



Naval Facilities Engineering Systems Command Mid-Atlantic
Norfolk, Virginia

Final

**Site Management Plan
Fiscal Years 2024–2028**

Naval Station Norfolk
Norfolk, Virginia

October 2023



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Prepared for NAVFAC Mid-Atlantic
by CH2M HILL, Inc.
Virginia Beach, Virginia
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Acronyms and Abbreviations

AFFF	aqueous film-forming foam
AM	Action Memorandum
AOC	area of concern
AOI	area of interest
AR	Administrative Record
AS	air sparge
AST	aboveground storage tank
CALF	Camp Allen Landfill
CASY	Camp Allen Salvage Yard
CD	Construction Debris
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
COC	constituent of concern
DCA	dichloroethane
DCE	dichloroethene
DD	Decision Document
DPT	direct-push technology
DPVE	dual-phase vacuum extraction
EE/CA	Engineering Evaluation/Cost Analysis
ERP	Environmental Restoration Program
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
FFS	Fire Fighting School
FS	Feasibility Study
FY	fiscal year
GAC	granular activated carbon
HHRA	Human Health Risk Assessment
IAS	Initial Assessment Study
IR	Installation Restoration
LTM	long-term monitoring
LUC	land use control
MCL	maximum contaminant level
N/A	not applicable

NAVFAC	Naval Facilities Engineering Systems Command
Navy	Department of the Navy
NFA	No Further Action
NPL	National Priorities List
NSN	Naval Station Norfolk
NTCRA	non-time-critical removal action
OU	operable unit
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PRAP	Proposed Remedial Action Plan
RAB	Restoration Advisory Board
RAO	Remedial Action Optimization
RCRA	Resource Conservation and Recovery Act
RFA	Resource Conservation and Recovery Act Facility Assessment
RI	Remedial Investigation
ROD	Record of Decision
RRR	Relative Risk Ranking
RSL	regional screening level
SAP	Sampling and Analysis Plan
SBGR	subgrade biogeochemical reactor
SI	Site Inspection
SMP	Site Management Plan
SVE	soil vapor extraction
SWMU	solid waste management unit
TBD	to be determined
TCA	trichloroethane
TCE	trichloroethene
TCRA	time-critical removal action
Team	Partnering Team

USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VDEQ	Virginia Department of Environmental Quality
VDOT	Virginia Department of Transportation
VI	vapor intrusion
VOC	volatile organic compound
yd ³	cubic yard(s)

Introduction

This Site Management Plan (SMP) was prepared by CH2M HILL, Inc. (CH2M), a wholly owned subsidiary of Jacobs, under Naval Facilities Engineering Systems Command (NAVFAC) Mid-Atlantic's Comprehensive Long-term Environmental Action—Navy Program, Contract N62470-21-D-0007, Contract Task Order N4008522F4497. This document presents the Naval Station Norfolk (NSN), which includes Naval Support Annex (NSA) Hampton Roads, SMP for Fiscal Years (FYs) 2024 through 2028. This SMP has been prepared for use by the Department of the Navy (Navy), U.S. Environmental Protection Agency (USEPA) Region 3, and the Virginia Department of Environmental Quality (VDEQ).

1.1 Purpose of the Site Management Plan

The purpose of the SMP is to provide a management tool for the Navy, USEPA, VDEQ, and activity personnel for use in planning, scheduling, and setting priorities for environmental remedial response activities conducted at NSN. This SMP focuses on upcoming activities planned for FY 2024 and identifies any additional activities that are planned through FY 2028. NSN was proposed for inclusion on the National Priorities List (NPL) in the *Federal Register*, Volume 16, Number 117, on June 17, 1996, and was added to the NPL on April 1, 1997. NSN was included under the "Federal Facilities" section of the NPL, in which federal agencies are considered responsible for conducting the majority of the response actions at facilities under their jurisdiction. A Federal Facility Agreement (FFA) between USEPA Region 3 and NSN was finalized in February 1999 (USEPA and Navy, 1999). Because NSN has a final FFA in place, USEPA's role at NSN sites is less extensive than at NPL sites that do not have FFAs. However, USEPA continues to function in an oversight role for the management and cleanup of the Environmental Restoration Program (ERP) sites and solid waste management units (SWMUs) at NSN. No Munitions Response Program sites have been identified at NSN.

This SMP presents the rationale for the sequence of environmental investigations and remedial response activities to be completed for each site and the estimated schedule for completion of these activities. Detailed activity schedules are provided for FY 2024, and prospective activities are provided for years through FY 2028.

1.2 Format of the Site Management Plan

This SMP consists of three sections:

- **Section 1—Introduction**, describes the SMP's scope and purpose, provides a description and history of NSN, summarizes the environmental setting and previous environmental investigations conducted at NSN, provides the FFA site classifications and supporting rationale for these classifications, and briefly describes the Team Partnering process at NSN.
- **Section 2—Site Descriptions**, provides specific information regarding each of the active ERP sites. Site-specific information includes physical characteristics of the site, a description of past activities conducted at the site, and known contaminants in each site medium. A site map is provided for each site. Scheduling assumptions are provided for basewide tasks and Sites 1, 2, 3, 18, and 20.
- **Section 3—References**, provides a list of documents used in preparing this plan.

1.3 Facility Description

1.3.1 Facility Location and Physical Description

NSN

NSN, the largest naval base in the United States, is situated on 4,631 acres of land (A.T. Kearney, 1992) in the northwestern portion of the City of Norfolk, Virginia. The location of environmental sites currently undergoing investigations and remediation at NSN is shown on **Figure 1-1**. NSN is bounded on the north by Willoughby Bay, on the west by the confluence of the Elizabeth and James Rivers, on the east by the City of Norfolk, and on the south by Naval Support Activity Hampton Roads and the City of Norfolk. A portion of NSN's eastern boundary is also formed by Mason Creek. NSN includes approximately 4,000 buildings, 20 piers, and an airfield. The western portion of NSN is a developed waterfront area containing the piers and facilities for loading, unloading, and servicing naval vessels. Land use in the surrounding area is commercial, industrial, and residential. The waterfront area south of NSN provides shipping facilities and a network of rail lines. Residential and recreational areas border NSN at the southern, eastern, and northeastern boundaries.

NSA Hampton Roads

NSA Hampton Roads is located along the southern border of NSN and encompasses just under 800 acres. The location of environmental sites currently undergoing investigations and remediation at NSA Hampton Roads is shown on **Figure 1-1**. NSA Hampton Roads is bordered to the north and east by NSN, to the south by the city of Norfolk, and to the west by the City of Norfolk and the Supply Depot Annex.

1.3.2 Facility History and Mission

NSN

NSN began operations in 1917, when the Navy acquired 474 acres of land to develop a naval base to support World War I activities. Bulkheads were built along the coast to extend available land, and after extensive dredge-and-fill operations, the total amount of land under Navy control was 792 acres. An additional 143 acres of land were acquired in 1918 and officially commissioned as Naval Air Station Norfolk. Improvements to the piers and expansion of supply and material-handling facilities were also completed from 1936 through 1941.

During World War II, major construction projects included a power plant, numerous runways and hangars, a tank farm, several barracks, and housing complexes. During this time, the area of NSN expanded to more than 2,100 acres. After World War II, NSN continued to acquire land through various types of land transfers and dredge-and-fill operations conducted in areas of Mason Creek, the Bousch Creek Basins, and Willoughby Bay (**Figure 1-1**).

