA	Recent	Fill		Anthropogenic Fill	Fill Unit
	Pamlico Formation	NA	Pleistocene to Recent <sup>6</sup>	Alluvium		Gravel, sand, silt, and clay.	Alluvium Unit
	Wicomico Formation		Pleistocene	Sand-and-Gravel Unit	Fine-grained	Gravel, sand, and silt. Local basal deposits of carbonaceous clay containing tree stumps and other woody debris.	Sand and Gravel
	Sunderland Formation				Coarse-grained	Coarse gravel, boulders, crossbedded sand, silt, and clay.	
	Potomac Group	Patapsco Formation	Upper Cretaceous	Potomac Group	Massive maroon clay and varicolored sand and clay. Sand lenses grade into clay lenses. In some places basal gravel, sand, and arkose.		Potomac Group Unit
			Upper Cretaceous		Unconsolidated fluvial dark gray clay containing lignitized wood and saurian bones.		
Lower Cretaceous			Unconsolidated fluvial large round pebbles, fine sand, and thin lenses of white or iron-stained clay.				

**Notes:**

- (1) Units are presented in order encountered with increasing depth from ground surface.
- (2) **Chronostratigraphic** units are generally formally named geologic units based on temporal associations, as described in scientific literature
- (3) **Lithostratigraphic** units are informally named, generally site-specific, geologic units that are organized on the basis of lithology (i.e., geologic materials having similar characteristics). These units may be the same as, subdivisions of, or different from chronostratigraphic units.
- (4) **Hydrostratigraphic** units are informally named geologic units, generally site-specific, that are organized on the basis of hydrogeologic similarities and connections (i.e., geologic materials through which groundwater moves in a consistent manner). These units may be the same as, subdivisions of, or different from chronostratigraphic or lithostratigraphic units.
- (5) The Brandywine Gravel and Byrn Mawr Gravel formations which are commonly present in the Washington, D.C. area are not believed to be present underlying the Washington Navy Yard due to historical erosion events.
- (6) Several researchers including Johnston, 1964 map the Pamlico Formation to include Recent (Holocene) alluvium and anthropogenic fill

**Source:**

Adapted from the Geologic Map of Washington, D.C. and Table 2 Presented in *Geology and Ground-Water Resources of Washington, D.C., and Vicinity, USGS Water Supply Paper 1776, Johnston, 1964.*

**Table 1-2**  
Known Bird Species in the Lower Anacostia River Watershed  
Site Management Plan  
Washington Navy Yard, Washington, D.C.

Species	Scientific Name	Species	Scientific Name	Species	Scientific Name
<b>Podicipediformes</b>		Ring-billed Gull	<i>Larus delawarensis</i>	Wood Thrush	<i>Hylocichla mustelina</i>
Red-necked Grebe	<i>Podiceps grisegena</i>	Herring Gull	<i>Larus argentatus</i>	American Robin	<i>Turdus migratorius</i>
Horned Grebe	<i>Podiceps auritus</i>	Great Black-backed Gull	<i>Larus marinus</i>	Gray Catbird	<i>Dumetella carolinensis</i>
<b>Pelecaniformes</b>		Lesser Black-backed Gull	<i>Larus fuscus</i>	Northern Mockingbird	<i>Mimus polyglottos</i>
Double crested Cormorant	<i>Phalacrocorax auritus</i>	Caspian Tern	<i>Sterna caspia</i>	Brown Thrasher	<i>Toxostoma rufum</i>
<b>Ciconiiformes</b>		Forster's Tern	<i>Sterna forsteri</i>	Cedar Waxwing	<i>Bombycilla cedrorum</i>
Great Blue Heron	<i>Ardea herodias</i>	Least Tern	<i>Sterna antillarum</i>	European Starling	<i>Sturnus vulgaris</i>
Great Egret	<i>Ardea alba</i>	<b>Columbiformes</b>		White-eyed Vireo	<i>Vireo griseus</i>
Little Blue Heron		Rock Dove	<i>Columba livia</i>	Warbling Vireo	<i>Vireo gilvus</i>
Green Heron	<i>Butorides virescens</i>	Mourning Dove	<i>Zenaida macroura</i>	Red-eyed Vireo	<i>Vireo olivaceus</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	<b>Cuculiformes</b>		Northern Parula	<i>Parula americana</i>
Turkey Vulture	<i>Cathartes aura</i>	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Yellow Warbler	<i>Dendroica petechia</i>
<b>Anseriformes</b>		<b>Apodiformes</b>		Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>
Canada Goose	<i>Branta canadensis</i>	Chimney Swift	<i>Chaetura vauxi</i>	Magnolia Warbler	<i>Dendroica magnolia</i>
Snow Goose	<i>Chen caerulescens</i>	Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Cape May Warbler	<i>Dendroica tigrina</i>
Wood Duck	<i>Aix sponsa</i>	<b>Coraciiformes</b>		Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
Green-winged Teal	<i>Anas crecca</i>	Belted Kingfisher	<i>Ceryle alcyon</i>	Yellow-rumped Warbler	<i>Dendroica coronata</i>
American Black Duck	<i>Anas rubripes</i>	<b>Piciformes</b>		Black-throated Green Warbler	<i>Dendroica virens</i>
Mallard	<i>Anas platyrhynchos</i>	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	Blackburnian Warbler	<i>Dendroica fusca</i>
Northern Pintail	<i>Anas acuta</i>	Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	Palm Warbler	<i>Dendroica palmarum</i>
Blue-winged Teal	<i>Anas discors</i>	Downy Woodpecker	<i>Picoides pubescens</i>	Blackpoll Warbler	<i>Dendroica striata</i>
Canvasback	<i>Aythya valisineria</i>	Hairy Woodpecker	<i>Picoides villosus</i>	Black-and-white Warbler	<i>Mniotilta varia</i>
Ring-necked Duck	<i>Aythya collaris</i>	Northern Flicker	<i>Colaptes auratus</i>	American Redstart	<i>Myioborus pictus</i>
Bufflehead	<i>Bucephala albeola</i>	<b>Passeriformes</b>		Northern Waterthrush	<i>Seiurus noveboracensis</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>	Eastern Wood-Peevee	<i>Contopus virens</i>	Common Yellowthroat	<i>Geothlypis trichas</i>
Common Merganser	<i>Mergus merganser</i>	Alder Flycatcher	<i>Empidonax alnorum</i>	Wilson's Warbler	<i>Wilsonia pusilla</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>	Eastern Phoebe	<i>Sayornis phoebe</i>	Canada Warbler	<i>Wilsonia canadensis</i>
<b>Falconiformes</b>		Great Crested Flycatcher	<i>Myiarchus crinitus</i>	Scarlet Tanager	<i>Piranga olivacea</i>
Osprey	<i>Pandion haliaetus</i>	Eastern Kingbird	<i>Tyrannus tyrannus</i>	Northern Cardinal	<i>Cardinalis cardinalis</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Purple Martin	<i>Progne subis</i>	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
Northern Harrier	<i>Circus cyaneus</i>	Tree Swallow	<i>Tachycineta bicolor</i>	Blue Grosbeak	<i>Guiraca caerulea</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Indigo Bunting	<i>Passerina cyanea</i>
Cooper's Hawk	<i>Accipiter cooperii</i>	Barn Swallow	<i>Hirundo rustica</i>	Field Sparrow	<i>Spizella pusilla</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>	Blue Jay	<i>Cyanocitta cristata</i>	Fox Sparrow	<i>Passerella iliaca</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>	American Crow	<i>Corvus brachyrhynchos</i>	Song Sparrow	<i>Melospiza melodia</i>
American Kestrel	<i>Falco sparverius</i>	Fish Crow	<i>Corvus ossifragus</i>	Swamp Sparrow	<i>Melospiza georgiana</i>
Peregrine Falcon	<i>Falco mexicanus</i>	Carolina Chickadee	<i>Poecile carolinensis</i>	White-throated Sparrow	<i>Zonotrichia albicollis</i>
<b>Charadriiformes</b>		Tufted Titmouse	<i>Baeolophus bicolor</i>	Dark-eyed Junco	<i>Junco hyemalis</i>
Killdeer	<i>Charadrius vociferus</i>	Brown Creeper	<i>Certhia americana</i>	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Carolina Wren	<i>Thryothorus ludovicianus</i>	Rusty Blackbird	<i>Euphagus carolinus</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>	House Wren	<i>Troglodytes aedon</i>	Common Grackle	<i>Quiscalus quiscula</i>
Solitary Sandpiper	<i>Tringa solitaria</i>	Winter Wren	<i>Troglodytes troglodytes</i>	Brown-headed Cowbird	<i>Molothrus ater</i>
Spotted Sandpiper	<i>Actitis macularia</i>	Golden-crowned Kinglet	<i>Regulus satrapa</i>	Orchard Oriole	<i>Icterus spurius</i>
Semi-palmated Sandpiper	<i>Calidris pusilla</i>	Ruby-crowned Kinglet	<i>Regulus calendula</i>	Baltimore Oriole	<i>Icterus galbula</i>
Western Sandpiper	<i>Calidris mauri</i>	Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	Purple Finch	<i>Carpodacus purpureus</i>
Least Sandpiper	<i>Calidris minutilla</i>	Eastern Bluebird	<i>Sialia sialis</i>	House Finch	<i>Carpodacus mexicanus</i>
Pectoral Sandpiper	<i>Calidris melanotos</i>	Veery	<i>Catharus fuscescens</i>	American Goldfinch	<i>Carduelis tristis</i>
Common Snipe	<i>Gallinago gallinago</i>	Swainson's Thrush	<i>Catharus ustulatus</i>	House Sparrow	<i>Passer domesticus</i>
Laughing Gull	<i>Larus atricilla</i>	Hermit Thrush	<i>Catharus guttatus</i>		

**Table 1-3**  
 Known Fish Species in the Anacostia River  
 Site Management Plan  
 Washington Navy Yard, Washington, D.C.

Species	Scientific Name
Striped bass	<i>Morone saxatilis</i>
White perch	<i>Morone americana</i>
Largemouth bass	<i>Micropterus salmoides</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Channel catfish	<i>Ictalurus punctatus</i>
White catfish	<i>Ameiurus catus</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Yellow bullhead	<i>Ameiurus natalis</i>
Alewife	<i>Alosa pseudoharengus</i>
Blueback herring	<i>Alosa aestivalis</i>
American shad	<i>Alosa sapidissima</i>
Hickory shad	<i>Alosa mediocris</i>
Yellow perch	<i>Perca flavescens</i>
Walleye	<i>Stizostedion vitreum</i>
Quillback carpsucker	<i>Carpoides cyprinus</i>
Golden redhorse	<i>Moxostoma erythrurum</i>
Carp	<i>Cyprinus carpio</i>
Goldfish	<i>Carassius auratus</i>
Silvery minnow	<i>Hybognathus regius</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Spottail shiner	<i>Notropis hudsonius</i>
Spotfin shiner	<i>Cyprinella spiloptera</i>
Atlantic silverside	<i>Menidia menidia</i>
Tessellated darter	<i>Etheostoma olmstedii</i>
Bluegill	<i>Lepomis macrochirus</i>
Longear sunfish	<i>Lepomis megalotis</i>
Redbreast sunfish	<i>Lepomis auritis</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Mummichog	<i>Fundulus heteroclitus</i>
Banded killifish	<i>Fundulus diaphanus</i>
American eel	<i>Anguilla rostrata</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>
Longnose gar	<i>Lepisosteus osseus</i>
Creek chubsucker	<i>Erimyzon oblongus</i>
Blue catfish	<i>Ictalurus furcatus</i>
Common shiner	<i>Luxilus cornutus</i>
Bay anchovy	<i>Anchoa mitchilli</i>
White sucker	<i>Catostomus commersoni</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Green sunfish	<i>Lepomis cyanellus</i>
Atlantic menhaden	<i>Brevoortia tyrannus</i>
Needle fish	<i>Strongylura marina</i>
Bluntnose minnow	<i>Pimephales notatus</i>
Shorthead gar	<i>Lepisosteus platostomus</i>
Swallowtail shiner	<i>Notropis procne</i>
White crappie	<i>Pomoxis annularis</i>
Northern hogsucker	<i>Hypentelium nigricans</i>
Bridle shiner	<i>Notropis bifrenatus</i>
Sea lamprey	<i>Petromyzon marinus</i>
Black bullhead	<i>Ameiurus melas</i>

\* Source: Katju, D. 2003. Personal communication. Washington, D.C., Division of Fisheries and Wildlife. Dec. 11.

TABLE 1-4  
**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities**  
**FY 2018 Site Management Plan**  
**Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
<b>PRELIMINARY ASSESSMENTS and EVALUATIONS (by date)</b>					
Preliminary Assessment (PA)	1993	Baker	Determined 16 AOCs, some of which became sites. Site descriptions and operational histories performed for the following Sites: Site 1 Site 2 Site 3 Site 4 Site 5 Site 6 Site 7 Site 8 Site 9 Site 10 Site 11	**None	<i>Final Preliminary Assessment Washington Navy Yard, Washington, D.C.</i> Baker Environmental, Inc. November 1993.
Areas of Concern (AOCs) Evaluation	2002	CH2M HILL	Site descriptions and operational histories performed for the following AOCs: AOC 1 AOC 2 AOC 3 AOC 4 SSA 7 (former AOC 5)	**None	<i>Final Areas of Concern (AOCs) Evaluation Report, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. March 2002.
AOCs 6 and 7 Evaluation	2004	CH2M HILL	Site descriptions and operational histories performed for the following AOCs: AOC 6 AOC 7	**None	<i>Final AOCs Evaluation Report for AOCs 6 and 7, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. April 2004.
<b>SITE SCREEING INVESTIGATIONS and INSPECTIONS (by date)</b>					
EPA Special Sampling Investigation	1995	EPA	Storm Sewer Sediment Sampling (WNY and SEFC)	**None	<i>A Brief Review and Analysis of Recent Heavy Metals and PCB Data, Lower Anacostia River</i> , EPA Region III, Environmental Programs Branch. October 1995.
Site Investigation (SI)	1995	Baker	Site 1 – Soil Gas and Subsurface Soil Site 2 – Soil Gas, Subsurface Soil, MW GW, and DP GW Site 3 – Soil Gas and Subsurface Soil Site 4 – Soil Gas, Subsurface Soil, and DP GW Site 5 – Soil Gas, Subsurface Soil, and DP GW Site 6 – Soil Gas, Subsurface Soil, DP GW, and Former Coal Pit Sediment and Surface Water Site 7 – Soil Gas, Subsurface Soil, and DP GW Site 8 – Soil Gas and Subsurface Soil Site 9 – Soil Gas, Subsurface Soil, and DP GW Site 10 – Surface and Subsurface Soil Site 11 – Subsurface Soil Site 13 – Surface Soil Site 14 – Surface Soil and sub-basement Surface Water Site 17 – Subsurface Soil and DP GW Facility-Wide Groundwater Investigation, Operable Unit 1 Nearshore Sediment (Anacostia River), Operable Unit 2	<i>Site Investigation Project Plans.</i> Baker Environmental, Inc. May 1995	<i>Site Investigation. Washington Navy Yard, Washington, D.C.</i> Baker Environmental, Inc. September 1996.

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**FY 2018 Site Management Plan**  
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Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
Site 1 Site Investigation (SI)	1999	CH2M HILL	Site 1 – Subsurface Soil	**None	<i>Final Environmental Baseline Survey for Building 22, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. December 1999.
SSA 7 Investigation	2001	CH2M HILL	SSA7 – Wipe Sampling	<i>Final Project Plan Addenda for Site Screening Area (SSA) Sampling, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. March 2002.	<i>FFA Final PCB Wipe Sampling at Transformer Rooms Which Formerly Held Potentially Leaking PCB-Containing Transformers, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. November 2002.
Site Screening Areas (SSAs) 1, 3, 4, 6, 8, 9, 10, and 11 Investigation	2002	CH2M HILL	SSA 1 – Subsurface Soil	<i>Final Project Plan Addenda for Site Screening Area (SSA) Sampling, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. March 2002.	<i>FFA Final Investigation Report for Site Screening Areas 1, 3, 4, 6, 8, 9, 10, and 11, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. December 2004.
			SSA 3 – Subsurface Soil, DP GW, and Nearshore Sediment (Anacostia River), Operable Unit 2		
			SSA 4 – Surface Soil and MW GW		
			SSA 6 – Subsurface Soil		
			SSA 8 – DP GW		
			SSA 9 – Subsurface Soil and MW GW		
			SSA 10 – Subsurface Soil		
SSA 11 – Subsurface Soil					
SSA 12 (Fill) Investigation (Phase 1 Screening)	2003/2006-2008	CH2M HILL	SSA 12 – Fill – Subsurface Soil	<i>FFA Final SSA 12 Fill Investigation Project Plans, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. June 2004.  <i>FFA Final Addendum to Work Plan for Sites 21, 22, and 23 to Address the Follow-on Screening Investigation of EAs 10 and 11 of SSA 12, Washington Navy Yard, Washington, DC.</i> CH2M HILL. September 2007.	<i>FFA Final Site Screening Area 12 Fill Investigation Report, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. April 2007.  <i>FFA Final Site Screening Area 12 Fill Investigation Report Addendum, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May 2008.
SSA 12 (Fill) Investigation (Phase 2 Screening)	2008-2014	CH2M HILL	SSA 12 – Fill – Subsurface Soil; investigation of 10 exposure areas (EAs) that required further evaluation based on Phase I screening (EAs 1, 5, 11, 13, 14, 15, 19, 21, 27, and 32), plus 5 additional EAs that passed Phase 1 screening but had concentrations close to the risk screening criteria (EAs 2, 28, 29, 30, and 31).	<i>FFA Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Site Screening Area 12 - Phase 2 Fill Investigation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. March 2012.	<i>FFA Final SSA 12 Phase 2 Fill Investigation Report, Washington Navy Yard, Washington, D.C.,</i> CH2M HILL. September 2014.
SSA 9 and 14 Investigation	2006-2012	CH2M HILL	Screening investigation of soil and groundwater for SSA 9 (follow-up) and SSA 14 (initial).	<i>FFA Final Investigation Work Plan for Site Screening Areas 9 and 14, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. December 2006.  Work Plan Addendum 1 - Additional groundwater investigation to define extent, September 2007.  Work Plan Addendum 2 - Vapor intrusion investigation for Building 172, June 2008.	<i>FFA Final Investigation Report for Site Screening Areas 9 and 14, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May 2012.

TABLE 1-4  
**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities**  
**FY 2018 Site Management Plan**  
**Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
<b>REMEDIAL INVESTIGATIONS (by date)</b>					
Initial Findings Investigation (IFI)	1999	CH2M HILL	Site 1 – DP GW	<i>Final Work Plan for the RCRA Facility Investigation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. February 1999	<i>FFA Draft Remedial Investigation Initial Findings Report, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. October 2000.
			Site 3 – Subsurface Soil, DP GW, and MW GW		
			Site 4 – Subsurface Soil, DP GW, and MW GW		
			Site 5 – DP GW		
			Site 6 – Subsurface Soil, DP GW, MW GW, Building 118 Trench Sediment Sampling		
			Site 7 – Subsurface Soil, DP GW, and MW GW		
			Site 8 – DP GW		
			Site 9 – Subsurface Soil, DP GW, and MW GW		
			Site 10 – Subsurface Soil, DP GW, and MW GW		
			Site 11 – DP GW		
			Site 13 – DP GW		
			Site 14 – Subsurface Soil, DP GW, and MW GW		
			Facility-Wide Groundwater Investigation, Operable Unit 1		
Nearshore Sediment (Anacostia River), Operable Unit 2					
Site 16 Remedial Investigation (RI)	1999	CH2M HILL	Site 16 – Subsurface Soil, DP GW, and MW GW	<i>Final Site 16 RFI Work Plan, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. February 1999.	<i>FFA Final Remedial Investigation for Site 16, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. April 2002.
Sites 7, 11, and 13 Removal Site Evaluation	1999	CH2M HILL	Site 7 – Subsurface Soil	<i>Final Work Plan for the Removal Site Evaluations Sites 7, 11, and 13, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. February 1999.	<i>Final Removal Site Evaluation Report for Sites 7, 11, and 13, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. April 2000.
			Site 11 – Subsurface Soil		
			Site 13 – Surface and Subsurface Soil		
Data Gaps Investigation (DGI)	2001	CH2M HILL	Facility-Wide Groundwater Investigation, Operable Unit 1	<i>Field Investigation Data Gaps Scope of Work, Facility-Wide Remedial Investigation, Washington Navy Yard, Washington, DC.</i> CH2M HILL. April 2001.	**None, specific report for this event not completed. Results documented in other reports.
			Site 14 – Subsurface Soil		
Site 5 RI	2001	CH2M HILL	Site 5 – Subsurface Soil and Groundwater	<i>Final Project Plan Addenda for Site 5 Phase II Site Investigation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. November 2001.	<i>FFA Final Focused Remedial Investigation Report for Site 5, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. November 2003.
Site 10 - Phase II RI	2002	CH2M HILL	Site 10 – Surface and Subsurface Soil	<i>FFA Final Phase II Remedial Investigation Project Plans for Site 10, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. August 2002.	<i>FFA Final Focused Remedial Investigation Report for Site 10, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May 2004.
Facility-Wide Well Installation Event (FWI)	2003	CH2M HILL	Facility-Wide Groundwater Investigation, Operable Unit 1	<i>Proposed Facility-Wide Groundwater Monitoring Well Installation Scope of Work, Facility-Wide Groundwater Investigation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. June 2003.	<i>FFA Draft Facility-Wide Groundwater, OU-1, Remedial Investigation Report.</i> CH2M HILL. July 2004.
Phase II Sites RI	2003	CH2M HILL	Site 1 – Subsurface Soil and MW GW	<i>FFA Final Phase II Remedial Investigation Project Plans for Sites 1, 2, 3, 7, 8, 9, 11, 13, and 17, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. November 2002.	<i>FFA Final Phase II Focused Remedial Investigation Report for Sites 1, 2, 3, 7, 8, 9, 11, 13, and 17, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. November 2005.
			Site 3 – Subsurface Soil, MW GW		
			Site 8 – Subsurface Soil and MW GW		
			Site 9 – Radiological Survey		
			Site 11 – Subsurface Soil and MW GW		
			Site 13 – Surface Soil and Wipe Sampling		
			Site 17 – Subsurface Soil and MW GW		
Facility-Wide Groundwater Investigation, Operable Unit 1					
Sites 4 and 14 RI	2003	CH2M HILL	Site 4 - Soil around Buildings 44, 46, 67, and 108.	<i>FFA Final Work Plan for RCRA Facility Investigation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. February 1999.	<i>FFA Final Focused Remedial Investigation Report for Sites 4 and 14, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. August 2003.
			Site 14 - Soil around Building 292		

TABLE 1-4

**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities**  
**FY 2018 Site Management Plan**  
**Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
Interim Groundwater Summary and RI (IGS)	2004	CH2M HILL	OU1 - Facility-Wide Groundwater Investigation, Operable Unit 1	**None	1. Results presented in <i>FFA Draft Facility-Wide Groundwater, OU-1, Remedial Investigation Report</i> . CH2M HILL. July 2004.  2. <i>FFA Draft Interim Groundwater Summary, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. July 2002.  [Note: This Interim Groundwater Summary report was not completed to document the results of a specific investigation. The report was completed to provide a summary of the geology, hydrogeology, and groundwater sampling data performed across the WNY facility.]
Background Data Evaluation	2005/2006	CH2M HILL	Background Data Evaluation for Soil	**None	Results presented in <i>FFA Final Background Data Evaluation Report</i> CH2M HILL. April 2006.
Site 6 Supplemental RI, Supplemental Field Work, Revised RI	2005-2014	CH2M HILL	Site 6 - Building 118 PCBs in detritus	<i>FFA Final Site 6 Supplemental Focused Remedial Investigation Work Plan, Washington Navy Yard, Washington, D.C.</i> (CTO 058), CH2M HILL. January 2006.  <i>FFA Final Site 6-Building 118 Investigation Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Site 6 Expanded Remedial Investigation, Washington Navy Yard, Washington, D.C.</i> , CH2M HILL. August 2011.	Results of Supplemental RI sampling documented in: <i>FFA Final Site 6 EE/CA - Building 118 Detritus Removal, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. April 2007.  <i>FFA Final Remedial Investigation Report for Site 6, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. August 2014.
Sites 8 and 17 Supplemental Remedial Investigation	2006-2008	CH2M HILL	Sites 8 and 17 - Followup investigation of soil and groundwater to address data gaps left by 2003 Phase II Sites RI.	<i>FFA Final Supplemental Remedial Investigation Work Plan for Sites 8 and 17, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. November 2006.	<i>FFA Final Supplemental RI Report for Sites 8 and 17, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. February 2008.  <i>FFA Final Revised HHRA for Site 17, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. March 2010.
Near-Shore Sediment (OU2) RI Phase 1	2006-2007 (Phase 1)	CH2M HILL	OU-2 – WNY Near-shore sediment surrounding piers and extending into the Anacostia River. Phase 1 - Initial Nature and Extent	<i>FFA Final OU-2 Phase 1 Project Plan, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. August 2006.	<i>FFA Final OU2 Remedial Investigation Phase 1 Data Report, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. October 2007.
Near-Shore Sediment (OU2) RI Phase 2	2008-2014	CH2M HILL	OU-2 – WNY Near-shore sediment surrounding piers and extending into the Anacostia River. Phase 2 - Additional nature and extent, baseline HHRA, baseline ERA, background, sediment stability	<i>FFA Final OU-2 Phase 2 Project Plan, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. June 2009.	<i>FFA Final OU2 Remedial Investigation Report, Washington Navy Yard, Washington DC.</i> CH2M HILL. February 2014.
Site 8 Additional Remedial Investigation - Vapor Intrusion	2009-2012	CH2M HILL	Vapor Intrusion investigation for Building 211	<i>FFA Final Vapor Intrusion Investigation Work Plan Addendum, Site 8. Washington Navy Yard, Washington, DC.</i> CH2M HILL. June 2009.	<i>FFA Final Remedial Investigation Report for Site 8, Washington Navy Yard, Washington, DC.</i> CH2M HILL. August 2012.
Sites 22 and 23 Remedial Investigation	2007-2012	CH2M HILL	Site 22 - RI of soil and groundwater (formerly SSA 8) Site 23 - RI of soil and groundwater (formerly SSA 10)	<i>FFA Final Remedial Investigation Work Plan for Sites 21, 22, and 23, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May, 2007.	<i>FFA Final Remedial Investigation Report for Sites 22 and 23, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May 2012.

TABLE 1-4  
**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities**  
**FY 2018 Site Management Plan**  
**Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
Site 21 Remedial Investigation	2007-Present	CH2M HILL	Site 21 - RI of soil, groundwater, and indoor air (formerly SSA 3)	<p><i>FFA Final Remedial Investigation Work Plan for Sites 21, 22, and 23, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May 2007.</p> <p><i>FFA Final Remedial Investigation Addendum Work Plan Site 21, Washington Navy Yard, Washington, D.C.</i> CH2M HILL Sept. 2009.</p> <p><i>FFA Final Remedial Investigation - Work Plan Addendum for Site 21, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. September 2014.</p> <p><i>FFA Final Revised Remedial Investigation Sampling and Analysis Plan Addendum for Site 21, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. June 2015.</p>	FFA Final Remedial Investigation Report for Site 21 planned for December 2017 (draft report submitted for review in May 2017).
Munitions Response Program Site 1 Site Inspection	2009-2011	CH2M HILL	MRP Site 1 - Former Experimental Battery	NA	<i>FFA Final Site Inspection Report, Former Experimental Battery, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May 2011.
Site 24 Remedial Investigation	2013-Present	CH2M HILL	Site 24 - soil beneath Building 172 and Quarters U	<p><i>FFA Final Remedial Investigation Sampling and Analysis Plan, Site 24 (Formerly SSA 14), Washington Navy Yard.</i> CH2M HILL. June 2013.</p> <p><i>FFA Final Work Plan Addendum for Site 24 Remedial Investigation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. December 2014.</p> <p><i>FFA Final UFP-SAP, Site 24 Vapor Intrusion Assessment for Buildings 157, 172, and 210, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. February 2016.</p>	FFA Final Remedial Investigation Report for Site 24 planned for March 2018 (additional vapor intrusion investigation completed in February 2017).
OU1 Remedial Investigation Update	2013-Present	CH2M HILL	OU1 - Facility Wide Groundwater	<i>FFA Final Remedial Investigation Update Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), Operable Unit 1 - Facility Wide Groundwater, Washington Navy Yard.</i> CH2M HILL. October 2013.	FFA Final Revised OU1 Remedial Investigation Report planned for November 2017.
SSA 12 (Fill) Investigation Remedial Investigation/Feasibility Study	2014-2016	CH2M HILL	SSA 12 – Fill – Subsurface Soil; remedial investigation of 4 exposure areas (EAs) that required further evaluation based on Phase I and Phase II screening (EAs 1, 19, 21, and the consolidated Eastern Extension EA).	**None	<i>FFA Final Remedial Investigation/Feasibility Study for Site Screening Area 12, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. September 2016.

TABLE 1-4  
**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities**  
**FY 2018 Site Management Plan**  
**Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
<b>EE/CAs and REMOVAL ACTIONS (by date)</b>					
Storm Sewer Line Cleanout, Former Sites 12 and 15 (Now Sites 4 and 6)	1996	OHM	Site 4 and Site 6 - Storm Sewer Line Cleanout of Outfalls #4, 5 (Site 4), and 10 (Site 6)	<i>Work Plan for Industrial Waste Line Cleaning, Washington Navy Yard, Washington, D.C.</i> OHM Remediation Services Corp. May 1996.	<i>Closure Report, Industrial Waste Line Cleanout, Washington, D.C. Navy Yard, Washington, D.C.</i> OHM Remediation Services Corp. October 1996.
Site 6 Removal Action (1)	1997	OHM	Site 6 - (Removal of Coal Pile Storage Area) – Subsurface Soil and Concrete sampling	<i>Action Memorandum for Sites 6 and 14, Washington Navy Yard, Washington, D.C. Naval District Washington.</i> September 1997.  <i>Final Interim Measures Scope of Work for Site 6 (Coal Pile Storage Area) and Site 14 (Building 292).</i> OHM Remediation Services Corp. October 1997	<i>Final Closure Report for Removal Activities, Site 6 Coal Pile Storage Area, Site 14 Building 292 Washington Navy Yard, Washington, D.C.</i> OHM Remediation Services Corp. July 2000.
Site 14 Removal Action	1997	NDW OHM	Site 14 - (Removal of PCB Contaminated Soil) – Subsurface Soil	<i>Action Memorandum for Sites 6 and 14, Washington Navy Yard, Washington, D.C. Naval District Washington.</i> September 1997.  <i>Final Interim Measures Scope of Work for Site 6 (Coal Pile Storage Area) and Site 14 (Building 292).</i> OHM Remediation Services Corp. October 1997.	<i>Final Closure Report for Removal Activities, Site 6 Coal Pile Storage Area, Site 14 Building 292 Washington Navy Yard, Washington, D.C.</i> OHM Remediation Services Corp. July 2000.
Storm Sewer Rehabilitation	1998	OHM	Rehabilitation of WNY Storm Sewers	<i>Engineering Design Report, Washington Navy Yard Storm Sewer Rehabilitation Project, Washington Navy Yard, Washington, D.C.</i> Parsons Engineering Science, Inc. December 1999.	<i>Storm Sewer Rehabilitation Report, Naval District Washington, Washington Navy Yard, Washington, D.C.</i> OHM Remediation Services Corp. October 2001.
Site 16 Removal Action	1999	OHM NDW	Site 16 - (Removal of Mercury Impacted Soil) – Subsurface Soil	<i>Final Work Plan for Time Critical Mercury Removal Action Site 16, Washington Navy Yard,</i> OHM Remediation Services Corp. Washington, D.C. May 1999.  <i>Action Memorandum for Time-Critical Removal Action of Mercury-contaminated Soil at Site 16, Washington Navy Yard.</i>	<i>Site 16 Mercury Removal Action Close-out Summary, Washington Navy Yard, Washington, D.C. LANTDIV, NAVFAC .</i> OHM Remediation Services. October 1999.
Site 6 - Building 118 Sump Modification Removal Action (2)	2001	OHM	Site 6 - (Removal of PCB-contaminated sediment in Building 118 sump and sump modification) – Concrete samples	<i>Notification of Removal of PCB-contaminated Sediment from Building 118 Sump at Washington Navy Yard, Washington, D.C.</i> Atlantic Division, Naval Facilities Engineering Command. OHM Remediation Services Corp. February 2001.	<i>Action Memorandum, Building 118 Sump Modification, Washington Navy Yard, Naval District Washington, Washington, D.C.</i> OHM Remediation Services Corp. July 2001.

TABLE 1-4

Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities  
 FY 2018 Site Management Plan  
 Washington Navy Yard, Washington, D.C.

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
Site 10 Non-Time-Critical Removal Action (NTCRA)	2003-2009	CH2M HILL/ Shaw Group	Site 10 – (Removal of lead-impacted soil) – Surface and Subsurface Soil  Removal actions at Quarters E, F, and G were completed in late 2003 Removal actions at Quarters D, L/L-1, M, and V were completed in Summer 2004 Removal actions at Quarters H, R, N, O, and Building 1 were completed in 2005 Removal actions at Quarters A, C and 2 were completed in 2006. Removal actions at Luetze Park and Quarters B, S, T, W, and Y were completed in 2007. Removal action at Quarters U was completed in 2008.	<i>Preliminary Draft Work Plan for Washington Navy Yard Site 10 Interim Removal Action</i> , Shaw. October 2003	<i>Final Contractor Closeout Report, Quarters E, F, and G, Soil Removal Action, Site 10, Washington Navy Yard, Washington DC</i> , Shaw E&I, Inc. (Shaw) January 2004.  <i>Final Contractor Closeout Report, Quarters D, L, L-1, M, and V, Soil Removal Action, Site 10, Washington Navy Yard, Washington, D.C.</i> December 2004.  <i>Final Contractor Closeout Report, Quarters N, O, H, and R, Soil Removal Action, Site 10, Washington Navy Yard, Washington, D.C.</i> Shaw. 2005.  <i>Final Contractor Closeout Report, Building 1, Soil Removal Action, Site 10, Washington Navy Yard, Washington, D.C.</i> Shaw. 2005.  <i>Final Contractor Closeout Report, Quarters A, C and 2, Soil Removal Action, Site 10, Washington Navy Yard, Washington, D.C.</i> Shaw. 2007.  Final Contractor Closeout Report, Luetze Park and Quarters B, Soil Removal Action, Site 10, Washington Navy Yard, Washington, D.C. Shaw. 2007.  Final Contractor Closeout Report, Quarters U, Soil Removal Action, Site 10, Washington Navy Yard, Washington, D.C. Shaw. 2008.  <i>FFA Final Site 10 Removal Action Master Report, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. October 2005. (Appended September 15, 2006 (C), March 27, 2007 (D), April 15, 2008 (E))
Site 6 EE/CA and Removal Action (3)	2005-2007	CH2M HILL	Site 6 - Building 118 PCBs in detritus	**None	FFA Final Site 6 EE/CA - Building 118 Detritus Removal, Washington Navy Yard, Washington, D.C. CH2M HILL. April 17, 2007.  Final Closeout Report, Removal Action/Building Decontamination Work Plan (PCB - Detritus Removal Activities) Site 6, Building 118, Former Electrical Generator House, Washington Navy Yard, Washington, DC (TO 004), JVIII Agviq/CH2M HILL. February 1, 2007.
Site 8 EE/CA and Removal Action	2014-2016	CH2M HILL/ CAPE Environmental Management, Inc.	Site 8 - TCE in soil adjacent to Building 211	<i>FFA Final Sampling and Analysis Plan for Site 8 - Building 211 Soil Source Area Delineation, Washington Navy Yard.</i> CH2M HILL. October 2013.  <i>Final Remedial Action Work Plan, Washington Navy Yard Removal Action Site 8, Washington Navy Yard, Washington, D.C.</i> CAPE Environmental Management, Inc. March 2016.	<i>FFA Final Site 8 EE/CA, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. May 2015.  <i>Final Action Memorandum for Site 8 Soil, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. September 2015.  <i>Completion Report, Remedial Action Washington Navy Yard Removal Action Site 8, Washington Navy Yard, Washington, D.C.</i> CAPE