During its history, NSN has expanded to become the world's largest naval installation, with 105 ships home-ported in Norfolk. The Base currently has 20 piers handling approximately 3,100 ship movements annually.

The mission of NSN is to support the operational readiness of the United States Atlantic Fleet, providing facilities and services to enable mission accomplishment.

NSA Hampton Roads

The area of NSA Hampton Roads was acquired by the Department of Defense (DoD) in 1941 and was used as part of NSN until NSA Hampton Roads was officially established in 1977. In 1999, NSA Hampton Roads was re-designated a major command (CNIC, n.d.), however, the area now known as NSA Hampton Roads was included in the Federal Facility Agreement (FFA) as it was part of NSN at the time of the agreement.

The mission of NSA Hampton Roads is to enable robust command and control for Navy, Marine Corps, Coast Guard, NATO and interagency units; provide premier training and operational facilities and ranges to sustain generation activities; support warfighters with world-class medical, family support and recreational facilities and

services; and enhance relationships with community partners in Norfolk, Portsmouth, Chesapeake, and North Carolina (CNIC, n.d.).

1.3.3 Operations and Process Descriptions

NSN

NSN operates in various capacities to provide support to vessels, aircraft, and other activities. NSN houses many tenants, each performing different operations involving the servicing and maintenance of vessels and aircraft.

The service and maintenance of ships includes utilities hook-up, onboard maintenance, and coordination of ship movements in the harbor. Additional functions include loading, unloading, and handling of fuels and oils used aboard the vessels. Ship and aircraft repair operations consist of paint-stripping, patching, parts cleaning, repainting, engine overhauls, sandblasting, and metal-plating processes.

NSA Hampton Roads

NSA Hampton Roads seats more than 6,000 personnel and includes facilities for fleet headquarters administrative and communication operations as well as the U.S. Fleet Forces Command; Joint Staff Hampton Roads; U.S. Marine Corps Forces Command; Naval Submarine Forces, Atlantic; and Naval Reserves Forces Command (CNIC, n.d.)

1.4 Environmental Setting

1.4.1 Geology and Hydrogeology

NSN is in the outer Atlantic Coastal Plain Physiographic Province, which is characterized by low elevations and gently sloping relief. NSN is underlain by more than 2,000 feet of gently dipping sandy sediment, ranging in age from Recent to Lower Cretaceous. As a result of the dredge-and-fill activities used to expand the installations, the soils here are a distribution of naturally occurring material and dredge-and-fill material. The native soils are composed of unconsolidated fine sands and silts of low to moderate permeability. The composition of the dredge-fill sediments varies from site to site, but it is generally composed of sand, silt, and gravel. Some concrete, stone, and miscellaneous debris were also used as fill material (CH2M, 1997). Further detail about the geology in the area is presented in **Table 1-1**.

Table 1-1. Geologic and Hydrogeologic Units Present at NSN

Geologic Period	Geologic Epoch	Geologic Unit	Hydrogeologic Unit	Geologic Description (Smith, 2002 and Powars, 2000)
Quaternary	Pleistocene	Tabb Formation	Columbia aquifer	Tabb Formation (Lynnhaven Member) - gray, pebbly and cobbly, fine to coarse sand, grading upward into clayey and silty fine sand and sandy silt.
		Chowan River Formation	Yorktown confining unit	Chowan River Formation - interbedded, silty, fine sand, clayey silt, and bioclastic sand.
	Pliocene	Yorktown Formation	Yorktown-Eastover aquifer	Yorktown Formation - bluish-gray, greenish-gray, and dark greenish-gray, very fine to coarse sand, in part glauconitic and phosphatic, commonly very shelly and interbedded with gray and blue-gray sandy and silty clay.
		Eastover Formation		Eastover Formation - dark-gray to bluish-gray to greenish-gray, muddy fine sand interbedded with finer and coarser-grained beds.
	Miocene	St. Marys Formation	St. Marys confining unit	St. Marys Formation - muddy, very fine sand and sandy clay and silt containing scattered shells, abundant iron sulfide, and finely disseminated organic material.

The conceptual hydrogeologic framework of the shallow aquifer system at NSN consists of the Columbia aquifer, the Yorktown confining unit, and the Yorktown-Eastover aquifer. These units are separated from deeper units by the relatively thick and continuous St. Marys confining unit (**Table 1-1**; Smith, 2002).

At NSN, the surficial Columbia aquifer consists of the Pleistocene Lynnhaven Member of the Tabb Formation. The Columbia aquifer is unconfined, and the water table depth is usually less than 8 feet below ground surface. The Yorktown confining unit is defined as a series of coalescing clay layers at or near the top of the Yorktown Formation. The Yorktown confining unit is not a single continuous layer, but a series of very fine sandy to silty clay units of various colors near the top of the Yorktown Formation (Powars, 2000). The Yorktown confining unit varies in thickness and in composition, but on a regional scale is a leaky confining unit. The Yorktown-Eastover aquifer is defined as the predominantly sandy deposits of the Yorktown Formation and the upper part of the Eastover Formation above the confining clays of the St. Marys Formation. The St. Marys confining unit is defined predominantly by clays of the St. Marys Formation, but in places also includes clays of the overlying Eastover Formation.

Groundwater flow in the surficial aquifer generally follows the topography and flows toward nearby surface water bodies. Groundwater in the surficial aquifer at NSN predominantly flows toward the Elizabeth River and Willoughby Bay. Tidal fluctuations in the nearby rivers (Elizabeth River, Lafayette River, James River) may have an impact on groundwater levels in the unconfined aquifer. Groundwater flow in the Yorktown-Eastover aquifer is anticipated to flow to the northeast toward the confluence of the Elizabeth River and James River (McFarland and Bruce, 2006).

1.4.2 Topography and Surface Water Hydrology

Elevations at NSN range from sea level at the northern and western boundaries to approximately 15 feet above sea level in central portions of the Base.

Four major surface water features surround the greater Norfolk area, including the James River, Elizabeth River, Willoughby Bay, and Chesapeake Bay, all of which are tidally influenced in this area.

Most surface water at NSN flows to either Mason Creek or the remnants of Bousch Creek. The main channel of Bousch Creek was filled during the development of NSN and replaced by a network of drainage ditches and underground culverts. Because of the proximity of tidal waters and the low relief of the land, both Mason Creek and the remnant tributaries of Bousch Creek are tidally influenced throughout NSN. Both creeks discharge to Willoughby Bay, and ultimately, to the Chesapeake Bay. In addition, some surface water runoff from NSN discharges directly to the Elizabeth River.

A Federal Emergency Management Agency flood insurance study established that the 100-year floodplain elevation at NSN is 8.5 feet above sea level (A.T. Kearney, 1992). Therefore, the portions of NSN adjacent to Willoughby Bay and the Elizabeth River are within the 100-year floodplain.

1.5 Environmental History

1.5.1 Environmental Restoration Program

In 1975, the Department of Defense began a program to assess past hazardous and toxic materials storage and disposal activities at military installations. The goals of this program, initially referred to as the Installation Restoration (IR) Program and now known as the ERP, were to identify environmental contamination resulting from past hazardous materials management practices, to assess the impacts of the contamination on public health and the environment, and to provide corrective measures as required to mitigate adverse impacts. The ERP continues to be conducted in accordance with applicable federal and state environmental regulations and requirements.