TABLE 1-4  
**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities**  
**FY 2018 Site Management Plan**  
**Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
<b>FEASIBILITY STUDIES (by date)</b>					
Site 5 Feasibility Study	2004-2005	CH2M HILL	Site 5 – Subsurface Soil	Technical Memorandum, <i>Work Plan for Additional Subsurface Soil Sampling at Site 5, Washington Navy Yard, Washington, D.C. (CTO-165)</i> . CH2M HILL. March 2004.	<i>FFA Final Site 5 Feasibility Study Soil Sampling and Necessity Evaluation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. March 2005.
Site 16 Feasibility Study	2004-2005	CH2M HILL	Site 16 – Subsurface Soil	Technical Memorandum, <i>Work Plan for Additional Subsurface Soil Sampling at Site 16, Washington Navy Yard, Washington, D.C. (CTO-39)</i> . CH2M HILL. March 2004.	<i>FFA Final Site 16 Feasibility Study Soil Sampling and Necessity Evaluation, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. March 2005.  <i>FFA Final Site 16 Supplemental Sampling Results and Feasibility Study Necessity Evaluation, Washington Navy Yard, Washington, D.C.</i> . CH2M HILL. October 2005.
Site 22 Feasibility Study	2013-Present	CH2M HILL	Site 22 - Soil beneath Building 112	<i>FFA Final Sampling and Analysis Plan for the Feasibility Study Investigation, Site 22, Washington Navy Yard.</i> December 2013.	<i>FFA Final Site 22 Feasibility Study, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. June 2015.
Site 6 Feasibility Study	2014-2015	CH2M HILL	Site 6 - Building 118 PCBs in detritus	**None	<i>FFA Final Site 6 Feasibility Study, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. October 2015.
OU2 Feasibility Study	2014-Present	CH2M HILL	OU2 - nearshore sediment	<i>FFA Final Feasibility Study Data Gaps Investigation Sampling and Analysis Plan, Operable Unit 2 - Near-shore Sediment, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. October 2015.	Additional sediment sampling to support the FS completed in March 2016.  FFA Final Feasibility Study planned for September 2018.
<b>PROPOSED PLANS and RODS (by date)</b>					
Sites 4 and 14 Proposed Plan and Record of Decision	2004-2005	CH2M HILL	Site 4 - Soil around Buildings 44, 46, 67, and 108.  Site 14 - Soil around Building 292	**None	<i>FFA Final Site 4 Proposed Plan, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. June 2004.  <i>FFA Final Site 4 Record of Decision, Washington Navy Yard, Washington, D.C.</i> DON. September 2004.  <i>FFA Final Site 14 Proposed Plan, Washington Navy Yard, Washington, D.C.</i> CH2M HILL. December 2004.  <i>FFA Final Site 14 Record of Decision, Washington Navy Yard, Washington, D.C.</i> DON. September 2005.
Site 16 Proposed Plan and Record of Decision	2005	CH2M HILL	Site 16 – Subsurface Soil	**None	<i>FFA Final Site 16 Proposed Plan, Washington Navy Yard, Washington, D.C.</i> November 2005.  <i>FFA Final Sites 5 and 16 Record of Decision, Washington Navy Yard, Washington, D.C.</i> . September 2006.

TABLE 1-4  
**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities**  
**FY 2018 Site Management Plan**  
**Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
Site 5 Proposed Plan and Record of Decision	2005	CH2M HILL	Site 5 – Subsurface Soil	**None	FFA Final Site 5 Proposed Plan, Washington Navy Yard, Washington, D.C. November 2005.  FFA Final Sites 5 and 16 Record of Decision, Washington Navy Yard, Washington, D.C. September 2006.
SSA 1, 2, 6, 7,11, and 13 and AOC 1 No-Further-Action Decision (Closure)	2006	CH2M HILL	No Further Action Decision Document signed for 6 SSAs and 1 AOC	**None	FFA Final NFA Decision Document for SSA 1, 2, 6, 7, 11, and 13 and AOC 1, Washington Navy Yard, Washington, D.C. Navy. December 2006.
Sites 1, 2, 3, 7, 9, 11, and 13 Proposed Plan and ROD	2007	CH2M HILL	No Further Action Proposed Plan and ROD for seven of the Phase II Sites	**None	FFA Final Sites 1, 2, 3, 7, 9, 11, and 13 Proposed Plan, Washington Navy Yard, Washington, D.C. February 2007.  FFA Final Site 1, 2, 3, 7, 9, 11, and 13 Record of Decision Washington Navy Yard, Washington, D.C. September 2007.
Site 17 Proposed Plan and Record of Decision	2008-2011	CH2M HILL	No Action Proposed Plan and ROD	**None	FFA Final Proposed Plan for Site 17, Washington Navy Yard, Washington, D.C. May 2011.  FFA Final Record of Decision for Site 17, Washington Navy Yard, Washington, D.C. September 2011.
SSA 9 No-Further-Action Decision (Closure)	2012	CH2M HILL	No Further Action Decision Document signed for SSA 9	**None	FFA Final NFA Decision Document for SSA 9, Washington Navy Yard, Washington, D.C. Navy. August 2012.
Site 23 Proposed Plan and Record of Decision	2012-2013	CH2M HILL	No Action Proposed Plan and ROD	**None	FFA Final Proposed Plan for Site 23, Washington Navy Yard, Washington, D.C. August 2012.  FFA Final Record of Decision for Site 23, Washington Navy Yard, Washington, D.C. March 2013.
Site 6 Proposed Plan and Record of Decision	2016	CH2M HILL	Proposed Plan and ROD for Land Use Controls and Long-term Management	**None	FFA Final Proposed Plan, Site 6 at the Washington Navy Yard, Washington, D.C. June 2016.  FFA Final Record of Decision for Site 6, Washington Navy Yard, Washington, D.C. September 2016.
Site 22 Proposed Plan and Record of Decision	2016	CH2M HILL	Proposed Plan and ROD for Land Use Controls and Long-term Management	**None	FFA Final Proposed Plan, Site 22 at the Washington Navy Yard, Washington, D.C. June 2016.  FFA Final Record of Decision for Site 22, Washington Navy Yard, Washington, D.C. September 2016.
Site 8 Proposed Plan and Record of Decision	2017	CH2M HILL	No Further Action Proposed Plan and ROD	**None	FFA Final Proposed Plan, Site 8 at the Washington Navy Yard, Washington, D.C. June 2017.  FFA Final Record of Decision for Site 8, Washington Navy Yard, Washington, D.C. September 2017.

TABLE 1-4

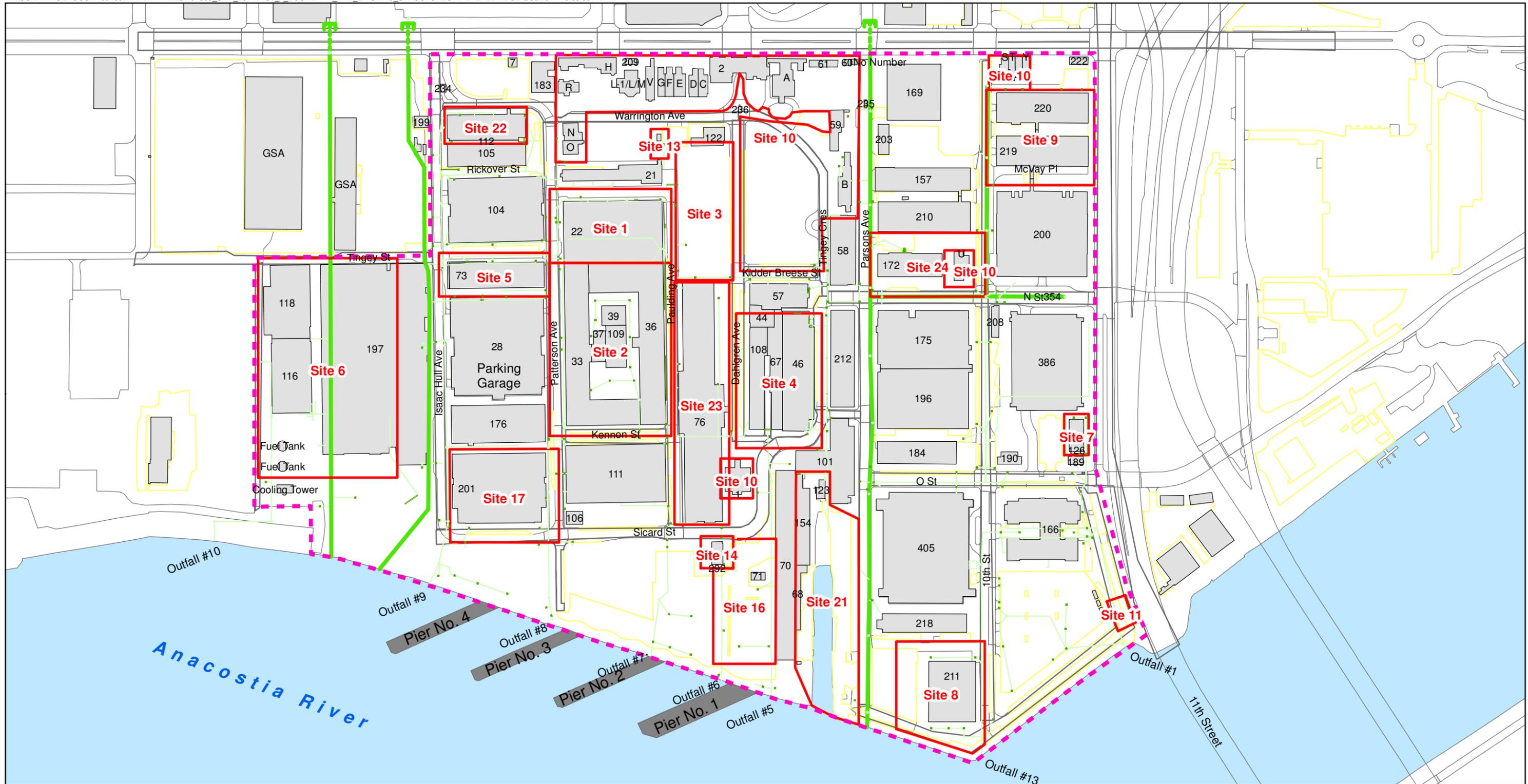
**Summary of Significant Environmental Restoration Program Investigation, Removal Action, and Remediation Activities  
 FY 2018 Site Management Plan  
 Washington Navy Yard, Washington, D.C.**

Investigation / Removal Action / Study	Date(s) of Activity	Author / Contractor	Description / Sites, AOCs, SSAs, or Other Areas - Media	Associated Work Plan	Associated Report(s)
SSA 12 Proposed Plan and Record of Decision	2017	CH2M HILL	No Action Proposed Plan and ROD	**None	FFA Final Proposed Plan, Site Screening Area 12: Exposure Areas 1, 19, 21, and the Eastern Extension Exposure Area at the Washington Navy Yard, Washington, D.C. . June 2017.  FFA Final Record of Decision for Site Screening Area 12: Exposure Areas 1, 19, 21, and the Eastern Extension Exposure Area, Washington Navy Yard, Washington, D.C. September 2017.
<b>REMEDIAL DESIGNS (by date)</b>					
Site 6 Land Use Control Remedial Design	2016-present	CH2M HILL	Land Use Control implementation plan for the soil beneath the combined footprint of Buildings 116, 118, and 197	**None	FFA Final Land Use Control Remedial Design for Site 6 at the Washington Navy Yard, Washington, D.C. September 2017
Site 22 Land Use Control Remedial Design	2016-present	CH2M HILL	Land Use Control implementation plan for the soil beneath the combined footprint of Buildings 112 and 105	**None	FFA Final Land Use Control Remedial Design for Site 22 at the Washington Navy Yard, Washington, D.C. September 2017

Notes and Abbreviations

- Baker - Baker Environmental, Inc.
- DP GW = direct push groundwater sampling
- MW GW = monitoring well groundwater sampling
- NEESA - Naval Energy and Environmental Support Activity
- OHM - OHM Remediation Services
- SEFC - Southeast Federal Center
- WNY - Washington Navy Yard

Shaw E&I, Inc = Shaw Environmental and Infrastructure, Inc.



- Legend**
- WNY Storm Sewer Line
  - DC Storm Sewer Line
  - Building
  - Road Way
  - Parking Area
  - Water Body
  - Environmental Restoration (ER) Site
  - Numbers and Boundaries
  - Navy Yard Boundary

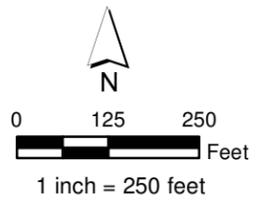


Figure 1-1  
 Facility Boundary and Existing Structures  
 Washington Navy Yard  
 Washington, DC

# Site, SSA, and AOC Descriptions

This section provides specific information regarding each of the ER sites, OUs, SSAs, and AOCs included in the FFA and SMP. In addition, the one Navy MRP site on WNY, referred to as the “Experimental Battery”, is identified and described below as MRP Site 1.<sup>10</sup> Site-specific information includes site physical characteristics and known contaminants in each site medium. The descriptions were generally taken from the 1997 RCRA Consent Order and the FFA, except for OU2 (WNY Near-Shore Sediment), SSA 12 (WNY Fill Material), and MRP Site 1, which were added to the program after the FFA was written. Figure 2-1 presents the ER site locations; Figure 2-2 illustrates the SSA locations, except for SSA 12 and MRP Site 1; Figure 2-3 presents the location of SSA 12, as well as the representative outline of OU2 Near-Shore Sediment; and Figure 2-4 presents the AOC locations. Appendix A presents a list of the sites and OUs, and Appendix B presents a list of the AOCs and SSAs. Section 4 presents the project schedules, including project-related deliverables and anticipated fieldwork dates for work planned at the sites, SSAs, and OUs. Refer to Table 1-4 for additional information for each site.

## 2.1 ER Site Descriptions

Seventeen ER sites (Sites 1 through 17) and one OU (OU1, Facility-Wide Groundwater) were identified in the FFA. OU2 (Near-Shore Sediment) and four additional sites (Sites 21, 22, 23, and 24) were later added to the ER Program. Each is described below.

### 2.1.1 Site 1—Building 22 (Lead and Brass Foundry)

Site 1 comprises a multistoried brick building, Building 22, and the soils directly adjacent to it. Surrounding areas consist of pavement, concrete and other buildings. It is the location of a former foundry for the manufacture of brass cannons, shells, and shot. Other machinery has also been constructed where Building 22 currently is located. Activity locations here included a 6-inch-gun shop, miscellaneous shops, an erecting shop, a general machine shop, and a laundry facility (EPA, 1999).

Based on historical and current processes and suspected past waste disposal practices, residues from the processes listed above may have contributed to the contamination of the soil surrounding Building 22. Historically, it is known that heavy metals were used in ordnance production. Solvents, such as carbon tetrachloride, also were used for cleaning. Cyanide and phenols were used for cooling, and solvents and metals (lead, chromium, cadmium, and antimony) were used for paint spraying. Perchloroethylene, carbon tetrachloride, dichloroethene, and vinyl chloride may be associated with laundry facility processes (EPA, 1999). Analytes of interest (AOIs) at this site are metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and cyanide.

### 2.1.2 Site 2—Buildings 33, 33a, 36, 37, 39, and 109 Quadrangle (Gun Carriage Shop)

Site 2 consists of Buildings 33, 33a, 36, 37, 39, and 109—known as the Quadrangle Complex. The surrounding areas consist of pavement, concrete, and other buildings. The Quadrangle Complex is believed to be the original machine shop location at WNY and was constructed in phases between 1854 and 1860 with the exception of Building 37, which was constructed in 1899 as a toilet (Dolph, 2001a). The buildings were then used primarily as storage facilities for the Navy Exchange System and WNY Supply Department until the 1990s, when all of the Site 2 Quadrangle Complex buildings were fully gutted and renovated within the original building footprints. A battery shop, containing automotive-type batteries, was believed to be located in former Building 33a in a small cinderblock addition to Building 33 (Dolph, 2001a). The FFA formerly identified the presence of an acid room and flammable storage area in Building 33a. This information was not confirmed by recent historical research of the

<sup>10</sup> MRP Site 1 (Experimental Battery) was identified under the Navy’s MRP as established by the DoD under the DERP to address munitions and explosives of concern (MEC) and munitions constituents (MC) other than operational ranges and other sites. Additional information is provided in Section 3.

Quadrangle Complex performed by the naval historian (Dolph, 2001a). Potential hazardous substances associated with general machine shop operations may be assumed to include solvents, such as carbon tetrachloride, and metals used in paint-spraying may have contributed to the soil and groundwater contamination (EPA, 1999). AOIs at this site are metals and VOCs.

### 2.1.3 Site 3—Buildings 40 and 41 (Gun and Metal Plating Shop)

Site 3, a sloped, grassy area, is the former location of Buildings 40 and 41. The surrounding areas consist of pavement, concrete, and other buildings. Electroplating was performed in Building 41 in the 1950s using equipment that consisted of three deep plating pits (one 75 feet deep and two 69 feet deep) for the longer gun barrels and a number of plating and other storage tanks (Dolph, 2001b, c). These pits were believed to be filled with rubble or granular material. Additionally, underground rooms beneath Dahlgren Avenue were left in place after the demolition of Buildings 40 and 41. Through the years, Buildings 40 and 41 were transformed from a gun shop to a plating shop, and then to offices before demolition in 1977. Typically, a large variety of heavy metals, acids, cleaners, and caustics were used during plating operations. These materials may have contributed to the soil contamination at Site 3. The Fire Control School operated here, providing training in the operation and aiming of naval guns (not training in fighting fires) (EPA, 1999). AOIs at this site are metals, VOCs, and cyanide.

### 2.1.4 Site 4—Buildings 44, 46, 67, and 108 (Cartridge Case Shop)

Site 4 includes Buildings 44, 46, 108, 67, and the adjacent soil. The buildings are multistoried, brick structures. The surrounding areas consist of pavement, concrete, and other buildings. Building 46 was used as a copper-rolling mill, cartridge-case shop, metal pressings shop, Navy Exhibit Center, offices, and warehouse. Currently, it contains the Navy Exhibit Center, shop, and warehouse. Building 46 also contained waste channels, scale pits, and various other pits under the flooring (EPA, 1999).

Building 108 was originally used in 1872 as an anchor and faggoting shop. It also was used for a cartridge-case shop, chemical laboratory, seamen shop, offices, and storage. Based on the historical operational processes associated with it, residues from solvents, phenols, and metals may be present. An industrial sewer line (designated as a river water line), apparently for conveying industrial waste, ran north-south between Buildings 108 and 67 (EPA, 1999).

Building 67 can be traced back to 1898 and was used as a cartridge-case shop, primer shop, furnace room, metal pressings shop, storage, and Navy Exchange Center. Acid pits were also located in its northern portion (EPA, 1999). AOIs at this site are metals and SVOCs.

### 2.1.5 Site 5—Building 73 (Gun Mount, Metal-Cleaning, and Fabricating Shop)

Site 5 includes Building 73 and adjacent soils. Building 73 is a multistoried brick building. Surrounding areas include pavement, concrete, and other buildings. Activity at this location can be traced to 1845, when an ordnance laboratory was established. WNY's 1872 plan shows the area as a vacant lot. The 1898 plan indicates underground storage tanks (USTs) on this site. Building 73 was constructed during 1901 and 1902 and used as a specialized gun-mount shop. It also was utilized as a secondary mount shop, roughing shop, erecting shop annex, broadside mount shop annex, Shop 28 Annex 2, aluminum-cleaning facility, welding and fabricating shop, storage, snack bar, and supply department. The aluminum-cleaning facility contained 10 aboveground tanks storing iridite and alkaline for etching, degreasing tanks with sump pumps, deoxidizer tanks, and tanks of nonetching-related alkaline (EPA, 1999). AOIs at this site are metals, VOCs, and SVOCs.

It is known that solvents, phenols, and metals were historically used in cleaning, cooling, and paint-spraying activities. A variety of wastes could have been generated from processes when the building was used as an aluminum cleaning facility and may have contributed contamination to the soil and groundwater at Site 5 (EPA, 1999).

### 2.1.6 Site 6—Buildings 116, 118, and 197 (Heating and Former Power Plant, Gun Assembly Shop)

Site 6 includes Buildings 197, 116, and 118 and adjacent soils. The buildings are multistoried brick structures, and the surrounding areas consist of pavement, concrete, and other buildings. Before construction of Building 197, an old scale pit, a fuel oil tank, Building 126, Building 127, and Building 150 were scheduled to be removed to facilitate the placement of the building's foundation. A gun pit was installed in the building's northern end, 12 feet below the ground-floor level. It was used as a gun assembly shop and is currently abandoned. It is known that solvents such as carbon tetrachloride were used for cleaning, and metals (lead, chromium, cadmium, and antimony) were used in paint-spraying operations. Fuel oils, greases, metals, and solvents may have contributed to the contamination found in the soil and/or groundwater at Site 6 (EPA, 1999).

The area of Buildings 116 and 118 can be traced back to 1904 as it was gradually filled in with material of unknown composition before 1902. The two buildings were constructed shortly after 1904. Building 116 has operated as the boiler house since its construction and Building 118 operated as WNY power plant. An ash sedimentation pit was located south of Building 116 and later converted to a coal storage area (EPA, 1999). AOIs at this site are metals, SVOCs, and VOCs. In addition to the AOIs (metals, SVOCs, and VOCs) specified in the RCRA Consent Order and the FFA for Site 6, PCBs and dioxins and furans are considered as AOIs for Site 6.

### 2.1.7 Site 7—Building 126 (Laundry)

Site 7 includes Building 126, a multistoried brick structure, and the adjacent soils. Surrounding areas consist of pavement, concrete, and other buildings. This site was used as the receiving station laundry from 1938 through 1950. Offices and the Naval Command System Support Activity also used this site.

According to the FFA (EPA, 1999), solvents (perchloroethylene, carbon tetrachloride, dichloroethene, and vinyl chloride) associated with dry cleaning processes may have contributed contamination to the soil and groundwater at Site 7; however, it has since been determined that no dry cleaning activities were performed at Building 126. Based on recent historical information contained in the *Building 126 Literature Search* (Dolph, 2001d) it was determined that the building was used only as a laundry, housing clothes washers and dryers.

### 2.1.8 Site 8—Building 211 (Paint and Oil Storage)

Site 8 includes Building 211 and the adjacent soils. Building 211 is a single-story building and is surrounded by the Anacostia River, grass, pavement, concrete, and other buildings. It can be traced to 1942, when it was used for paint and oil storage. It also has been used to store other flammables and chemicals and is presently a reception hall. Based on past activities and the possibility of spills, residues from the products stored on these premises may have contributed contamination to the soils and groundwater at Site 8 (EPA, 1999). AOIs at this site are metals, VOCs, and SVOCs.

### 2.1.9 Site 9—Buildings 219 and 220 (Gauge and Chemical Laboratory)

Site 9 includes Buildings 219 and 220 and the adjacent soils. Both buildings are multistoried brick structures. Surrounding areas consist of grass, pavement, concrete, and other buildings. Building 219 was used as a gauge laboratory and machine shop from 1944 to 1962. The building also operated as offices, a chemical laboratory, and the home of the Naval Weapons Quality Assurance Officer (Dolph, 2001f).

As stated in the FFA, mercury, a material associated with typical gauge laboratories, may have been released in Building 219 and may have affected the underlying soils due to the presence of porous wooden floors within the building; however, recent historical research indicates that the Building 219 floors consisted of a concrete floor underneath the wooden floor. Therefore, a porous wooden floor does not exist at Building 219. AOIs at this site are metals and cyanide.

### 2.1.10 Site 10—Admiral’s Row (Flag, Captain, and Visiting Officer Housing)

Admiral’s Row is the designation given to a group of buildings located along Warrington Avenue that are currently used to house naval officers and their families and include Quarters A, B, C, D, E, F, G, H, K, L, M, M-1, N, O, P, R, S, T, U, V, W, and Y; Buildings 1, 59, and 61; and Leutze Park. These are multistoried residences with adjacent areas consisting of grass, pavement, concrete, and other buildings. Maintenance of these buildings with lead-based paints, lead roofing materials, and lead water mains is believed to be the source of lead-contaminated soil (EPA, 1999). The AOI at this site is lead.

### 2.1.11 Site 11—Incinerators (Former Incinerators)

Site 11 consists of two former incinerators located in the southeastern corner of the Building 166 parking lot. The removal of the two incinerators and associated structures (watch house and footings) appears to have been completed to a depth of 12 inches (Dolph, 2001g). The materials incinerated were classified materials consisting of paper, cellophane, film, and Mylar. The site is presently used as a parking area. AOIs at this site are dioxins, SVOCs, and metals.

In earlier versions of the SMP and other WNY reports, the Site 11 boundary was shown approximately 150 to 200 feet west of the current Site 11 location shown in Figure 2-1. The locations of the two former incinerators were revised to the current location based on research presented in *FFA Final Phase II Focused Remedial Investigation Report for Sites 1, 2, 3, 7, 8, 9, 11, 13, and 17* (CH2M HILL, 2005g).

### 2.1.12 Site 12—Stormwater Lines from Site 4 to Outfall 5 (Deleted from List)

Site 12 consisted of the stormwater line running from the area of Site 4 to Outfall 5. Material that accumulated in this pipe contained elevated levels of heavy metals, PAHs, and PCBs. The potential source of this contaminated material may have included past releases from Site 4. For the remainder of this document, Site 12 is considered to be a part of Site 4.

### 2.1.13 Site 13—Building 290 (Electrical Equipment)

Site 13 includes Building 290 and the soil adjacent to it. It is located south of Admiral’s Row and north of Buildings 40 and 41. It was suspected to house PCB-containing equipment in the past; however, it does not presently house PCB-containing equipment. PCBs have been found in the soil (EPA, 1999). AOIs at this site are PCBs.

### 2.1.14 Site 14—Building 292 (Electrical Equipment)

Site 14 includes Building 292 and the adjacent soils. Building 292 is a small, single-story brick structure. Surrounding areas consist of paved parking and other brick buildings. It previously housed a PCB-containing portable generator. The leaking generator is believed to have contaminated the soils. No PCBs are presently housed there (EPA, 1999).

Analytical results on a standing water sample from the Building 292 basement did not indicate detectable concentrations of benzene, toluene, ethylbenzene, and xylenes; pesticides; or PCBs. Only low levels of total petroleum hydrocarbons were detected (EPA, 1999). AOIs at this site are PCBs and metals.

### 2.1.15 Site 15—Stormwater Lines from Site 6 to Outfall 10 (Deleted from List)

Site 15 consists of the stormwater line running from the area of Site 6 to Outfall 10. Material that accumulated in this pipe contained elevated levels of levels PCB, PAHs, and metals in concentrations above EPA screening criteria. The potential sources of this contaminated material may have included Site 6 and offsite contaminated soil from the SEFC, currently operated by GSA. For the remainder of this document, Site 15 is considered to be a part of Site 6.

### 2.1.16 Site 16—Building 71 (Gasoline and Diesel Fuel Station)

The area defined as Site 16 is located in the south-central portion of WNY, adjacent to the Anacostia River. Site 16 encompasses Building 71 and its current and former USTs, several monitoring wells, stormwater lines traversing the site, and an area where a small quantity (estimated at less than 1 cup) of free-phase mercury was discovered in the subsurface. The stormwater lines that run through the site terminate at Outfalls 5 and 6 (EPA, 1999). The petroleum portion of this site has since been removed from the ER Program and is being addressed under the UST Program.

### 2.1.17 Site 17—Building 201 (Automotive Maintenance Facility)

This site includes former Building 201 and the adjacent soils. Former Building 201 was a two-story concrete and brick building. It was constructed as a maintenance facility for automotive equipment and official government cars. Building 201 was investigated because of past and current public works operations. Miscellaneous operations are suspected of contributing to the contamination found in site soil and groundwater (EPA, 1999). AOIs at this site are VOCs, pesticides, metals, PCBs, and SVOCs. Building 201 and adjacent Buildings 198 and 142 were demolished around 1999 and a new four-story office building (new Building 201) was constructed in their places.

### 2.1.18 Site 21—Buildings 68, 123, 130, 133, 154, 224, and 246 (Ship Repair Department)

The Ship Repair Department (initially identified as SSA 3) consists of existing and previously existing Buildings 68, 123, 130, 133, 154, 224, and 246; Wharf No. 1; the marine railway; and Slip No. 1. The department overhauled and repaired small craft such as tugboats, barges, yachts, tenders, pile drivers, lighters, floats, derricks, and patrol vessels. The Ship Repair Department generally operated from the late 1890s to approximately 1980. SSA 3 was elevated to ER site status in 2006. AOIs for this SSA are metals, SVOCs, and VOCs.

### 2.1.19 Site 22—Building 112 (Polishing and Plating Shop)

Building 112 was constructed in 1903 and served as the Seaman Gunner's Repair and Storehouse. Operations such as light machining, benchwork, and light motor overhaul and assembly were likely conducted here. It was converted to an electroplating plant in the 1920s in support of the manufacture of naval guns. Operations included plating with chromium, cadmium, nickel, copper, lead, tin, gold, and silver. Pickling, parkerizing, and polishing operations were conducted in the building in addition to plating. Since the 1920s, it has housed the Navy Band and has operated as a storage facility. AOIs for this site are metals, VOCs, and cyanide.

This site was initially identified as SSA 8. In 2006, the WNY Tier 1 Partnering Team concluded that additional investigation at SSA 8 was appropriate because of recent renovation/activities at Building 112 (that is, SSA 8) that revealed elevated chromium levels in the soil in May 2004. Therefore, it was recommended that SSA 8 become an ER site (Site 22).

### 2.1.20 Site 23—Building 76 (Breech Mechanism Shop)

Building 76 (initially identified as SSA 10) was constructed in 1899 as a Breech Mechanism Shop. It generally served as a large machine shop and included the manufacturing and assembling operations of breech mechanisms for guns. Manufacturing operations ceased in 1961. After extensive renovations, during which the original flooring was removed, the building began serving as the Navy Museum. Building 76 was originally listed as a potential AOC, but after further review of the building history, the building was assigned as SSA 10. SSA investigation activities identified potential unacceptable risks related to PAHs in the soil. As a result, the SSA was elevated to ER Site status as Site 23 in 2006. AOIs for this site are metals, SVOCs, and VOCs.

### 2.1.21 Site 24—Quarters U, Buildings 157, 172, 210 Former Buildings 185 and 261

Site 24 (initially identified as SSA 14), Building 172 (where former Buildings 185 and 261 were located), was associated with the historical Experimental Ammunition Unit and Mine Laboratory activities. Quarters U was

constructed as a Mine Building Annex in 1937 (Dolph, 2004) and was one of several buildings that constituted the Experimental Ammunition Unit and Mine Laboratory that was established at WNY between 9th Street and 11th Street in 1919. Initially, the Experimental Ammunition Unit and Mine Laboratory included Buildings 172, 185, and 261, as well as two small dwellings that were originally occupied by private citizens, until the Navy acquired WNY's eastern portion during World War I. In 1937, the Navy constructed Building 195 (now Quarters U), to replace the two small dwellings. The work performed by the Experimental Ammunition Unit and the Mine Laboratory included the development of new, experimental projects involving pyrotechnic devices. In addition, the Experimental Ammunition Unit developed a number of pyrotechnic fuses, requiring the handling of small amounts of explosives that ranged from black powder to trinitrotoluene (better known as TNT). The handling of the pyrotechnic materials and explosives was performed in the two old dwellings until 1924, when one of the dwellings was destroyed by an explosion. A 1928 naval gun factory annual report stated that these buildings were inadequate for this type of work because of their construction (wood and plaster) and lack of space, both contributing to safety concerns for personnel. Because of the explosion and this concern, Building 195 (present Quarters U) was constructed in 1937. Sometime during WWII, the Experimental Ammunition Unit and the Mine Laboratory were combined to form the Naval Ordnance Laboratory. The laboratory relocated to form the Naval Surface Warfare Center—White Oak in Silver Spring, Maryland, following the end of WWII. There is no documentation detailing a release or disposal practices; however, an explosion incidence report details a 1924 explosion in one of the two small dwellings.

### 2.1.22 Operable Unit 1—Facility-Wide Groundwater (Shallow Aquifer)

Facility-wide groundwater is being investigated and evaluated for risks as a single unit for the entire WNY. Various industrial operations have occurred at the facility since its establishment. Approximately two-thirds of the current facility was formed by filling the former mudflats and channel of the Anacostia River in various phases. Fill has also been placed on much of the original land surface. Shallow groundwater is present in two distinct water-bearing units—the surficial fill layer and the underlying sand and gravel formation. However, these units are not sufficiently distinct to warrant designation as separate aquifers, and therefore the two units are being evaluated as one unit under the OU1 designation. Solvents, metals, PCBs, pesticides, PAHs, and other chemicals have been identified on WNY. The above sites and other potential sources may be present and affecting the groundwater at WNY.

Additional detail regarding the definition of “shallow aquifer” in the context of facility-wide groundwater (OU1) is contained in the *FFA Revised Draft Operable Unit 1 Facility-Wide Groundwater Focused Remedial Investigation Report* (CH2M HILL, 2014). EPA has determined that the water in the shallow fill unit is groundwater and that the fill aquifer is classified as a Class 2B aquifer, meaning that it could potentially be used as a drinking water source (EPA, 2010).

### 2.1.23 Operable Unit 2—Near-Shore Sediment

The near-shore sediment consists of sediment from the bulkhead to the end of WNY piers, as agreed at the February 2003 Tier 1 partnering meeting. Additional investigation outside the boundary WNY piers are being performed in accordance with CERCLA to investigate if the contamination contributed by the Navy extends outside the boundary. This near-shore sediment exceeds EPA criteria for several SVOCs, PCBs, and metals. The RI that has been completed to date has included several rounds of sampling of shallow and deeper sediments as well as analysis of fish tissue and risks to human health and ecological receptors. The results of the investigations are being evaluated against the appropriate federal, state, and/or local guidelines and criteria as well as background conditions in the river. The Navy has worked with the Anacostia Watershed Toxics Alliance (AWTA) to coordinate the study of the near-shore sediment. The Navy has provided the AWTA leadership with copies of all Navy-generated data and reports for inclusion into AWTA's river-wide database. Key AWTA members have reviewed the Navy's OU2-related work plans and reports and provide suggestions for enhancing the study. The Navy has also shared investigation reports with the DOEE Anacostia RI team. The Navy also reviewed and commented on the DOEE Anacostia RI sampling plans.

## 2.2 Site Screening Areas

Seven SSAs were identified in the FFA from the District's letter of November 2, 1995. These seven SSAs and seven additional SSAs are described below.

### 2.2.1 SSA 1—Building 106 (Oil Gasification and Forge Shop Pneumatic Plant)

Building 106 was an oil gasification and pneumatic plant associated with and located south of the Forge Shop, north of Willard Park and the dock area. It was equipped with centrifugal blowers and graduated oil tanks, providing blast air, gas, and fuel oil to operate furnaces and forges in the production shops. It was built of brick in 1899 and measured 1,200 square feet (ft<sup>2</sup>) (Dolph, 1998, 1999). The FFA-suggested AOs for this SSA are SVOCs.

### 2.2.2 SSA 2—Building 212 (Cartridge Case Foundry)

During preparation of the FFA, Building 212 (SSA 2) was misidentified as a cartridge case foundry. It actually was operated as a storehouse and an electronics shop. The activities in this building were determined to warrant NFA.