In 1976, Congress passed the Resource Conservation and Recovery Act (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, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund, was passed to investigate and remediate areas resulting from past hazardous waste management practices. This program is administered by USEPA or state agencies.

The Department of Defense's ERP was reissued in 1981, with additional responsibilities and authorities specified in CERCLA delegated to the Secretary of Defense. The Navy subsequently restructured the ERP to match the terminology and structure of the USEPA CERCLA program. The CERCLA process is further discussed in **Appendix A**.

Because NSN is on the NPL, Navy and USEPA approval of all Records of Decision (RODs) with state concurrence is required. Prior to delisting, No Further Action (NFA) RODs will be signed to formally document site closeout through the CERCLA process (after the environmental cleanup activities are complete).

Team partnering was introduced to NSN in October 1996 to streamline the cleanup of former disposal sites by using consensus-based site management strategies during the CERCLA process. The Partnering Team (Team) consists of Naval Facilities Engineering Systems Command (NAVFAC) Mid-Atlantic, USEPA Region 3, VDEQ, CH2M, and other Navy contractors as warranted. The Team has streamlined the site investigation (SI) and remediation process to reduce costs and expedite cleanup and closure of ERP sites. **Appendix B** discusses how the Team applied the CERCLA process (**Appendix A**) for sites identified at NSN.

Recently, regional tribes have expressed interest in becoming involved with the ERP at NSN, and other Federal Facilities, in response to USEPA Tribal outreach in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribes. The Navy is in the process of developing procedures to engage Tribal communities interested in the ERP at various naval installations in the region, including NSN.

1.5.2 Previous Investigations

The following basewide investigations were completed through the ERP:

- Initial Assessment Study (IAS) (ESE, 1983)
- Installation Restoration Program Remedial Investigation (RI) Interim Report (Malcolm Pirnie, 1988)
- RCRA Facility Assessment (RFA) (A.T. Kearney, 1992)
- Aerial Photographic Site Analysis (USEPA, 1994)
- Relative Risk Ranking (RRR) System Data Collection Sampling and Analysis Report Phase I (RRR Phase I) (Baker, 1996a)
- RRR System Data Collection Sampling and Analysis Report Phase II (Baker, 1996e)
- Preliminary Assessment Per- and Polyfluoroalkyl Substances (CH2M, 2022a)

1.5.3 Site Classifications

Environmental Restoration Program Sites

The purpose of the 1983 IAS was to identify and assess sites posing a potential threat to human health or the environment because of contamination from past hazardous materials handling and operations. Eighteen potentially contaminated sites (Sites 1 through 18) were identified based on information obtained from historical records, photographs, site inspections, and personnel interviews. Each of the 18 sites was evaluated for the past history of potential releases, potential migration pathways, and pollutant receptors. Sampling and analysis activities were not performed as part of the IAS. The IAS concluded that 6 of the 18 sites posed sufficient threats to human health or the environment to warrant further evaluation in a Confirmation Study (ESE, 1983). Several of the IAS sites were re-designated under the RFA. Subsequent to the IAS, the Navy added five more sites to the IR Program (Sites 19

through 23) identified through historical information. The status of IAS sites and RFA designations are summarized in **Table 1-2**. The ERP sites at NSN that have been investigated and are currently undergoing remediation are described in more detail in **Section 2**, and the locations of these sites are shown on **Figure 1-1**.

Solid Waste Management Units

In March 1992, an RFA was completed for NSN (A.T. Kearney, Inc. 1992). This study was a basewide inventory of existing SWMUs and other areas of concern (AOCs). A total of 274 SWMUs and 10 AOCs were tentatively identified in this study. The September 1994 USEPA Photographic Interpretation Center study of aerial photography identified 37 potential waste disposal areas. Of the sites identified by the RFA and USEPA Photographic Interpretation Center study, 148 were identified as potentially contaminated. The RRR-Phase I Report provided sampling results for 45 of the 148 identified sites (Baker, 1996a). Of the sites sampled as part of the RRR-Phase I Report, the Navy identified 25 for additional evaluation and possible investigation.

The current status of all SWMUs investigated at NSN is summarized in **Table 1-3**. SWMU 14, which is further discussed in **Section 2**, is the only SWMU currently undergoing remediation.

No Further Action Sites

The remaining 148 sites previously identified were individually evaluated during the NFA negotiations between the Navy and USEPA. The Team determined that NFA is required for the 105 sites, as detailed in **Table 1-4**.

Federal Facility Agreement Areas of Concern

The FFA, signed by USEPA on February 18, 1999, listed eight AOCs as sites under evaluation to determine whether the sites should proceed to the screening process and be investigated as Site Screening Areas, or whether the information under review supports an NFA determination (USEPA and Navy, 1999). Descriptions of the NFA determination for each of the eight AOCs are presented in **Table 1-5**.

1.5.4 Preliminary Closeout Report

A Preliminary Closeout Report summarizing the investigations and remedies at each site was signed by USEPA in September 2010 (Navy, 2010b). The Report documented construction completion for USEPA and changed NSN's classification on the NPL.

1.5.5 Team Partnering at Naval Station Norfolk

In October 1996, NAVFAC Mid-Atlantic convened the environmental Partnering Team consisting of representatives from the Navy, USEPA, VDEQ, and Navy contractors. In addition, the Team created the Restoration Advisory Board (RAB) in 1994 to keep members of the community informed of Base ERP activities. The RAB met regularly during the course of ERP investigations at NSN but dissolved in 2009 shortly before NSN achieved construction complete status in 2010. Additional information on the RAB can be found in the *Community Involvement Plan* (CH2M, 2021a). As mentioned in **Section 1.5.1**, regional tribes have expressed interest in becoming involved with the ERP at NSN, and the Navy is in the process of developing policies and procedures to engage those tribal communities.

The Team is implementing an approach to site remediation referred to as "streamlined oversight." The implementation of the streamlined oversight process has promoted a higher degree of communication, understanding, and cooperation among all of the involved groups. The scheduling as discussed in **Section 2** for basewide tasks and Sites 1, 2, 3, 18, and 20 assumes an ideal flow of work for sites that are addressed through the conventional cleanup approach. The scheduling does not account for how the streamlined oversight process may affect schedules and potentially affect the sequence of tasks as the Team evaluates project progress on an accelerated basis and expedites the decision-making process. The goal of the streamlined oversight process is to increase the efficiency of the regulatory review processes of implementation, decision-making, reporting, and other environmental regulatory documentation, and to achieve significant savings of time and funding. Team

decisions are documented through consensus statements and partnering meeting minutes; a summary of Team consensus statements is presented in **Table 1-6**.