### 2.2.3 SSA 3—Buildings 68, 123, 130, 133, 154, 224, and 246 (Ship Repair Department)

Based on the results of a SSA investigation, SSA 3 was elevated to ER site status and renamed Site 21 (Section 2.1).

### 2.2.4 SSA 4—Building 183 (Dispensary)

Building 183, located at the northeast corner of Warrenton and Patterson, was built in 1922 of concrete and brick and measures approximately 17,000 ft<sup>2</sup> (Dolph, 1998). The dispensary has always provided and continues to provide medical services to personnel at WNY. Equipment included X-ray facilities and dental facilities. Silver and scrap-film wastes were generated at the dispensary, according to the Naval Energy and Environmental Support Activity (1988) PA (Dolph, 1998).

An industrial hygiene office and laboratory within the building monitored working conditions at the facility and tested toxic substances used in the shops to ensure worker safety. AOs for this SSA are metals, VOCs, SVOCs, and PCBs.

### 2.2.5 SSA 5—Building 207 (Liquid Storage)

Building 207 was combined with other Buildings 157, 203, and 210, which were part of the Optical Shop and Laboratory, to form SSA 9 (Section 2.2.9).

### 2.2.6 SSA 6—Building 223 (Garbage and Trash House)

Building 223 was built in 1943 of concrete and brick foundation and "BW" superstructure, with 600 ft<sup>2</sup> of floor space. The last data available on the use of the building were from 1965 (Dolph, 1998). AOs for this SSA are metals, SVOCs, VOCs, and PCBs.

### 2.2.7 SSA 7—Buildings 22, 76, 101, 104, 111, 154, 166, 169, 176, 184, 196, 200, and 218 (Former Leaking PCB Transformer Locations)

Six buildings (76, 101, 169, 176, 196, and 218) were added to the original seven buildings (22, 104, 111, 154, 166, 184, and 200) identified as SSA 7 (former potentially leaking PCB transformer rooms) in the FFA. AOs for this SSA consist of PCBs.

### 2.2.8 SSA 8—Building 112 (Polishing and Plating Shop)

Based on the results of an SSA investigation, SSA 8 was elevated to ER site status and renamed Site 22 (Section 2.1).

### 2.2.9 SSA 9—Buildings 157, 203, 207, and 210 (Optical Shop and Laboratory)

The Optical Shop and Laboratory, which operated from about 1941 to 1955, were located in either Building 210 or 157. Activities in adjacent Buildings 203 and 207 supported the operating needs of the Optical Shop. Chemicals were stored in Building 203 and used daily in other buildings. Pitch for the Optical Shop was stored in Building 207. AOIs for this SSA are metals.

### 2.2.10 SSA 10—Building 76 (Breech Mechanism Shop)

Based on the results of a SSA investigation, SSA 10 was elevated to ER site status and renamed Site 23 (Section 2.1).

### 2.2.11 SSA 11—Building 176 (Storehouse)

The Supply Department used Building 176 as a general storehouse from 1919 (when it was constructed) until 1965. Degreasing activities occurred on the second floor of Building 176, but large quantities of chemicals were not stored in this building. AOIs for this SSA are metals, SVOCs, and VOCs.

### 2.2.12 SSA 12—Fill Material

SSA 12 consists of the fill material that had been placed at WNY between 1800 and 1942. The fill was used to reclaim mudflats and shallow areas of the Anacostia River, as well as to raise the ground surface of original land in other portions of WNY. To assist in characterizing the fill material, the area requiring investigation was divided into 32 exposure areas (EAs). The EAs were defined by consensus with WNY Tier 1 Partnering Team, based on a consideration of the fill and land reclamation history at WNY, and the source of fill material emplaced (if known). The area for the fill investigation (SSA 12) on WNY, and each EA, are shown in Figure 2-3. Based on the results of the Phase 1 investigation of SSA 12, the WNY Tier I Partnering Team agreed to conduct further investigation at 10 of the original 32 EAs (EAs 1, 5, 11, 13, 14, 15, 19, 21, 27, and 32). Five other EAs were added to the Phase 2 evaluation (EAs 2, 28, 29, 30, and 31) even though they passed the Phase 1 screening, but had concentrations close to the risk screening criteria, based on Tier I Partnering Team agreement. Because of the similarities among seven of the EAs included in the Phase 2 investigation, these EAs were combined and evaluated as one comprehensive “Eastern Extension” EA during the Phase 2 investigation. Based on the results of the Phase 2 evaluation, four EAs (EAs 1, 19, 21, and the Eastern Extension EA) were carried forward for further evaluation in an RI/FS.

### 2.2.13 SSA 13—Quarters N/O

The *FFA Final AOCs Evaluation Report for AOCs 6 and 7* (CH2M HILL, 2004e) concluded that Quarters N/O (that is, AOC 6) should be reassigned to SSA 13 to be investigated under the SSP detailed in the FFA. WNY Quarters N/O, currently a duplex Officers Quarters (since around 1898), was originally constructed in 1866 as the Paint Shop (Dolph, 2003). The Paint Shop was run by of the Bureau of Yards and Docks. This department was responsible for the maintenance of buildings and structures at WNY. Therefore, the Paint Shop would likely have supported building and structure painting requirements. The Bureau of Yards and Docks typically was not responsible for ship painting and maintenance (this was managed by the Bureau of Construction and Repair).

In addition to painting activities, paint shops historically supported glass workshops because of the relationship of painting and repairing windows. Historical research revealed that paint-grinding mills (used to grind pigments), a hoisting crane, a laboratory portable furnace, paint, oils, turpentine, varnishes, brushes, and glass were all stored and/or used inside the Paint (and Glass) Shop. Materials records (dated 1865) show that the paints, varnishes, and oils contained lead, chromium, zinc, and linseed oil. There is no documentation to suggest that a release occurred (that is, no documentation of spills or disposal practices were located).

### 2.2.14 SSA 14—Quarters U, Building 172, and Former Buildings 185 and 261

Based on the results of a SSA investigation, SSA 14 was elevated to ER site status and renamed Site 24 (Section 2.1).

## 2.3 Areas of Concern

The five AOCs identified in the FFA from the District’s letter of November 2, 1995, are described below or in Section 2.2 if the AOC was reassigned to an SSA. In addition, two AOCs (6 and 7) that were identified after the submission of the FFA are described below. These two AOCs were identified in the *FFA Final Phase II Remedial Investigation Project Plans for Site 10* (CH2M HILL, 2002e). The locations of the AOCs are presented in Figure 2-4.

### 2.3.1 AOC 1—Building 142 (Public Works Maintenance Shop)

Building 142, completed in 1915, was located on the northwestern corner of Sicard Street and Patterson Avenue, across the street from Willard Park (south of Building 201). It was a steel-framed building with a wood- and steel-framed addition and brick and vinyl siding. The building originally served as a radio station and its name was changed to the Radio Test Laboratory in 1919. Its function included manufacture of radio equipment such as receivers, condensers, and amplifiers (Dolph, 1998).

In the late 1930s, Building 162, the Fire Control Laboratory, and Building 142 were combined to form Building 142. The Fire Control Laboratory tested naval equipment for endurance, including temperature rise and corrosion (Dolph, 1998).

The Radio Test Laboratory was charged with “the inspection and testing of radio, sound, and signal equipment” during WWII. After the name changed to Electronics Laboratory (but still carried out the same function), the operation moved to Buildings 154, 101, and 212 (Dolph, 1998). In 1965, Building 142 was converted to the Public Works Maintenance Shop.

Three soil samples were collected in September 1998 in the area of the AOC. PAHs and arsenic were detected in the samples at similar levels detected throughout WNY during the Baker (1996) SI. It is likely that these constituents originated from the fill material and are not associated with the past practices performed at Building 142 (Dolph, 1998).

Further review of Building 142 historical information indicated that NFA was appropriate for this AOC. The building was demolished in 1999 to support Naval Sea System Command’s relocation to WNY (that is, the construction of Building 201). This AOC also overlaps with ER Site 17, and therefore the soil was also evaluated as part of that site.

### 2.3.2 AOC 2—Building 154 (Ship Repair Shop; Excluding Leaking PCB Transformers Identified in SSA 7)

This AOC was reassigned to SSA 3, underwent a screening investigation, and was then elevated to ER site status as Site 21 (Section 2.1.18).

### 2.3.3 AOC 3—Building 210 (Optical Shop and Laboratory)

This AOC was reassigned to SSA 9 (Section 2.2.9).

### 2.3.4 AOC 4—Building 112 (Polishing and Plating Shop)

This AOC was reassigned to SSA 8, underwent a screening investigation, and was then elevated to ER site status as Site 22 (Section 2.1.19).

### 2.3.5 AOC 5—Buildings 76, 101, 169, 176, 196, 218 (Former Potentially-Leaking Transformer Locations)

This AOC was assigned to SSA 7 (Section 2.2.7).

### 2.3.6 AOC 6—Quarters N and O

AOC 6 (WNY Quarters N/O) was identified by the WNY Tier I Partnering Team in the *FFA Final Phase II Remedial Investigation Project Plans for Site 10* (CH2M HILL, 2002e), when historical research for the various Site 10 quarters revealed that Quarters N/O was used for functions other than living quarters. It was learned that Quarters N/O was originally built as Paint Shop #1 in 1866 and was remodeled into living quarters circa 1900 (Dolph, 2001e).

The *FFA Final AOCs 6 and 7 Evaluation Report* (CH2M HILL, 2004e) recommended that AOC 6 be reassigned to SSA 13 to be investigated under the SSP (Section 2.2.13).

### 2.3.7 AOC 7—Quarters U

The *FFA Final AOCs 6 and 7 Evaluation Report* (CH2M HILL, 2004e) recommended that AOC 7 be reassigned to SSA 14 to be investigated under the SSP (Section 2.2.14). In addition, Building 172 and the area north of it (where former Buildings 185 and 261 were located) will be included in SSA 14 because they were associated with the historical Experimental Ammunition Unit and Mine Laboratory activities.

## 2.4 Navy MRP Sites

One site has been identified by the Navy’s MRP on WNY. The MRP site is known as the Former Experimental Battery and referred to herein as the Experimental Battery (MRP Site 1). MRP Site 1 was assessed through the PA process of the Navy’s MRP in 2006, with a recommendation for further evaluation through the MRP SI process (Malcolm Pirnie, 2006).

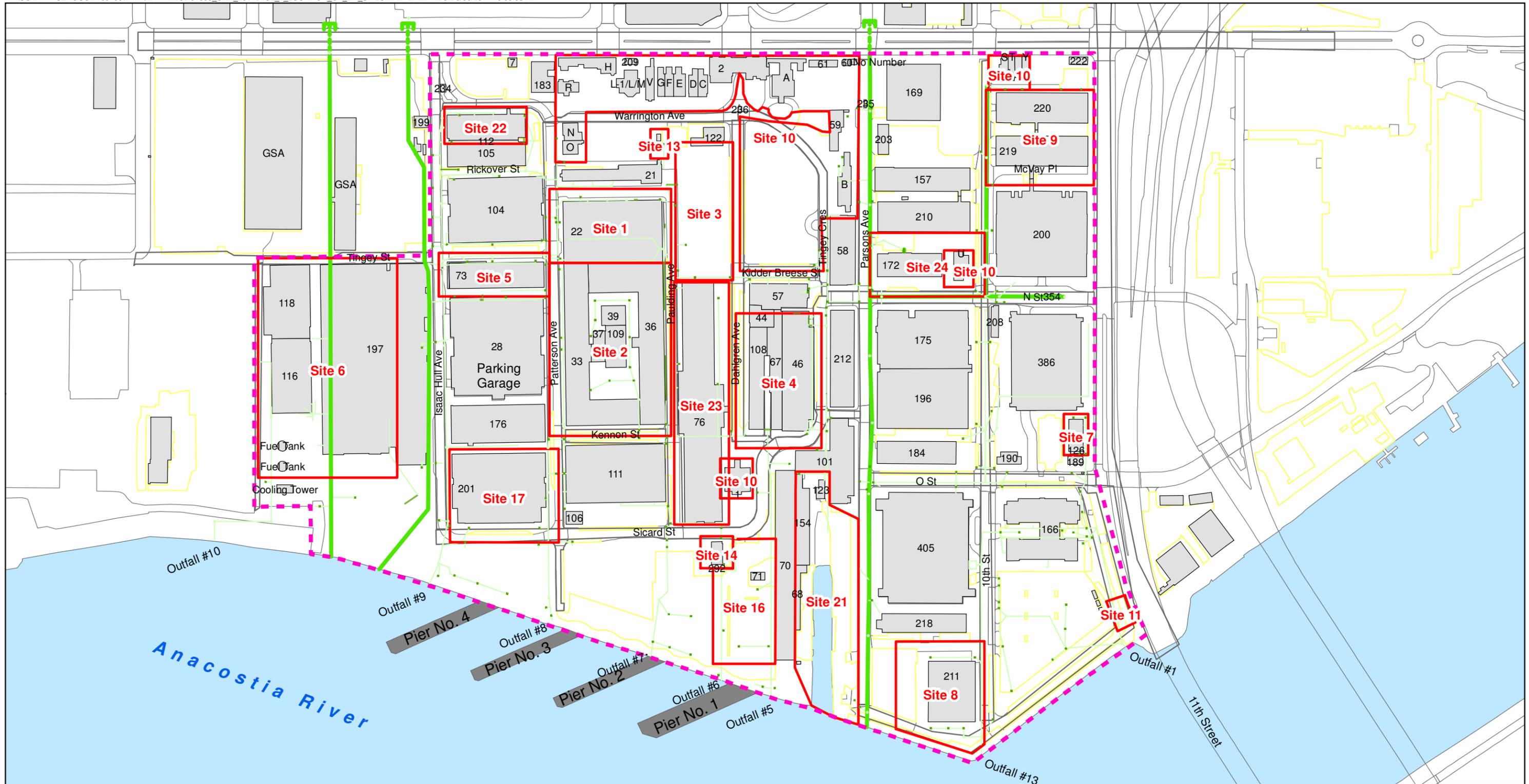
### 2.4.1 MRP Site 1—Experimental Battery

The former Experimental Battery was located on the southern edge of WNY along the Anacostia River, approximately 100 feet north of the current Anacostia River bulkhead and approximately 100 feet south of the current Sicard Street and Patterson Avenue intersection (Figure 2-2) (Malcolm Pirnie, 2006). The battery consisted of a building that simulated a deck and side of a Civil War-era ship with the barrels pointing out the gun ports southwest on the Anacostia River. The building for the battery itself was approximately 112 feet long and 22 feet wide, with an observation tower located at the roof apex. The total area for the site is approximately 0.3 acre.

From circa 1844 to 1872, the Experimental Battery was used to test the firing of 32-pound cannons and to train sailors in gunnery. The battery fired solid shot cannon balls and shells (simulation shells with rice, black powder, and fuses) in a southwesterly direction, with a maximum recorded distance of approximately 1.7 miles. Shells and possibly solid shot were also fired directly across the Anacostia River onto the mud flats so that the experimental shell could be recovered and examined for performance.

By 1872, the Experimental Battery’s testing was transferred to Annapolis, Maryland, and the building at WNY was demolished sometime between 1898 and 1902. The area that comprises the former Experimental Battery is now part of the Admiral Willard Park and an adjacent parking lot.

The SI was completed in 2011, and the final report concluded that any remaining risks related to the battery operations are low and within an acceptable range; as a result, no action is warranted for this site.



- Legend**
- WNY Storm Sewer Line
  - DC Storm Sewer Line
  - Building
  - Road Way
  - Parking Area
  - Water Body
  - Environmental Restoration (ER) Site
  - Numbers and Boundaries
  - Navy Yard Boundary

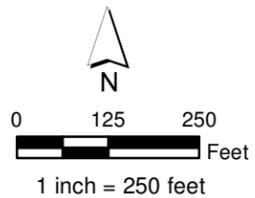
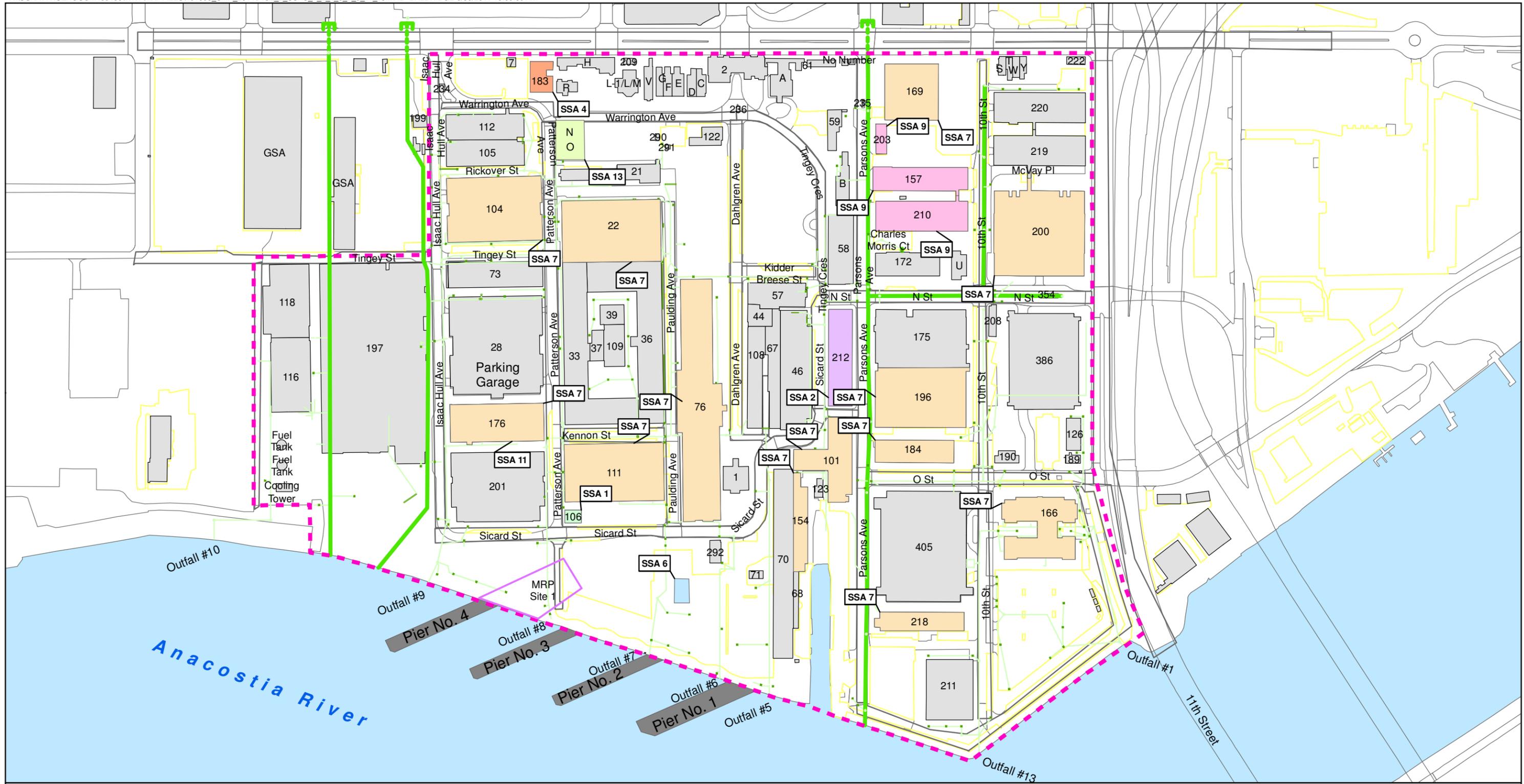