Table 1-2. Status Summary of Environmental Restoration Sites
Site Management Plan
Fiscal Years 2024 to 2028
Naval Station Norfolk

Site	OU/RFA Designations	PA or IAS	SI or CS	EE/CA	Work Plans	RI	FS	PRAP	Closeout Report	ROD/DD	RD	RA Construction Phase	RA Ops Phase	Comments
Remedy in Place (Ongoing O&M and LTM)														
Site 1 – Camp Allen Landfill	OU01	1983	1988		1991	1994	1994	1995		1995, 2010	1996, 2005	1997		<p>Removal action (soil) completed January 1995 at Site 1 Area B. Construction of groundwater pump-and-treat and DPVE systems completed (although DPVE system is no longer in operation). LTM to evaluate system effectiveness was initiated in 1999. Performed volatile organic compound groundwater plume delineation for Area B in January 2008. Remedy reaffirmed September 2010. Area B VI investigation of Building MCA-600 was completed in January 2014. Reconstruction of the new Camp Allen Elementary School was completed in FY 2019. The school is located near Area B and was constructed with a vapor mitigation system within the foundation. The most recent round of LTM sampling was completed during the first quarter of FY 2022. The next round of LTM sampling is scheduled for the first quarter of FY 2024. As a part of ongoing LTM at Site 1, all monitoring wells will be re-surveyed in FY 2023 to support re-calibration of the groundwater flow model, expected to be completed in FY 2025.</p> <p>The RAO Investigation was initiated in FY 2020. The RAO Investigations is expected to continue through FY 2023 with the inclusion of a soil-groundwater equilibrium assessment at potential soil sources areas in Area A and Area B. In addition, a VI investigation at the Camp Allen Elementary School is expected to begin in FY 2023. Following completion of the VI investigation at Camp Allen Elementary School, a comprehensive evaluation of the VI pathway will be completed.</p> <p>A groundwater pilot study using phytoremediation to improve the hydraulic control of groundwater in the Columbia Aquifer south of the Elementary school near an existing shallow extraction well is expected to be initiated in FY 2023.</p> <p>The Basewide PFAS PA identified Site 1 as a PFAS release area and recommended further investigation (CH2M, 2022a). Further evaluation of PFAS at Site 1 is expected to begin in FY 2023 and will be followed by the field investigation in FY 2024.</p>
Site 2 – Naval Magazine Slag Pile - All Media	OU02	1983	1988		1996, 1998	1998	1998	1999		2000	1999, 2005	1999		<p>Sediments removed in December 1999. Annual post-closure monitoring conducted from 2000 to 2004. Following 2004, groundwater sampling conducted once every 5 years. Remedial Action Completion Report completed May 2007. LTM sampling was completed during the first quarter of FY 2022 in support of the Fifth Five-Year Review. The next LTM sampling event is scheduled for the first quarter of FY 2027 in support of the Sixth Five-Year Review.</p> <p>As a result of the data evaluation in the Fifth Five-Year Review (CH2M, 2023), in order to ensure long-term protectiveness, the residential risk exposure will be evaluated. The risk evaluation is expected to begin in the first quarter of FY 2026.</p>
Site 3 – Q-Area Drum Storage Yard	OU03	1983	1988		1991	1996	1996	1996		1996, 2010	1996, 2005	1998		<p>Construction of AS/SVE system completed as site remedy. LTM to evaluate the effectiveness of treatment system was instituted in 1999. Remedy reaffirmed September 2010. AS/SVE systems turned off in July 2013 per Team decision. Remedial Process Optimization ongoing. LTM sampling was most recently completed during the first quarter of FY 2023. The next round of LTM sampling is scheduled for the first quarter of FY 2024.</p> <p>As a result of the data evaluation in the Fifth Five-Year Review (CH2M, 2023), the VI exposure pathway will be evaluated and is expected to begin in FY 2026. In addition, a ROD amendment is anticipated to follow the VI evaluation to incorporate any recommendations and/or modify the cleanup goals of existing COCs.</p> <p>The Basewide PFAS PA identified Site 3 as a potential PFAS release area and recommended further investigation (CH2M, 2022a). Further investigation of PFAS at Site 3 was completed in FY 2022. The PFAS SI report is expected to be finalized during the fourth quarter of FY 2023.</p>
Site 6 –CD Landfill	OU06	1983	1991		1993	1995	1995							<p>Removal of contaminated sediments partially completed in fall 1997. Cap construction completed in December 1999. Post-closure monitoring initiated in January 2000. Groundwater Monitoring Plan in accordance with VSWMR corrective action finalized in April 2006. VSWMR permit was revoked by VDEQ in May 2013. LTM is completed once every 5 years to support each Five-Year Review. LTM sampling was completed during the first quarter of FY 2022 in support of the Fifth Five-Year Review. The next LTM sampling event is scheduled for the first quarter of FY 2027 in support of the Sixth Five-Year Review.</p> <p>Site inspections are completed quarterly to confirm that LUCs are being implemented.</p>

Table 1-2. Status Summary of Environmental Restoration Sites
Site Management Plan
Fiscal Years 2024 to 2028
Naval Station Norfolk

Site	OU/RFA Designations	PA or IAS	SI or CS	EE/CA	Work Plans	RI	FS	PRAP	Closeout Report	ROD/DD	RD	RA Construction Phase	RA Ops Phase	Comments
Site 6, OU1 – Sediments	OU06							1996		1996	1996, 2005	1999		
Site 6, OU2 – Landfill Cap	OU07							1998		1998	1999, 2005	1999		
Site 18 – Former Naval Magazine Hazardous Waste Storage Area	OU14 RFA M-26	1983	2002, 2003	2008	2001, 2003, 2004, 2005					2010	2010	2008		NTCRA completed 2008 and 2010 (amendment injections for enhanced reductive dechlorination). ROD signed August 2010 documenting continued enhanced bioremediation with groundwater monitoring and LUCs as selected remedy. RD for LUCs finalized August 2010. Performance monitoring period was completed in April 2013. The most recent round of LTM sampling was completed during the first quarter of FY 2023. The next round of LTM sampling is scheduled for the first quarter of FY 2024. As a result of the data evaluation in the Fifth Five-Year Review (CH2M, 2023), the VI exposure pathway will be evaluated and is expected to begin in FY 2026. The Basewide PFAS identified Site 18 as a potential PFAS release area and recommended further investigation (CH2M, 2022a). Further investigation of PFAS at Site 18 was completed in FY 2022. The PFAS SI report is expected to be finalized during the fourth quarter of FY 2023.
Site 20 – Building LP-20 Site	OU10 RFA M-9/M-10	1991	1991		1994	1995	1996	1996		1996, 2010	1997, 2005	1998		Construction of AS/SVE system to address total petroleum hydrocarbons and chlorinated solvents in groundwater completed as site remedy. Remedy enhancement (groundwater extraction) was constructed in 2010 (not currently operating because of excessive maintenance requirements). The AS/SVE system was shut down in 2013. Based on remedy evaluation and Remedial Process Optimization in FY 2016, a field investigation and bench-scale test for a SBGR was recommended. Construction of the pilot-scale test of the SBGR is scheduled for completion in FY 2023. Subsequent performance monitoring and remedy evaluation will be completed in FY 2025. In addition to the SBGR pilot test, emulsified vegetable oil injections will be implemented with performance monitoring and remedy evaluation performed thereafter. A VI investigation for the Site 20 buildings was initiated in FY 2019. The results of the investigation resulted in a Rapid Response Action of installing air purifying units to reduce the indoor air concentration of TCE in an office in LP-26. Monthly performance monitoring has been performed at Office 120 but sampling will be optimized in coordination with the Partnering Team. Additional investigation to identify sources of TCE in subsurface soil gas and evaluate the effectiveness of the SVE system on mitigating impacts to indoor air at Building LP-26 and LP-20 was conducted from FY 2022 through early FY 2023. The results of the investigation will be finalized in FY 2024 and will be followed by a Focused Feasibility Study to address the VI pathway. The most recent round of LTM sampling was completed during the first quarter of FY 2023. The next round of LTM sampling is scheduled for the first quarter of FY 2024. The Basewide PFAS PA identified Site 20 as a PFAS release area and recommended further investigation (CH2M, 2022a). Further evaluation of PFAS at Site 20 is expected to begin in FY 2024. As a result of the data evaluation in the Fifth Five-Year Review (CH2M, 2023), and in order to ensure long-term protectiveness, the VI exposure pathway will be evaluated. The VI evaluation is expected to begin in FY 2024.
Site 22 – Camp Allen Salvage Yard	OU08 RFA C-14	1994	1994	1999, 2002	1996	1999	2002	2002		2004	2002, 2004	2002, 2009		A NTCRA was implemented at the Site in 1998 to remove PCB-contaminated soils. An EE/CA was completed in January 2002 recommending that a soil cover be placed at the site. The cover was completed in summer 2002. Site inspections are completed quarterly to confirm that LUCs are being implemented. Site groundwater is monitored under Site 1.
Site 23 – Building LP-20 Plating Shop	OU10 RFA M-29		2005	2006	2004			2008		2008	2009			Final EE/CA completed December 2006. Construction for the interim action was implemented in June 2007 to construct a concrete cover (new floor). Site inspections are completed quarterly to confirm that the LUCs are being implemented.