Figure 2-1  
Location of ER Sites  
Washington Navy Yard  
Washington, DC



- Legend**
- WNY Storm Sewer Line
  - DC Storm Sewer Line
  - Building
  - Road Way
  - Parking Area
  - Water Body
  - Navy Yard Boundary
  - MRP Site 1
  - SSA 1 (Building 106)
  - SSA 2 (Building 212)
  - SSA 4 (Building 223)
  - SSA 6 (Building 223)
  - SSA 7 - Approximate Location of Tranformer Room
  - SSA 9 (Buildings 157, 203, 207, and 210)
  - SSA 11 (Building 176)
  - SSA 13 (Building N and O)

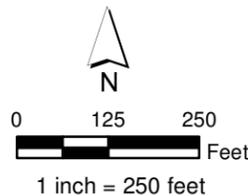
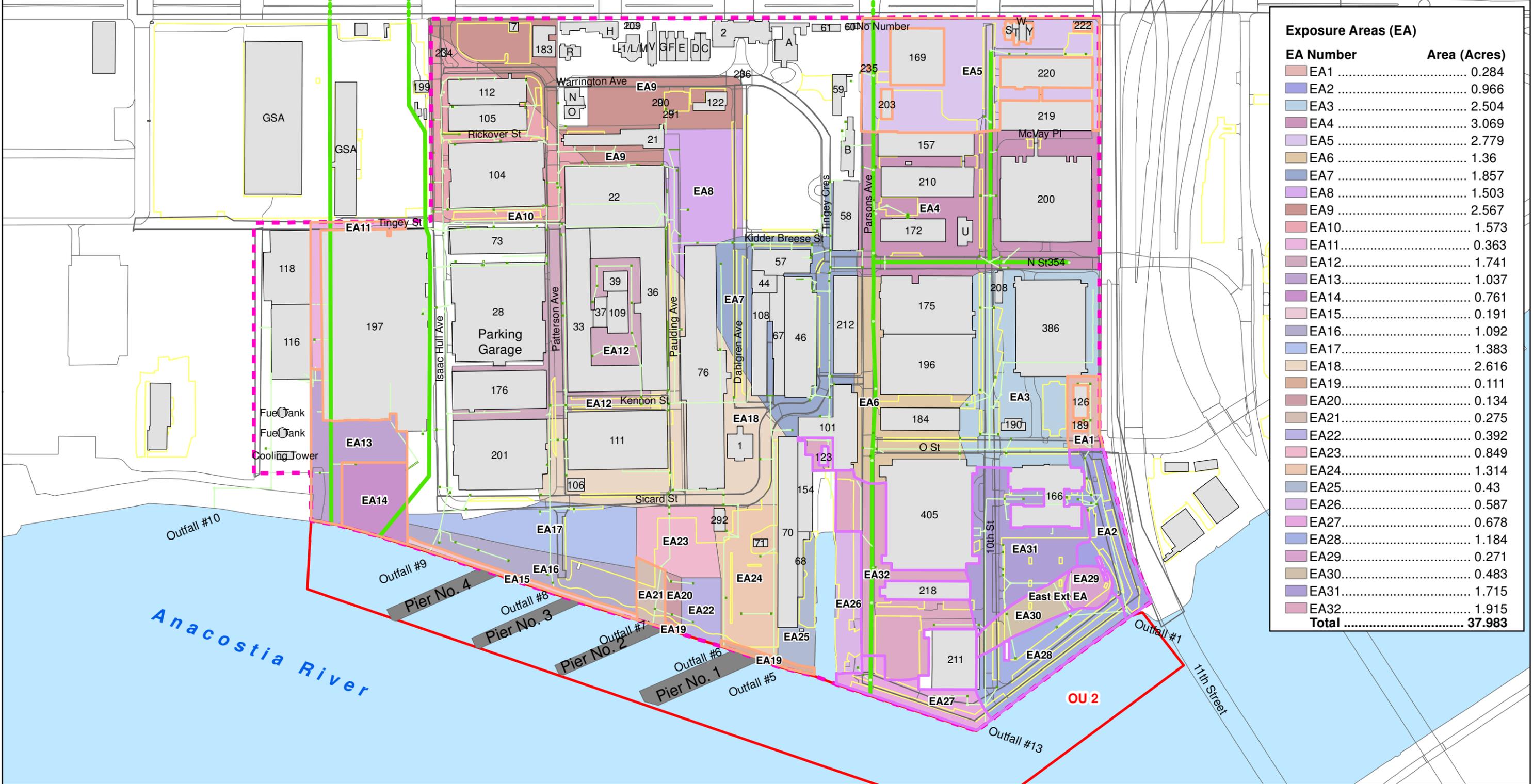


Figure 2-2  
Location of MRP Site and SSAs 1, 2, 4, 6, 7, 9, 11, and 13  
Washington Navy Yard  
Washington, DC



Exposure Areas (EA)		
EA Number		Area (Acres)
EA1	.....	0.284
EA2	.....	0.966
EA3	.....	2.504
EA4	.....	3.069
EA5	.....	2.779
EA6	.....	1.36
EA7	.....	1.857
EA8	.....	1.503
EA9	.....	2.567
EA10	.....	1.573
EA11	.....	0.363
EA12	.....	1.741
EA13	.....	1.037
EA14	.....	0.761
EA15	.....	0.191
EA16	.....	1.092
EA17	.....	1.383
EA18	.....	2.616
EA19	.....	0.111
EA20	.....	0.134
EA21	.....	0.275
EA22	.....	0.392
EA23	.....	0.849
EA24	.....	1.314
EA25	.....	0.43
EA26	.....	0.587
EA27	.....	0.678
EA28	.....	1.184
EA29	.....	0.271
EA30	.....	0.483
EA31	.....	1.715
EA32	.....	1.915
<b>Total</b>	<b>.....</b>	<b>37.983</b>

**Legend**

- WNY Storm Sewer Line
- DC Storm Sewer Line
- Building
- Road Way
- Parking Area
- Water Body
- Navy Yard Boundary
- OU2 Boundary
- EAs Further Evaluated in the Phase 2 SSA 12 Fill Investigation
- Eastern Extension EA

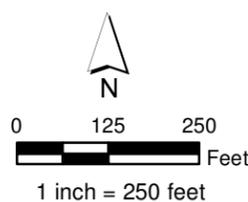
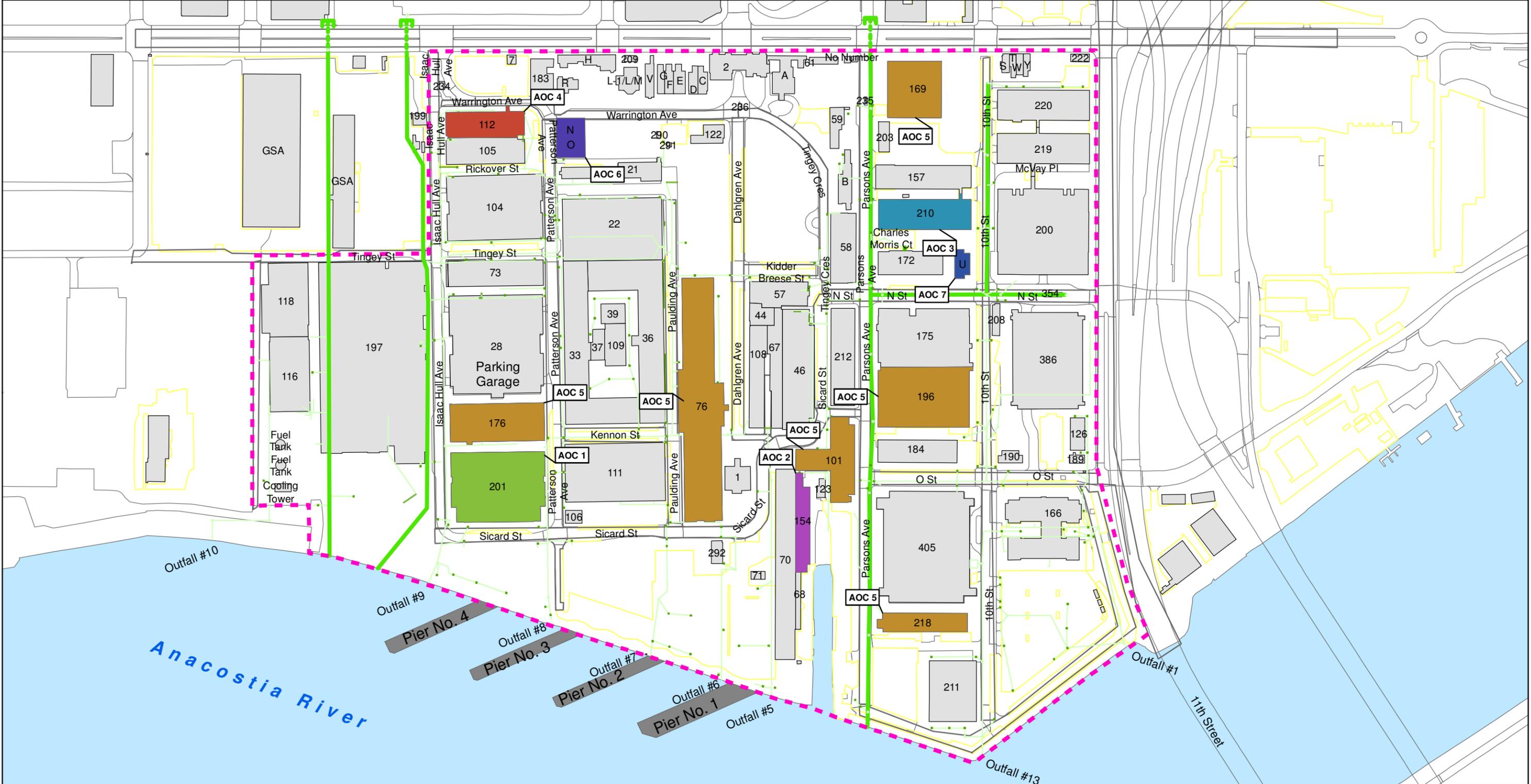


Figure 2-3  
OU2 Boundary and SSA 12 Exposure Area (EA) Locations  
Washington Navy Yard  
Washington, DC



- Legend**
- WNY Storm Sewer Line
  - DC Storm Sewer Line
  - Building
  - Road Way
  - Parking Area
  - Water Body
  - Navy Yard Boundary
  - AOC 1 (Building 201 and Former Building 142)
  - AOC 2 (Building 154)
  - AOC 3 (Building 210)
  - AOC 4 (Building 112)
  - AOC 5 (Building 76, 101, 169, 176, 196, and 218, Former Transformer Rooms)
  - AOC 6 (Quarters N and O)
  - AOC 7 (Quarters U)

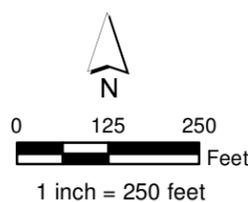


Figure 2-4  
Location of Areas of Concern (AOCs)  
Washington Navy Yard  
Washington, DC

# CERCLA Process Activities

WNY was proposed for inclusion on the NPL in a March 3, 1998, *Federal Register* notice. The addition of WNY on the NPL was effective on August 27, 1998 (EPA, 1999). The NPL is EPA's list of the nation's most serious uncontrolled (or abandoned) hazardous waste sites.

WNY was proposed under the "Federal Facilities" section of the NPL, wherein federal agencies are considered responsible for conducting most of the response actions at facilities under their jurisdiction. As noted earlier, an FFA was signed on June 30, 1999, under which all activities at WNY would be conducted consistent with standard CERCLA operating procedures. The CERCLA processes and investigations ordered under the FFA for the ER sites, OUs, SSAs, and AOCs at WNY are described below. In addition, a summary of the Navy's MRP process is also provided.

## 3.1 Areas of Concern

AOCs listed in Appendix C of the FFA and identified in Section 2.3 and Appendix B of this SMP will undergo a document evaluation. The document evaluation will involve a "thorough review of all existing or easily obtainable documentation and information on the identified" AOCs (EPA, 1999). If the Navy, EPA, and DOEE concur, evaluation of the AOCs "could also include obtaining discrete samples from the AOC without the development of a work plan" (EPA, 1999).

Based on the evaluation of each AOC, Navy, EPA, and DOEE project managers will decide whether to make it into an SSA and proceed with the SSP, or whether the AOC warrants NFA and can be closed out.

## 3.2 Site Screening Areas and the Site Screening Process

SSAs identified in Section 2.2 and Appendix B of this SMP may pose a threat or potential threat to human health and the environment. SSAs may be either RCRA solid waste management units, RCRA AOCs, or CERCLA AOCs. As ordered in the FFA, these SSAs are to be investigated and may require remediation under the CERCLA process. The Navy will submit an SSP work plan to the EPA and DOEE describing activities required to determine if releases to the environment have occurred from SSAs.

Upon the SSP's completion, the Navy will submit a draft SSP report to EPA and DOEE that provides supporting evidence indicating that either an RI/FS should be performed at the SSA or that the SSA does not pose a threat (or potential threat) to public health, welfare, or the environment and should be removed from further study.

## 3.3 CERCLA RI/FS and ROD Process

The CERCLA process objectives are to evaluate the nature and extent of contamination at a CERCLA site or OU and to identify, develop, and implement appropriate RAs in order to protect human health and the environment. An OU is typically defined as a certain element or media at a site, such as groundwater or sediment, which has been separated out to better facilitate an investigation or RA.

The CERCLA RI/FS process refers to the site investigation and RA selection process used for CERCLA sites. Major CERCLA process elements include the RI, risk assessment, FS, Proposed Plan, and the ROD or Decision Document. These steps ultimately lead to either implementation of a remedial design (RD)/RA or the decision to take no action (that is, NFA) at the site.

An RI report typically contains the following information related to the site or OU of interest: (1) field activities completed; (2) physical characteristics; (3) nature and extent of contamination; (4) contaminant fate and transport; (5) baseline risk assessment; and (6) summary and conclusions. The risk assessment typically consists of an exposure assessment, toxicity assessment, and risk characterization.

The results of the RI help determine the need for a FS, which may be conducted after the RI or at the same time. Data collected during the RI is used to develop the FS, which evaluates alternative methods for protecting human health and the environment.

If NFA is recommended, or after the completion of an FS, preferred alternatives are recommended, based on a list of criteria, and described in detail in a Proposed Plan. The public is given an opportunity to review the Proposed Plan during a formal public comment period. After the public comments are reviewed, the responses are recorded in a document called a Responsiveness Summary, which is incorporated into the ROD. The ROD is then issued that explains the selected RA.

The documents prepared for CERCLA are maintained in information repositories for public review. A formal public comment period and a public meeting (if required) generally take place at the remedy selection step. Public comments are addressed as part of the responsiveness summary. RD/RA activities are initiated after the public comment period.

## 3.4 Removal Action Process

Removal actions are implemented to clean up or remove hazardous substances from the environment at a specific site in order to mitigate the spread of contamination. Removal actions may be implemented any time during the remedial process.

A removal site evaluation is performed if it is unclear whether a removal action should be performed. This is a focused evaluation that includes sampling the media of concern. A decision is made based on the evaluation results whether to perform a removal action.

Removal actions are classified as either time-critical or non-time-critical (TCRA or NTCRA). Immediate actions taken to mitigate an imminent threat to human health or the environment (such as the removal of corroded or leaking drums) are classified as TCRA. Removal actions that may be delayed for 6 months or more without significant additional harm to human health or the environment are classified as NTCRA.

For NTCRA, an EE/CA is prepared rather than the more-extensive FS. An EE/CA focuses only on the substances to be removed rather than on all contaminated substances at the site. It is possible for a removal action to become the final RA if the post-removal action risk assessment results indicate that no further RA is required in order to protect human health and the environment.

## 3.5 Interim RA Process

An interim RA includes all discrete RAs taken to prevent or minimize the release of hazardous substances, pollutants, or contaminants and is implemented before a final RA.

Interim RAs are implemented to provide temporary mitigation of human health risks or the spread of contamination in the environment. Similar to removal actions, they may be implemented at any time during the remedial process. Interim RA alternatives will be identified and proposed to the Navy, EPA, and DOEE as early as possible before the formal proposal of interim RA(s) to EPA and DOEE. Examples of interim RAs include installing a pump-and-treat system for product recovery from the groundwater or installing a fence to prevent direct contact with hazardous materials.

For interim RAs, an FFS is prepared rather than the more-extensive FS. An FFS compares alternatives for a particular contaminated medium or a discrete portion of the site or OU, which does not require additional investigation in order to proceed in the remedial process. As with the removal action, an interim RA may become the final RA if the results of the subsequent risk assessment indicate that no further RA is required in order to protect human health and the environment.