Table 1-2. Status Summary of Environmental Restoration Sites

Site Management Plan
Fiscal Years 2024 to 2028
Naval Station Norfolk

Site	OU/RFA Designations	PA or IAS	SI or CS	EE/CA	Work Plans	RI	FS	PRAP	Closeout Report	ROD/DD	RD	RA Construction Phase	RA Ops Phase	Comments
Response Complete/NFA														
Site 4 – P-71 Transformer Storage	RFA M-5	1983	1988 ^a		1991	1991	1991	1991		1991	1991	1992		Cleanup completed. Construction Summary Report completed February 1993. Groundwater monitoring completed in 1995.
Site 5 – Pesticide Disposal Site		1983	1988 ^b 1998 ^c	1998					2000			1999		Pesticide-contaminated soil removal action completed in November 1999, and the site was closed out.
Site 7 – Inert Chemical Landfill	RFA L-3	1983							2001					
Site 8 – Asbestos Landfill	RFA L-4	1983							2001					
Site 9 – Q-50 Area Landfill	RFA L-5	1983							2001					Site 9 was incorporated as part of the Q-50 Satellite Accumulation Area (SWMU 14) where an RI was completed in 2004 (Table 1-3).
Site 10 – Apollo Fuel Disposal Sites	RFA M-23	1983	2001		2001				2002					
Site 11 – Instrument Repair Shop Drains	RFA-M-34	1983												IAS report indicates low-level radiological contamination remediated in 1982. FFA indicates remediation of the site was completed as part of the V-60/V90 demolition project at Site 19.
Site 12 – Alleged Mercury Disposal Site	RFA M-35	1983							2001					
Site 13 – Past Wastewater Outfalls	RFA TP 10/ M 45													Recommended for NFA in FFA (USEPA and Navy, 1999)
Site 14 – Oil Spill Piers 4, 5, and 7	RFA M 24													Recommended for NFA in FFA (USEPA and Navy, 1999)
Site 15 – Oil Spill Piers 20, 21, and 22														Recommended for NFA in FFA (USEPA and Navy, 1999)
Site 16 – Chemical Fire Building X-136		1983	2001		2001				2002					
Site 17 – Chemical Fire Building SDA-215	RFA C-25/ AOC E	1983							2001					
Site 19 – Buildings V-60/ V-90	RFA M-34	1988	1988		1989	1989	1989	1989		1989	1989	1991		Building demolition and site cleanup completed.
Site 21 – Building W-316	RFA M-9/10	1996	1996	1997	1996				1998					PCB-contaminated soil removal action completed in March 1998.

^a Refers to Initial Assessment Study, Sewells Point Naval Complex, Norfolk, Virginia (ESE, 1983)
^b Refers to Installation Restoration Program Investigation - Interim Report (Malcolm Pirnie, 1988)
^c CH2M HILL, Inc. SI completed February 1998
AS = air sparge
CS = Confirmation Study
DD = Decision Document
DPVE = dual-phase vacuum extraction
EE/CA = Engineering Evaluation/Cost Analysis
FFA = Federal Facility Agreement
FS = Feasibility Study
FY = Fiscal Year
IAS = Initial Assessment Study
LTM = long-term monitoring
LUC = land use control
NFA = no further action

NTCRA = non-time-critical removal action
O&M = operations and maintenance
Ops = Operations
OU = Operable Unit
PA = Preliminary Assessment
PCB = polychlorinated biphenyl
PFAS = per- and polyfluoroalkyl substances
PRAP = Proposed Remedial Action Plan
RA = Remedial Action
RAO = Remedial Action Optimization
RFA = Resource Conservation and Recovery Act Facility Assessment
ROD = Record of Decision

RD = Remedial Design
RI = Remedial Investigation
SBGR = subgrade biogeochemical reactor
SI = Site Inspection
SVE = soil vapor extraction
SWMU = solid waste management unit
TCE = trichloroethene
VDEQ = Virginia Department of Environmental Quality
VI = vapor intrusion
VSWMR = Virginia Solid Waste Management Regulations

Table 1-3. Status Summary of Solid Waste Management Units
Site Management Plan
Fiscal Years 2024 to 2028
Naval Station Norfolk

SWMU		OU/RFA Designations	Phase I RRR ^a	Phase 2 RRR ^b	Work Plans	PA/SI	SI/SSI ^c	RI/FS	EE/CA	Closeout Report	ROD/DD	RD	RA Construction	Comments
Remedy in Place (Ongoing O&M and LTM)														
14	Q-50 Satellite Accumulation Area	OU13 RFA C-17	1996	1996	1998	1998		2004, 2009	2008		2010	2010	2008	The Final Proposed Plan was submitted August 2009. RD for LUCs completed August 2010. Limited action Remedial Action Completion Report signed September 2010. Quarterly inspections completed to confirm LUCs are implemented.
Response Complete/NFA														
1	SP-2B Accumulation Area	RFA C-83	1996	1996			1996							No further action under CERCLA based on SI Report.
2	Building Z-309 Ash Hopper Storage Area	RFA M-13/ M-14	1996	1996						2000				
3	Building Z-309 Oil/Lubricant Storage Area	RFA AOC B	1996	1996						2000				
4	PWC Sandblast Area	RFA M-19/ M-20; EPIC WDA-1	1996	1996	1996	1996								Site removed from the CERCLA program because the facility remains active.
5	LF-61 Waste Holding Tank	RFA M-36	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
6	Building V-28 Waste Pit	RFA M-31	1996		1996, 2001	1996	1998, 1999			2002				
7	LF-18 Aircraft Ramp	EPIC WDA-3	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
8	Fire Fighting School	EPIC WDA-20	1996		1996	1996	1999			2001				
9	LP-200/MAC Terminal	EPIC WDA-28/29	1996		1998	1998	1999			2001				
10	LP-200/MAC Terminal/East	EPIC WDA-31/32/35	1996	1996	1998	1998	1999			2001				
11	Old Weapons Station Entrance	EPIC WDA-33/34	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
12	Disposal Area near Naval Magazine-37	OU09 EPIC WDA-36	1996	1996	1998	1998		2004			2005			
13	Disposal Area PWC Operations, near Naval Magazine-71	EPIC WDA-37	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
15	W-130 Accumulation Area	RFA C-27	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
16	Naval Magazine 37 Accumulation Area	OU09 RFA C-54	1996	1996	1998	1998		2004			2005			No further action.
17	Surface Disposal Area; Waste Generated from SP-10 Maintenance		1996	1996										No further action based on RRR report.
18	Surface Disposal Area; Waste Generated from V-88 Lab		1996	1996										No further action based on RRR report.
19	Surface Disposal Area; Waste Generated from LF-53 Painting		1996	1996										No further action based on RRR report.
20	Surface Disposal Area; Waste Generated from Aircraft Maintenance, Former UST Site		1996	1996										No further action based on RRR report.

Table 1-3. Status Summary of Solid Waste Management Units
Site Management Plan
Fiscal Years 2024 to 2028
Naval Station Norfolk

SWMU		OU/RFA Designations	Phase I RRR ^a	Phase 2 RRR ^b	Work Plans	PA/SI	SI/SSI ^c	RI/FS	EE/CA	Closeout Report	ROD/DD	RD	RA Construction	Comments
22	Surface Disposal Area; Waste Generated from Building LF-60 Helicopter Maintenance		1996	1996			1999							No further action based on RRR report.
24	Building LF-53 Trenches	RFA M-39	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
25	Q-82/78 Former PWC Parking Lot		1996	1996										No further action based on RRR report.
26	Old Mounds Northeast of Naval Magazine-140/141	EPIC WDA-21	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
27	Mason Creek Embankment	EPIC WDA-30	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
28	Probable Solid Waste Disposal South of CEP 201	EPIC WDA-11	1996		1998	1998				2000				
29	Solid Waste Disposal Area/ CD-3/CD-4	EPIC WDA-12	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
30	Sludge Fill Disposal Area/Marshy Area South of Runway	EPIC WDA-15/16/17	1996	1996										Recommended for NFA in FFA (USEPA and Navy, 1999). No further action based on RRR report.
31	Solid Waste Disposal; Area V-82		1996	1996										No further action based on RRR report.
32	Solid Waste Disposal Area CEP 160/161 Embankment	EPIC WDA-5	1996		1998	1998				2000				
33	Debris Piled at Seawell	EPIC WDA-6	1996		1998	1998				2000				
34	Solid Waste Disposal Area CEP 200	EPIC WDA-7	1996		1998	1998	1999			2000				
35	Solid Waste Disposal Area CEP 196/Resolute Embankment	EPIC WDA-8	1996		1998	1998	1999			2000				
36	Stormwater Drainage System	RFA M-44												No further action under CERCLA.
37	Q-82/78 Former PWC Parking Lot	EPIC WDA-2	1996	1996										No further action under CERCLA. Moved out of CERCLA in 1998 and into the UST program.
38	CD Area Behind Compost Yard	EPIC WDA-13		1996	1998	1998	2000			2001				
39	Open Dump and Disposal Area near Boundary of Camp Allen Landfill	EPIC WDA-18/19					2000			2001				
40	MCA-603 Pits	EPIC WDA-22			1998	1998				2000				
41	Disposal Area, CA-99 Golf Course	EPIC WDA-23			1998	1998	1999			2000				
42	CEP 201 Area	EPIC WDA-9	1996	1996	1998	1998	1999			2000				

^a Refers to Initial Assessment Study, Sewells Point Naval Complex, Norfolk, Virginia (ESE, 1983)

^b Refers to Installation Restoration Program Investigation - Interim Report (Malcolm Pirnie, 1988)

^c CH2M HIL,L Inc. SI completed February 1998.

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CD = construction debris
DD = Decision Document
EE/CA = Engineering Evaluation/Cost Analysis
EPIC = Environmental Photographic Interpretation Center (USEPA)
FFA = Federal Facility Agreement
FS = feasibility study
LUC = land use control
NFA = no further action

OU = Operable Unit
PA = Preliminary Assessment
PWC = Public Works Center
RA = Remedial Action
RD = Remedial Design
RFA = Resource Conservation and Recovery Act Facility Assessment
RI = Remedial Investigation
ROD = Record of Decision
RRR = relative risk ranking

SI = Site Inspection
SSI = Supplementary Site Investigation
SWMU = Solid Waste Management Unit
USEPA = U.S. Environmental Protection Agency
UST = underground storage tank

Table 1-4. Additional No Further Action Sites*Site Management Plan**Fiscal Years 2024 to 2028**Naval Station Norfolk*

Site	Site Description	Reason for No Further Action
RFA AOC C	Building V-93-1	UST/AST; Removed
RFA AOC C	Building V-93-2	UST/AST; Removed
RFA AOC C	Building V-93-3	UST/AST; Removed
RFA AOC C	Building V-112-1	UST/AST; Removed
RFA AOC C	Building V-112-2	UST/AST; Removed
RFA AOC C	Building V-112-3	UST/AST; Removed
RFA AOC C	Building NM-71-A	UST/AST; Removed
RFA AOC C	Building NM-71-B	UST/AST; Removed
RFA AOC C	Building U-117	UST/AST; Removed
RFA AOC C	Building CA-501-1	UST/AST; Removed
RFA C-4	Building CA-483 (A) SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-5	Building CA-483 (B) SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-6	Building CA-483 (C) SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-7	Building CA-483 (D) SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-9	Building W-7 (Pier 7) SAA	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA C-18	Building Z-309 SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-26	Building CA-501 SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-27	Building W-130 SAA	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA C-33	Building V-88 SAA (SWMU 18)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA C-36	Building LF-53 SAA (SWMU 19)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data

Table 1-4. Additional No Further Action Sites*Site Management Plan**Fiscal Years 2024 to 2028**Naval Station Norfolk*

Site	Site Description	Reason for No Further Action
RFA C-61	Building LP-20 SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-71	Building SP-10 SSA (SWMU 17)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA C-79	LP Fuel Farm SAA	Team site visit, review of existing documentation and review of operational procedures
RFA C-80	Building LP-100 SAA (SWMU 20)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA C-81	Building LF-59 SAA	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA C-82	Building LF-60 SAA (SWMU 22)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA M-18	Sanitary Sewers	Team site visit, review of existing documentation and review of operational procedures
RFA M-22	Sewage Waste Oil Barges	Team site visit, review of existing documentation and review of operational procedures
RFA M-36	Building LF-61 Waste Tank Area (SWMU 5)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA M-39	Building LF-53 Trenches (SWMU 24)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
RFA M-46	P-1 Pond	Team site visit, review of existing documentation and review of operational procedures
RFA R-3	LF-68 Former Hazardous Waste Storage Area	Team site visit, review of existing documentation and review of operational procedures
RFA O-1	A-80 Building O/WS	O/WS; Managed under IWMP
RFA O-2	A-81 Building O/WS	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-3	A-127 Building	O/WS; Managed under IWMP
RFA O-4	A-Area	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-7	CEP-188 Building	O/WS; Managed under IWMP
RFA O-8	LF-38 Building	O/WS; Demolition complete
RFA O-9	LF-53 Building	O/WS; Inactive due to BRAC closure of NSN tenants