## 3.6 Accelerated Operable Unit

Classifying an OU as an accelerated operable unit (AOU) allows the RA to proceed before the final ROD for the total site is completed. Designation of an AOU is appropriate when the “size and complexity of the total RA for the Site would seriously delay implementation of the independent parts of the action” (EPA, 1999).

AOUs will follow a streamlined remedial process with the development of an AOU FFS work plan, an AOU FFS, and a Proposed Plan.

## 3.7 Certification of Completion of Remedial Action

The Navy, EPA, and DOEE will attend a closeout inspection when the final RAs at an ER site or OU have been completed and meet the requirements of the FFA. Following the closeout inspection, the Navy will issue a site closeout inspection report. After submission of the report, EPA and DOEE will either grant or deny certification and may decide that additional work is required at the site before certification.

## 3.8 Treatability Studies

Treatability studies are performed to assist in the evaluation of a potentially promising remedial technology. The primary objectives of treatability testing are to provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the FS and support the RD of a selected alternative.

Treatability studies may be conducted at any time during the remedial process. The need for a treatability study generally is identified during the FS.

Treatability studies may be classified as either bench-scale (laboratory studies) or pilot-scale (field studies). Bench-scale studies are often sufficient to evaluate performance for well-developed and tested technologies. Pilot tests may be required for innovative technologies to obtain the desired information. Pilot tests simulate the physical and chemical parameters of the full-scale process and are designed to bridge the gap between bench-scale and full-scale operations.

## 3.9 Navy’s MRP

The DoD established the Military MRP (referred to herein as the Navy’s MRP) under DERP to address MEC, discarded military munitions, and MC at “other-than-operational” military ranges and other sites. Closed, transferred, and transferring military ranges, and sites not located on an operational range, are considered “other-than-operational.” As with the ER Program, the MRP is conducted in accordance with CERCLA and the National Contingency Plan (DoD, 2001, 2003; Navy, 2005a). Sites that are already in the ER Program are excluded from the MRP.

A summary of the objectives for three of the CERCLA-based Navy MRP steps (PA/SI, RI) is provided below based on the NAVFAC Munitions Program Management Tool (<http://www.ert2.org/MRMT/tool.aspx>, accessed September 1, 2008).

- PA
  - Eliminate from further consideration MEC and/or MC sites that pose little or no explosives safety hazard or threat to human health and the environment.
  - Identify and prioritize MEC and/or MC sites that may require further investigation and/or munitions response actions.
  - Determine if an imminent explosives safety hazard from MEC is present that warrants an accelerated response action.

- Determine if an imminent threat from MC to human health and the environment is present that warrants an accelerated response action.
- SI
  - Build on PA information by gathering initial field data.
  - Perform field reconnaissance and surveys according to the SI Work Plan.
  - Outline potential sources (for example, disposal areas, target areas, operations areas).
  - Accurately delineate MEC and MC site boundaries.
  - Develop (or revise) the conceptual site model using field reconnaissance and survey data and initial hazard and risk screening results.
  - Conduct initial MEC hazard screening.
  - Summarize information and recommend future site actions.
  - Collect field data necessary to evaluate site through DoD Munitions Response Site Prioritization Protocol.
- RI
  - Collect data to characterize site conditions and determine the nature and extent of the MEC and MCs. This typically includes the application of geophysics, followed by an intrusive investigation performed according to an approved Explosives Safety Submission to identify the engineering controls and other protective measures that will be implemented to protect the safety of personnel and property on and adjacent to the MRP site.
  - Assess risk to human health and the environment.
  - Conduct treatability studies to evaluate the potential performance and cost of the treatment technologies that are being considered.

As discussed in Section 2.4.1, an SI has been completed for MRP Site 1 (Former Experimental Battery) at WNY (CH2M HILL, 2011a).

# Site Management Plan Schedules

This section presents project-specific schedules for projects that are, or potentially will be, active in FY 2018. Project-specific schedules for active projects will be updated annually in the SMP.

The current project schedules, as developed by the Navy, are for active projects. For projects that have not yet been initiated, model schedules are presented that illustrate potential overall schedules for “typical” projects. Scheduling assumptions for these projects are discussed below.

## 4.1 Scheduling Assumptions

Assumptions regarding durations of field investigations, laboratory analysis, data validation, document preparation and review, and RD/RA are discussed below. All review and document preparation times are given in calendar days.

### 4.1.1 Field Investigation, Laboratory Analysis, and Data Validation

The time required for RI field investigations depends on the size and complexity of the site and the overall scope of the field investigation (for example, types of field investigation activities and number of sampling rounds). Generally, field investigations require from 2 to 6 months to complete.

A maximum 30-day turnaround time was assumed for laboratory analysis. Twenty-eight days is the standard turnaround time for NAVFAC–approved laboratories under the current Comprehensive Long-term Environmental Action—Navy Contract. A 30-day duration was assumed for validation of laboratory data. An additional 30 days is needed for data management.

### 4.1.2 Document Preparation and Document Review

The time required for document preparation under the RI/FS process has been estimated on the basis of experience in preparing the various types of documents. A summary of the estimated times required for developing the various types of documents typically prepared during the RI/FS process is presented in Table 4-1. These presented durations represent the time required to prepare the initial draft document and do not include review time and subsequent revisions of the document.

The time required for document review generally will vary according to the length and complexity of the document and the availability of resources on the part of the reviewing agency.

For purposes of this SMP, it is assumed that the following three versions of each document will be produced with corresponding maximum review periods:

- **Draft Document**—Submitted to the Navy for internal review (45-day review period)
- **FFA Draft Document**—Submitted to EPA, DOEE, and Navy for review (60-day review period)
- **FFA Draft Final Document**—Submitted to EPA, DOEE, and Navy after receipt and consideration of comments on FFA Draft Document (60-day period to consider comments on the FFA Draft Document)
- **FFA Final Document**—The FFA Draft Final Document will become the FFA Final Document 30 days after issuance unless dispute resolution is invoked

For this SMP, it was assumed that the consultant would need a maximum of 30 days to incorporate Navy comments on the Draft Document and to prepare and submit the FFA Draft Document.

### 4.1.3 Corrective Action Design and Corrective Action Implementation

The time required for RD/RA depends on the type and complexity of the proposed RA. For example, the RD of a groundwater pump-and-treat system generally is much more complex than the RD for a soil removal and offsite disposal RA. Therefore, the groundwater pump-and-treat RD process may require up to 6 months, whereas the soil removal and offsite disposal RD may require less than 3 months. Similarly, the groundwater pump-and-treat system may operate for a long period of time (for example, 10 to 20 years for RA), whereas the soil removal and offsite disposal RA may be completed in less than 1 year. Therefore, the schedules presented in Figures 4-1 and 4-10 are only through the FS phase of the RI/FS process, including preparation of the Proposed Plan and ROD, unless a specific remedial action has been identified for a site.

## 4.2 Project Schedules

Project-specific schedules for projects that are or potentially will be active in FY 2018 are presented in Figures 4-1 through 4-9. Figure 4-9 is the schedule for preparing and submitting next year's amendment to the SMP.

## 4.3 Summary of Milestones

### 4.3.1 Near-term and Out-year Milestones

Near-term milestones are defined in the FFA as dates established by the parties (Navy, EPA, and DOEE) in the SMP in consultation with stakeholders for submittal of deliverables and performance of work within the current FY (FY 2018), the next FY or "budget year" (FY+1, or FY 2019), and the year for which the budget is being developed or "planning year" (FY+2, or FY 2020). Out-year milestones are deliverables and performance of work beyond the planning year (FY+3, or after October 2021). Table 4-2 lists the near-term milestones.

**Table 4-1**  
Document Preparation Durations  
*Site Management Plan*  
*Washington Navy Yard, Washington, D.C.*

Document	Duration (Months)*
Preliminary Assessment/Site Inspection	2
Work Plans	2 to 3
Remedial Investigation Report	3 to 4
Preinvestigation Evaluation of Feasibility Study Technologies Report	1
Laboratory and Bench Scale Study Reports	2 to 3
Feasibility Study	3 to 4
Proposed Plan	2
Record of Decision	2
Prefinal Remedial Design	2
Final Design	1 to 2
Engineering Evaluation Cost Analysis	2 to 3
Removal Action Work Plan	2
Removal Action Report	1 to 2
Treatability Study Work Plan	2
Treatability Study Report	1 to 2

\* Durations represent estimated time required to complete draft documents after all data are obtained.

TABLE 4-2

## Near-Term Milestones

## Site Management Plan for FY 2018

## Washington Navy Yard, Washington, D.C.

Current Fiscal Year (FY) October 1, 2017 through September 30, 2018		
Site 6	FFA Draft RACR	February 18, 2018
	FFA Draft Final RACR	June 22, 2018
	FFA Final RACR	July 25, 2018
Site 21	FFA Final RI	December 20, 2017
	FFA Draft FS	July 18, 2018
Site 22	FFA Draft RACR	February 18, 2018
	FFA Draft Final RACR	June 22, 2018
	FFA Final RACR	July 25, 2018
Site 24	FFA Draft RI	November 16, 2017
	FFA Draft Final RI	March 16, 2018
	FFA Final RI	April 15, 2018
Operable Unit 1 - Facility Wide Groundwater	FFA Draft Final RI	March 1, 2018
	FFA Final RI	March 31, 2018
Operable Unit 2 - Nearshore Sediments	FFA Draft FS	July 25, 2018
Site Screening Area 12	FFA Draft LUC Remedial Design	March 13, 2018
	FFA Draft Final LUC Remedial Design	July 11, 2018
	FFA Final LUC Remedial Design	August 10, 2018
FY 2019 Site Management Plan	FFA Draft SMP	June 14, 2018
	FFA Draft Final SMP	August 13, 2018
	FFA Final SMP	September 12, 2018
Planning Year (FY+1) October 1, 2018 through September 30, 2019		
Site 21	FFA Draft Final FS	November 17, 2018
	FFA Final FS	December 19, 2018
	FFA Draft Proposed Plan	February 18, 2019
	FFA Draft Final Proposed Plan	June 21, 2019
	FFA Final Proposed Plan	July 24, 2019
	Public Comment Period Ends	August 24, 2019
	FFA Draft ROD	September 25, 2019
Site 24	FFA Draft FS	October 27, 2018
	FFA Draft Final FS	February 24, 2019
	FFA Final FS	March 26, 2019
	FFA Draft Proposed Plan	July 24, 2019
Operable Unit 1 - Facility Wide Groundwater	FFA Draft FS	October 12, 2018
	FFA Draft Final FS	February 9, 2019
	FFA Final FS	March 11, 2019
	FFA Draft Proposed Plan	June 9, 2019
Operable Unit 2 - Nearshore Sediments	FFA Draft Final FS	November 22, 2018
	FFA Final FS	December 22, 2018
	FFA Draft Proposed Plan	February 20, 2019
	FFA Draft Final Proposed Plan	June 20, 2019
	FFA Final Proposed Plan	July 20, 2019
	Public Comment Period Ends	September 2, 2019
Site Screening Area 4	FFA Draft Decision Document	February 13, 2019
	FFA Draft Final Decision Document	June 13, 2019
	FFA Final Decision Document	July 13, 2019

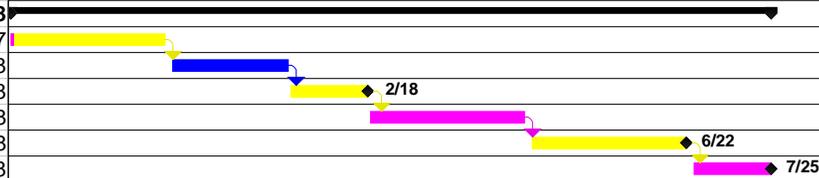
TABLE 4-2

**Near-Term Milestones****Site Management Plan for FY 2018****Washington Navy Yard, Washington, D.C.**

<b>Planning Year (FY+1) October 1, 2018 through September 30, 2019 (continued)</b>		
<b>Site Screening Area 12</b>	FFA Draft RACR	January 22, 2019
	FFA Draft Final RACR	May 22, 2019
	FFA Final RACR	June 21, 2019
<b>Planning Year (FY+2) October 1, 2019 through September 30, 2020</b>		
<b>Site 21</b>	FFA Draft Final ROD	December 26, 2019
	FFA Final ROD	January 26, 2020
	FFA Draft Remedial Design	August 12, 2020
<b>Site 24</b>	FFA Draft Final Proposed Plan	November 21, 2019
	FFA Final Proposed Plan	December 21, 2019
	Public Comment Period Ends	February 3, 2020
	FFA Draft ROD	March 4, 2020
	FFA Draft Final ROD	July 2, 2020
	FFA Final ROD	August 1, 2020
<b>Operable Unit 1 - Facility Wide Groundwater</b>	FFA Draft Final Proposed Plan	October 7, 2019
	FFA Final Proposed Plan	November 6, 2019
	Public Comment Period Ends	December 20, 2019
	FFA Draft ROD	January 19, 2020
	FFA Draft Final ROD	April 18, 2020
	FFA Final ROD	May 18, 2020
<b>Operable Unit 2 - Nearshore Sediments</b>	FFA Draft ROD	October 2, 2019
	FFA Final ROD	January 30, 2020

Figure 4-1  
Site 6  
ER Activities Schedule

Task Name	Duration	Start	Finish	2018			
				Qtr 1	Qtr 2	Qtr 3	Qtr 4
Site 6 Remedial Investigation	6112 days	Thu 5/1/97	Fri 8/1/14				
Site 6 Feasibility Study	425 days	Wed 9/10/14	Sun 11/8/15				
Site 6 Proposed Plan and Record of Decision	327 days	Mon 11/9/15	Fri 9/30/16				
Land Use Control Remedial Design	324 days	Mon 10/31/16	Wed 9/20/17				
Remedial Action Completion Report	296 days	Mon 10/2/17	Wed 7/25/18				
Draft RACR	60 edays	Mon 10/2/17	Fri 12/1/17				
Navy review of Draft RACR	45 edays	Mon 12/4/17	Thu 1/18/18				
FFA Draft RACR	30 edays	Fri 1/19/18	Sun 2/18/18				
EPA/DC/Navy Review	60 edays	Mon 2/19/18	Fri 4/20/18				
FFA Draft Final RACR	60 edays	Mon 4/23/18	Fri 6/22/18				
FFA Final RACR	30 edays	Mon 6/25/18	Wed 7/25/18				



Durations are expressed in calendar days.  
Date: Fiscal Year 2018

Contractor Work █ Regulator Review █ Summary Task   
Navy Review █ External Tasks  Milestone ◆

**Figure 4-2  
Site 21  
ER Activities Schedule**

Task Name	Duration	Start	Finish	2018				2019				2020				2021	
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
<b>RI Work Plan</b>	2677 days	Wed 8/30/06	Thu 12/1/16														
<b>Field Investigation</b>	259 days	Wed 8/30/06	Mon 8/27/07														
<b>RI Report (on hold pending VI)</b>	130 days	Tue 8/28/07	Mon 2/25/08														
<b>Vapor Intrusion Investigation</b>	354 days	Tue 2/26/08	Fri 7/3/09														
<b>Add'l Groundwater and Soil Investigation</b>	410 days	Mon 4/6/09	Fri 10/29/10														
<b>Add'l Well Install/GW Sampling (Phase 1)</b>	521 days	Fri 7/1/11	Fri 6/28/13														
<b>Add'l Well Install/GW Sampling (Phase 2)</b>	214 days	Fri 6/28/13	Thu 4/24/14														
<b>Add'l Well Install/GW Sampling (Phase 3)</b>	424 days	Sat 5/17/14	Thu 12/31/15														
<b>Add'l Well Install/GW Sampling (Phase 3)</b>	240 days	Fri 1/1/16	Thu 12/1/16														
<b>RI Report</b>	272 days	Mon 12/5/16	Wed 12/20/17														
Develop Draft RI Report	90 edays	Mon 12/5/16	Sun 3/5/17														
Navy Review	45 edays	Mon 3/6/17	Thu 4/20/17														
FFA Draft RI Report	30 edays	Fri 4/21/17	Sun 5/21/17														
EPA/DC/Navy Review	120 edays	Mon 5/22/17	Tue 9/19/17														
FFA Draft Final RI Report	60 edays	Wed 9/20/17	Sun 11/19/17														
FFA Final RI Report	30 edays	Mon 11/20/17	Wed 12/20/17														
<b>Feasibility Study</b>	230 days	Wed 1/31/18	Wed 12/19/18														
Develop Draft FS	90 edays	Wed 1/31/18	Tue 5/1/18														
Navy Review	45 edays	Wed 5/2/18	Sat 6/16/18														
FFA Draft FS	30 edays	Mon 6/18/18	Wed 7/18/18														
EPA/DC/Navy Review	60 edays	Thu 7/19/18	Mon 9/17/18														
FFA Draft Final FS	60 edays	Tue 9/18/18	Sat 11/17/18														
FFA Final FS	30 edays	Mon 11/19/18	Wed 12/19/18														
<b>Proposed Plan and ROD</b>	286 days	Thu 12/20/18	Sun 1/26/20														
FFA Draft Proposed Plan	60 edays	Thu 12/20/18	Mon 2/18/19														
EPA/DC/Navy Review	60 edays	Tue 2/19/19	Sat 4/20/19														
FFA Draft Final Proposed Plan	60 edays	Mon 4/22/19	Fri 6/21/19														
FFA Final Proposed Plan	30 edays	Mon 6/24/19	Wed 7/24/19														
Public Comment Period	30 edays	Thu 7/25/19	Sat 8/24/19														
FFA Draft ROD	30 edays	Mon 8/26/19	Wed 9/25/19														
EPA/DC/Navy Review	60 edays	Thu 9/26/19	Mon 11/25/19														
FFA Draft Final ROD	30 edays	Tue 11/26/19	Thu 12/26/19														
FFA Final ROD	30 edays	Fri 12/27/19	Sun 1/26/20														
<b>Remedial Design (TBD after the FS)</b>	231 days	Tue 2/25/20	Wed 1/13/21														
Develop Draft Remedial Design	90 edays	Tue 2/25/20	Mon 5/25/20														
Navy Review	45 edays	Tue 5/26/20	Fri 7/10/20														
FFA Draft Remedial Design	30 edays	Mon 7/13/20	Wed 8/12/20														
EPA/DC/Navy Review	60 edays	Thu 8/13/20	Mon 10/12/20														
FFA Draft Final Remedial Design	60 edays	Tue 10/13/20	Sat 12/12/20														
FFA Final Remedial Design	30 edays	Mon 12/14/20	Wed 1/13/21														