Table 1-4. Additional No Further Action Sites*Site Management Plan**Fiscal Years 2024 to 2028**Naval Station Norfolk*

Site	Site Description	Reason for No Further Action
RFA O-10	LF-59 Building	O/WS; Managed under IWMP
RFA O-11	LF-60 Building	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-23	LP-20 Building	O/WS; Managed under IWMP
RFA O-24	LP-22 Building	O/WS; Demolition complete – FY 1998
RFA O-25	LP-32 Building	O/WS; Inactive due to BRAC closure of NSN tenants
RFA O-27	LP-48 Building	O/WS; Demolition complete – FY 1998
RFA O-30	LP-78 Building	O/WS; Demolition complete – FY 1997
RFA O-31	LP-167 Area 1	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-32	LP-167 Area 2	O/WS; Managed under IWMP
RFA O-33	LP-167 Area 3	O/WS; Managed under IWMP
RFA O-34	LP-167 Area 4	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-35	LP-167 Area 5	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-36	LP-167 Area 6	O/WS; Managed under IWMP
RFA O-37	LP-176 Building	O/WS; Demolition complete – FY 1998
RFA O-43	SP-38 Building	O/WS; Managed under IWMP
RFA O-45	SP-296 Hangar	O/WS; Managed under IWMP
RFA O-46	SP-313	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-50	V-15 Building	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-51	V-27 Area 1	O/WS; Inactive due to BRAC closure of NSN tenants
RFA O-52	V-28 Area 2	O/WS; Inactive due to BRAC closure of NSN tenants

Table 1-4. Additional No Further Action Sites*Site Management Plan**Fiscal Years 2024 to 2028**Naval Station Norfolk*

Site	Site Description	Reason for No Further Action
RFA O-55	V-49 S Area 5	O/WS; Managed under IWMP
RFA O-56	V-49 W Area 6	O/WS; Managed under IWMP
RFA O-57	V-146 Building	O/WS; Demolition complete – FY 1997
RFA O-59	W-6 Building	O/WS; Managed under IWMP
RFA O-60	Firefighting School	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
RFA O-61	Firefighting School	O/WS; Demolition complete – FY 1992
RFA O-62	Firefighting School	O/WS; Demolition complete – FY 1992
RFA T-3	Wastewater Tank 3 Building CEP-200	UST/AST; Regulated under VDEQ
RFA T-10	W-7 Building	UST/AST; Regulated under VDEQ
RFA T-12	W-388 Building High Flashpoint Tank	UST/AST; Regulated under VDEQ
RFA T-13	W-388	O/WS; Managed under IWMP
RFA T-14	A-81 Building	UST/AST; Removed
RFA T-15	A-81 Building Tank No.1	UST/AST; Removed
RFA T-16	A-81 Building Tank No.2	UST/AST; Removed
RFA T-17	Firefighting School	UST/AST; Removed
RFA T-20	CEP-188 Building	UST/AST; Removed
RFA T-21	V-49 Building	UST/AST; Removed
RFA T-22	U-132 Calibration Fluid	UST/AST; Removed
RFA T-23	U-132 Varsol	UST/AST; Removed
RFA T-24	U-132 Waste Oil	UST/AST; Removed
RFA T-26	NH-34 Building	UST/AST; Removed
RFA T-27	NH-35 Building	UST/AST; Removed
RFA T-28	NH-94-1W Building	UST/AST; Regulated under VDEQ

Table 1-4. Additional No Further Action Sites*Site Management Plan**Fiscal Years 2024 to 2028**Naval Station Norfolk*

Site	Site Description	Reason for No Further Action
RFA T-29	NH-94-2W Building	UST/AST; Regulated under VDEQ
RFA T-30	MCE-225-4 Building	UST/AST; Removed
RFA T-31	MCE-57-1	O/WS; Demolition Complete – FY 1997
RFA T-32	W-6-1	UST/AST; Removed
RFA T-33	W-6-2	UST/AST; Removed
RFA T-34	W-6-3	UST/AST; Removed
RFA T-35	W-6-4	UST/AST; Removed
RFA T-36	W-196 Building	UST/AST; Removed
RFA T-37	LAFB Building	UST/AST; Removed
RFA T-38	NM-59 Building	UST/AST; Removed
RFA TP-6	Firefighting School Wastewater Pit	O/WS; Demolition complete – FY 1999
RFA W-4	Q-50	O/WS; Documentation of integrity and functionality inspections on file with the USEPA Region 3
EPIC WDA-3	Building LF-18 Aircraft Ramp (SWMU 7)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-4	Building V-82 Area (SWMU31)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-12	Building CD-2/CD-3	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-14	Building U-40	Team site visit, review of existing documentation and review of operational procedures
EPIC WDA-15/16/17	Marshy Area South of Runway (SWMU 30)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-21	Northeast of Building NH-140/141 (SWMU 26)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-24	Building LP-3	Team site visit, review of existing documentation and review of operational procedures
EPIC WDA-25	Building SP-367	Team site visit, review of existing documentation and review of operational procedures

Table 1-4. Additional No Further Action Sites

Site Management Plan

Fiscal Years 2024 to 2028

Naval Station Norfolk

Site	Site Description	Reason for No Further Action
EPIC WDA-26	Building SP-86	Team site visit, review of existing documentation and review of operational procedures
EPIC WDA-27	Building SP-85 Area	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-30	Mason Creek Embankment (SWMU 27)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-33/34	NM-43 Old Weapons Station Entrance (SWMU 11)	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data
EPIC WDA-37	Building NM-71	Team site visit, review of existing documentation and review of operational procedures, review of RRR analytical data

AST = aboveground storage tank

BRAC = Base Realignment and Closure

EPIC = Environmental Photographic Interpretation Center (USEPA)