Durations are expressed in calendar days.  
Date: Fiscal Year 2018

Contractor Work █ Regulator Review █ Summary   
Navy Review █ External Task  Milestone ◆

**Figure 4-3  
Site 22  
ER Activities Schedule**

Task Name	Duration	Start	Finish	2018			
				Qtr 1	Qtr 2	Qtr 3	Qtr 4
<b>Site 22 RI (originally combined with Site 23)</b>	1508 days	<b>Wed 8/30/06</b>	<b>Sat 6/9/12</b>				
<b>RI Work Plan</b>	259 days	<b>Wed 8/30/06</b>	<b>Mon 8/27/07</b>				
<b>Field Investigation</b>	130 days	<b>Tue 8/28/07</b>	<b>Mon 2/25/08</b>				
<b>RI Report</b>	1119 days	<b>Tue 2/26/08</b>	<b>Sat 6/9/12</b>				
<b>Site 22 Pre-Feasibility Study Investigation</b>	516 days	<b>Sat 6/9/12</b>	<b>Mon 6/2/14</b>				
<b>Site 22 Feasibility Study</b>	274 days	<b>Thu 8/7/14</b>	<b>Wed 8/26/15</b>				
<b>Site 22 Proposed Plan and ROD</b>	258 days	<b>Tue 10/6/15</b>	<b>Fri 9/30/16</b>				
<b>Land Use Control Remedial Design</b>	232 days	<b>Mon 10/31/16</b>	<b>Wed 9/20/17</b>				
<b>Remedial Action Completion Report</b>	212 days	<b>Mon 10/2/17</b>	<b>Wed 7/25/18</b>				
Draft RACR	60 edays	Mon 10/2/17	Fri 12/1/17				
Navy review of Draft RACR	45 edays	Mon 12/4/17	Thu 1/18/18				
FFA Draft RACR	30 edays	Fri 1/19/18	Sun 2/18/18				
EPA/DC/Navy Review	60 edays	Mon 2/19/18	Fri 4/20/18				
FFA Draft Final RACR	60 edays	Mon 4/23/18	Fri 6/22/18				
FFA Final RACR	30 edays	Mon 6/25/18	Wed 7/25/18				

Durations are expressed in calendar days. Date: Fiscal Year 2018	Contractor Work		Regulator Review		Summary	
	Navy Review		External Tasks		Milestone	



**Figure 4-5**  
**Operable Unit 1 - Facility-Wide Groundwater**  
**ER Activities Schedule**

Task Name	Duration	Start	Finish	2018				2019				2020			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	
<b>OU1 RI Report</b>	<b>3577 days</b>	<b>Fri 7/30/04</b>	<b>Fri 5/16/14</b>												
<b>OU1 Initial RI Report</b>	<b>3077 days</b>	<b>Fri 7/30/04</b>	<b>Tue 1/1/13</b>												
<b>Additional Investigation</b>	<b>500 days</b>	<b>Tue 1/1/13</b>	<b>Fri 5/16/14</b>												
<b>Revised OU1 RI Report</b>	<b>1393 days</b>	<b>Sun 6/8/14</b>	<b>Sat 3/31/18</b>	—————▶											
Revised FFA Draft RI Report	240 days	Sun 6/8/14	Mon 2/2/15												
EPA/DC/Navy Review	60 days	Mon 3/9/15	Thu 5/7/15												
Comment Resolution	969 edays	Thu 5/7/15	Sun 12/31/17	▶											
FFA Draft Final Report	60 edays	Sun 12/31/17	Thu 3/1/18												
FFA Final RI Report	30 edays	Thu 3/1/18	Sat 3/31/18												
<b>OU1 Feasibility Study Report</b>	<b>315 days</b>	<b>Mon 4/30/18</b>	<b>Mon 3/11/19</b>												
Draft FS (RAAs)	90 edays	Mon 4/30/18	Sun 7/29/18												
Navy Review (RAAs)	45 edays	Sun 7/29/18	Wed 9/12/18												
FFA Draft FS	30 edays	Wed 9/12/18	Fri 10/12/18												
EPA/DC/Navy Review	60 edays	Fri 10/12/18	Tue 12/11/18												
FFA Draft Final FS	60 edays	Tue 12/11/18	Sat 2/9/19												
FFA Final FS	30 edays	Sat 2/9/19	Mon 3/11/19												
<b>OU1 Proposed Plan and ROD</b>	<b>404 days</b>	<b>Wed 4/10/19</b>	<b>Mon 5/18/20</b>												
FFA Draft Proposed Plan	60 edays	Wed 4/10/19	Sun 6/9/19												
EPA/DC/Navy Review	60 edays	Sun 6/9/19	Thu 8/8/19												
FFA Draft Final Proposed Plan	60 edays	Thu 8/8/19	Mon 10/7/19												
FFA Final Proposed Plan	30 edays	Mon 10/7/19	Wed 11/6/19												
Public Comment Period	30 edays	Wed 11/20/19	Fri 12/20/19												
FFA Draft ROD	30 edays	Fri 12/20/19	Sun 1/19/20												
EPA/DC/Navy Review	60 edays	Sun 1/19/20	Thu 3/19/20												
FFA Draft Final ROD	30 edays	Thu 3/19/20	Sat 4/18/20												
FFA Final ROD	30 edays	Sat 4/18/20	Mon 5/18/20												

Durations are expressed in calendar days. Date: Fiscal Year 2018	Contractor Work	<span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	Regulator Review	<span style="background-color: magenta; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	Summary Task	<span style="border-top: 2px solid black; display: inline-block; width: 20px; height: 10px;"></span>
	Navy Review	<span style="background-color: blue; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	External Tasks	<span style="background-color: gray; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>	Milestone	◆

**Figure 4-6**  
**Operable Unit 2 - Nearshore Sediments**  
**ER Activities Schedule**

Task Name	Duration	Start	Finish	2018				2019				20			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
<b>OU2 RI</b>	<b>2971 days</b>	<b>Sun 1/1/06</b>	<b>Tue 2/18/14</b>												
<b>Work Plan</b>	<b>272 days</b>	<b>Sun 1/1/06</b>	<b>Fri 9/29/06</b>												
<b>Phase 1 Field Investigation</b>	<b>30 days</b>	<b>Fri 9/29/06</b>	<b>Sun 10/29/06</b>												
<b>Phase 1 Data Management</b>	<b>90 days</b>	<b>Sun 10/29/06</b>	<b>Sat 1/27/07</b>												
<b>Phase 1 Data Report</b>	<b>240 days</b>	<b>Sun 1/28/07</b>	<b>Mon 9/24/07</b>												
<b>Phase 2 Work Plan</b>	<b>543 days</b>	<b>Tue 1/1/08</b>	<b>Fri 6/26/09</b>												
<b>Phase 2 Field Investigation</b>	<b>60 days</b>	<b>Sun 8/30/09</b>	<b>Thu 10/29/09</b>												
<b>Phase 2 Data Management</b>	<b>90 days</b>	<b>Fri 10/30/09</b>	<b>Wed 1/27/10</b>												
<b>RI Report</b>	<b>1483 days</b>	<b>Thu 1/28/10</b>	<b>Tue 2/18/14</b>												
<b>OU2 FS Data Gaps Investigation</b>	<b>695 days</b>	<b>Fri 7/4/14</b>	<b>Sun 5/29/16</b>												
<b>OU2 FS Report</b>	<b>877 days</b>	<b>Thu 7/28/16</b>	<b>Sat 12/22/18</b>	[Summary Task Bar]											
Data Compilation Submittal (validated data)	137 edays	Thu 7/28/16	Mon 12/12/16												
Data Evaluation (Fingerprinting) Report	365 edays	Mon 12/12/16	Tue 12/12/17												
EPA/DC/Navy Review and Discussion	60 edays	Tue 12/12/17	Sat 2/10/18												
Draft FS	90 edays	Sat 2/10/18	Fri 5/11/18												
Navy Review	45 edays	Fri 5/11/18	Mon 6/25/18												
FFA Draft FS	30 edays	Mon 6/25/18	Wed 7/25/18												
EPA/DC/Navy Review	60 edays	Wed 7/25/18	Sun 9/23/18												
FFA Draft Final FS	60 edays	Sun 9/23/18	Thu 11/22/18												
FFA Final FS	30 edays	Thu 11/22/18	Sat 12/22/18												
<b>OU2 Proposed Plan and ROD</b>	<b>404 days</b>	<b>Sun 12/23/18</b>	<b>Thu 1/30/20</b>	[Summary Task Bar]											
FFA Draft PP	60 days	Sun 12/23/18	Wed 2/20/19												
EPA/DC/Navy Review	60 days	Thu 2/21/19	Sun 4/21/19												
FFA Draft Final PP	60 days	Mon 4/22/19	Thu 6/20/19												
FFA Final PP	30 days	Fri 6/21/19	Sat 7/20/19												
Public Comment Period	30 days	Sun 8/4/19	Mon 9/2/19												
FFA Draft ROD	30 days	Tue 9/3/19	Wed 10/2/19												
EPA/DC/Navy Review Due	60 days	Thu 10/3/19	Sun 12/1/19												
Submission and Signature of FFA Final ROD	60 days	Mon 12/2/19	Thu 1/30/20												

Durations are expressed in calendar days. Date: Fiscal Year 2018	Contractor Work		Regulator Review		Summary Task	
	Navy Review		External Tasks		Milestone	

**Figure 4-7  
Site Screening Area 4  
ER Activities Schedule**

Task Name	Duration	Start	Finish	2018				2019			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>SSA 4 Decision Document</b>	<b>205 days</b>	<b>Mon 10/1/18</b>	<b>Sat 7/13/19</b>								
Draft Decision Document	60 edays	Mon 10/1/18	Fri 11/30/18								
Navy Review	45 edays	Fri 11/30/18	Mon 1/14/19								
FFA Draft Decision Document	30 edays	Mon 1/14/19	Wed 2/13/19								
Navy/EPA/DC Review	60 edays	Wed 2/13/19	Sun 4/14/19								
FFA Draft Final Decision Document	60 edays	Sun 4/14/19	Thu 6/13/19								
FFA Final Decision Document	30 edays	Thu 6/13/19	Sat 7/13/19								

Durations are expressed in calendar days. Date: Fiscal Year 2018	Contractor Work		Regulator Review		Summary Task	
	Navy Review		External Tasks		Milestone	

**Figure 4-8  
Site Screening Area 12  
ER Activities Schedule**

Task Name	Duration	Start	Finish	2018				2019				2020					
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3			
<b>SSA 12 Phase II Screening Work Plan</b>	<b>1342 days</b>	<b>Mon 9/1/08</b>	<b>Fri 5/4/12</b>														
<b>SSA 12 Phase II Screening</b>	<b>411 days</b>	<b>Fri 5/4/12</b>	<b>Wed 6/19/13</b>														
<b>SSA 12 Phase II Screening Report</b>	<b>472 days</b>	<b>Thu 6/20/13</b>	<b>Sat 10/4/14</b>														
<b>SSA 12 RI/FS</b>	<b>669 days</b>	<b>Tue 12/30/14</b>	<b>Fri 10/28/16</b>														
<b>SSA 12 Proposed Plan and ROD</b>	<b>314 days</b>	<b>Sat 11/19/16</b>	<b>Fri 9/29/17</b>														
<b>SSA 12 Land Use Control (LUC) Remedial Design</b>	<b>285 days</b>	<b>Mon 10/30/17</b>	<b>Fri 8/10/18</b>	←————→													
Draft LUC Remedial Design	60 days	Mon 10/30/17	Thu 12/28/17	█													
Navy Review	45 days	Fri 12/29/17	Sun 2/11/18		█												
FFA Draft LUC Remedial Design	30 days	Mon 2/12/18	Tue 3/13/18			█											
EPA/DC/Navy Review	60 days	Wed 3/14/18	Sat 5/12/18				█										
FFA Draft Final LUC Remedial Design	60 days	Sun 5/13/18	Wed 7/11/18														
FFA Final LUC Remedial Design	30 days	Thu 7/12/18	Fri 8/10/18														
<b>SSA 12 Remedial Action Completion Report (RACR)</b>	<b>285 days</b>	<b>Mon 9/10/18</b>	<b>Fri 6/21/19</b>					←————→									
Draft RACR	60 days	Mon 9/10/18	Thu 11/8/18														
Navy Review	45 days	Fri 11/9/18	Sun 12/23/18														
FFA Draft RACR	30 days	Mon 12/24/18	Tue 1/22/19														
EPA/DC/Navy Review	60 days	Wed 1/23/19	Sat 3/23/19														
FFA Draft Final RACR	60 days	Sun 3/24/19	Wed 5/22/19														
FFA Final RACR	30 days	Thu 5/23/19	Fri 6/21/19														

Durations are expressed in calendar days. Date: Fiscal Year 2018	Contractor Work	█	Regulator Review	█	Summary Task	←————→
	Navy Review	█	External Tasks	█	Milestone	◆

**Figure 4-9**  
**Fiscal Year 2019 ER Site Management Plan**  
**ER Activities Schedule**

Task Name	DUR	Start	Finish	2018				2019				Q1	
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
<b>FY 2019 Site Management Plan (SMP)</b>	<b>164 days</b>	<b>Mon 4/2/18</b>	<b>Wed 9/12/18</b>										
Draft SMP	30 days	Mon 4/2/18	Tue 5/1/18										
Navy Review	30 days	Wed 5/2/18	Thu 5/31/18										
FFA Draft SMP	14 days	Fri 6/1/18	Thu 6/14/18										
EPA/DC/Navy Review	30 days	Fri 6/15/18	Sat 7/14/18										
FFA Draft Final SMP	30 days	Sun 7/15/18	Mon 8/13/18										
FFA Final SMP	30 days	Tue 8/14/18	Wed 9/12/18										

Durations are expressed in calendar days.  
 Date: Fiscal Year 2018

Contractor Work		Regulator Review		Summary Task	
Navy Review		External Tasks		Milestone	

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Appendix A  
CERCLA Sites and Operable Units  
at the Washington Navy Yard

**Table A-1**  
 CERCLA Sites and Operable Units at the WNY  
*Site Management Plan*  
 Washington Navy Yard, Washington, D.C.

Site No.	Description	Former Use
1	Building 22	Lead and Brass Foundry
2	Buildings 33, 33a, 36, 37, 39, 109	Gun Carriage Shop
3	Building 40/41	Gun and Metal Plating Shop
4	Buildings 44, 46, 67, and 108	Cartridge Case Shop
5	Building 73	Gun Mount, Metal Cleaning, and Fabricating Shop
6	Buildings 116, 118, and 197	Heating and former Power Plant, Gun Assembly Shop
7	Building 126	Laundry
8	Building 211	Paint and Oil Storage
9	Buildings 219 and 220	Gauge and Chemical Laboratory
10	Admiral's Row	Flag, Captain, and Visiting Officer Housing
11	Incinerators	Former Incinerators removed in 1979
13	Building 290	Electrical Equipment
14	Building 292	Electrical Equipment
16	Building 71	Gasoline and Diesel Fuel Station
17	Building 201	Automotive Maintenance Facility
21	Buildings 68, 123, 130, 133, 154, 224, and 246	Ship Repair Department
22	Building 112	Polishing and Plating Shop
23	Building 76	Breech Mechanism Shop
24	Quarters U	Trinity Building, Experimental Ammunition Building, and Naval Reserve Center
Operable Unit No.		Description
1	Basewide Groundwater	Shallow Aquifer
2	Near Shore Sediment	Near Shore Sediment

Appendix B  
Site Screening Areas (SSAs) and  
Areas of Concern (AOCs)

**Table B-1**  
SSAs and AOCs at the WNY  
*Site Management Plan*  
Washington Navy Yard, Washington, D.C.

<b>Site Screening Areas</b>		
<b>SSA No.</b>	<b>Description</b>	<b>Former Use</b>
1	Building 106	Oil Gasification and Forge Shore Pneumatic Plant
2	Buildings 33, 33a, 36, 37, 39, and 109 Quadrangle	Cartridge Case Foundry
3 (Reassigned to Site 21)	Buildings 68, 123, 130, 133, 154, 224, and 246	Ship Repair Department
4	Building 183	Dispensary
5 (combined to form SSA 9)	Building 207	Liquid Storage
6	Building 223	Garbage and Trash House
7	Buildings 22, 76, 101, 104, 111, 154, 166, 169, 176, 184, 196, 200, and 218	Former Leaking PCB Transformer Locations
8 (Reassigned to Site 22)	Building 112	Polishing and Plating Shop
9	Buildings 157, 203, 207, and 210	Optical Shop and Laboratory
10 (Reassigned to Site 23)	Building 76	Breech Mechanism Shop
11	Building 176	Storehouse
12	Fill Material	Fill material placed at the WNY
13	Quarters N/O	Built as Paint Shop in 1866
14 (Reassigned to Site 24)	Quarters U	Trinity Building, Experimental Ammunition Building, and Naval Reserve Center
<b>Areas of Concern</b>		
<b>AOC No.</b>	<b>Description</b>	<b>Former Use</b>
1	Building 142	Public Works Maintenance Shop
2 (Reassigned to SSA 3)	Building 154 leaking PCB transformers designated as SSA #7	Ship Repair Shop
3 (Reassigned to SSA 9)	Building 210	Optical Shop and Laboratory
4 (Reassigned to SSA 8)	Building 112	Polishing and Plating Shop
5 (Reassigned to SSA 7)	Buildings 76, 101, 169, 176, 196, 218	Former Potentially Leaking Transformer Locations
6 (Reassigned to SSA 13)	Quarters N/O	Built as Paint Shop in 1866
7 (Reassigned to SSA 14)	Quarters U	Trinity Building, Experimental Ammunition Building, and Naval Reserve Center