FY = Fiscal Year

IWMP = Industrial Wastewater Management Plan

NSN = Naval Station Norfolk

O/WS = oil/water separator

RFA = Resource Conservation and Recovery Act Facility Assessment

RRR = relative risk ranking

SAA = Satellite Accumulation Areas

SSA = Site Screening Areas

SWMU = solid waste management unit

USEPA = United States Environmental Protection Agency

UST = underground storage tank

VDEQ = Virginia Department of Environmental Quality

WDA = waste disposal area

Table 1-5. Status Summary of Federal Facility Agreement Areas of Concern

Site Management Plan

Fiscal Years 2024 to 2028

Naval Station Norfolk

AOC Designation	Site Description		Evaluation Determination
AOC 1	Building Z-309 Area	SWMU 2; RFA M-13/14	In March 2000, Close-Out Report approved, no further action is required, and the land use will be unrestricted.
		SWMU 3; RFA AOC B	In March 2000, Close-Out Report approved, no further action is required, and the land use will be unrestricted.
AOC 2	MAC Area	SWMU 9; EPIC WDA-28/29	In October 2000, Streamline Risk Assessment approved, no further action is required, and the land use will be unrestricted.
		SWMU 10; EPIC WDA-31/32/35	In October 2000, Streamline Risk Assessment approved, no further action is required, and the land use will be unrestricted.
AOC 3	CEP 201 Area	SWMU 42; EPIC WDA-9/10	In March 2000, Close-Out Report approved, no further action is required, and the land use will be unrestricted.
	CEP Area	SWMU 28; EPIC WDA-11	In May 2000, Streamline Risk Assessment approved, no further action is required, and the land use will be unrestricted.
		SWMU 32; EPIC WDA-5	In May 2000, Streamline Risk Assessment approved, no further action is required, and the land use will be unrestricted.
		SWMU 33; EPIC WDA-6	In May 2000, Streamline Risk Assessment approved, no further action is required, and the land use will be unrestricted.
		SWMU 34; EPIC WDA-7	In May 2000, Streamline Risk Assessment approved, no further action is required, and the land use will be unrestricted.
		SWMU 35; EPIC WDA-8	In May 2000, Streamline Risk Assessment approved, no further action is required, and the land use will be unrestricted.
AOC 4	Q-50 PWC Accumulation Area	SWMU 14; RFA C-17	Refer to Table 1-3 for status
AOC 5	CD Area Behind the Compost Yard	SWMU 38; WPIC WDA-13	In March 2001, Close-Out Report signed, no further action is required, and the land use will be unrestricted.
AOC 6	Open Dump and Disposal Area at Boundary of Camp Allen Landfill	SWMU 39; EPIC WDA-18/19	In March 2001, Close-Out Report signed, no further action is required, and the land use will be unrestricted.

Table 1-5. Status Summary of Federal Facility Agreement Areas of Concern

Site Management Plan

Fiscal Years 2024 to 2028

Naval Station Norfolk

AOC Designation	Site Description		Evaluation Determination
AOC 7	MCA-603 Pits	SWMU 40; EPIC WDA-22	In March 2000, Close-Out Report approved, no further action is required, and the land use will be unrestricted.
AOC 8	CA-99 Golf Course Disposal Area	SWMU 41; EPIC WDA-23	In March 2000, Close-Out Report approved, no further action is required, and the land use will be unrestricted.

AOC = Area of Concern

CD = Construction Debris

EPIC = Environmental Photographic Interpretation Center (USEPA)

RFA = Resource Conservation and Recovery Act Facility Assessment

SWMU = Solid Waste Management Unit

USEPA = U.S. Environmental Protection Agency

WDA = waste disposal area

Table 1-6. NSN Partnering Team Consensus Statement Summary*Site Management Plan**Fiscal Years 2024 to**Naval Station Norfolk, Norfolk, Virginia*

Number	Date	Facility	Site	Topic	Consensus Statement
1	12/18/1997	NSN	Basewide	Human Health Risk	Since no groundwater classification(s) has been assigned to either the shallow or deep aquifer beneath NSN describing natural water quality conditions, the establishment of information regarding natural groundwater quality will be conducted on a site by site basis. This should include the evaluation of analytical results acquired for a set of appropriate and agreed-upon water quality parameters (e.g. total dissolved solids, pH, conductivity, nitrates, nitrites, alkalinity, acidity, chloride, sulfates, sulfides, biological oxygen demand, chemical oxygen, etc.).
2	9/26/2000	NSN	Basewide	Background	The Background Report will be finalized documenting the native, fill (Admiral's Row), and combined soil types and that these soil types will be taken into consideration.
3	9/26/2000	NSN	Basewide	Fieldwork	Complete the Draft-Final SWMU 12, 14, 16, 38, & 39 Work Plan and begin field work (9/00).
4	11/18/2003	NSN	Site 23	Investigation	The Team agrees to prepare a letter referencing previous investigations that have occurred at Site 23 in lieu of a formal PA/SI.
5	11/19/2003	NSA HR	Site 22	Remedy	The NSN Tier I Partnering Team agrees to move forward with a revised PRAP and ROD addressing soil and sediment at the CASY. The preferred alternatives will be: <ul style="list-style-type: none"> • Soil: ICs and LUCs • Sediment: ICs and LUCs The NSN Tier I Partnering Team agrees to address groundwater at the CASY.
6	1/7/2004	NSN/ NSA HR	Bousch Creek	Ecological Risk	The Team agrees that the Draft Bousch Creek ERA Report (through Step 3A) will be finalized by preparing a resolution to the response to comments Memorandum on the document. The ecological subgroup positions and Tier I resolutions will be incorporated in the next Bousch Creek ERA Report (through Step 7).
7	3/2/2004	NSA HR	Site 18	Investigation	The Team agrees to implement the Site 18 proposed alternative consisting of additional delineation of the VOCs in the groundwater and evaluation of analytical data to determine the path forward.
8	3/3/2004	NSN	Site 23	Investigation	The Team agrees with the recommendation (from 01/04/04 meeting) of a phased sampling approach for the investigation at Site 23 that begins with the collection of soil samples as the first phase of the investigation. The next phase of the investigation will be determined on the basis of the Phase I soil sampling results.
9	5/11/2004	NSN	Site 23	Site Walk	The Team agreed to postpone the site visit to Site 23 until the new VDEQ representative is available to attend.
10	7/1/2004	NSN	Site 3 - AOC 1	Remedy	The Team agreed to the recommendations of the close-out strategy to continue operation of AS system and revise the LTM to include only wells CMW-101 and CMW-103R. The Team will revisit the close-out strategy following 6 additional rounds of sampling to determine if the strategy is adequate prior to dismantling of the system. The monitoring wells that are no longer part of the LTM sampling will be left intact until the Team decides they are no longer needed.

Table 1-6. NSN Partnering Team Consensus Statement Summary*Site Management Plan**Fiscal Years 2024 to**Naval Station Norfolk, Norfolk, Virginia*

Number	Date	Facility	Site	Topic	Consensus Statement
11	4/28/2004	NSN/ NSA HR	Bousch Creek	Ecological Risk	The Team agrees with the ecological subgroup proposed path forward for Bousch Creek (Camp Allen Area). The proposed path forward consists of 1. development of a draft Step 4 work plan including a site visit to joint scope sampling locations, 2. conduct additional studies (Steps 5 and 6), 3. generate a Step 7 ERA report incorporating new data, and 4. provide input to risk managers (Step 8).
12	4/28/2004	NSN	SWMU 12/ 16	Remedy	The Team agrees to the recommendation in the Draft SWMUs 12 & 16 RI for a NFA determination.
13	3/24/2005	NSN	SWMU 14	Remedy	The Team agreed to the following statements regarding the SWMU 14 presumptive remedy: <ul style="list-style-type: none"> • A proposed continuous asphalt parking lot will cover the unpaved areas of SWMU 14. • The proposed asphalt parking lot will tie-in to the revetment such that the impervious surface is contiguous to minimize erosion, exposure to soils, and infiltration into the site. • These two components will serve as the presumptive remedy for site soils and sediments underneath the revetment. • The groundwater and other remaining sediments will be evaluated separately.
14	11/17/2004	NSA HR	Site 1/ Site 22	Operable Units	The Team agrees that the Columbia aquifer at CALF and CASY can be considered one hydrogeologic unit. The Team agrees that the Yorktown aquifer at CALF and CASY can be considered one hydrogeologic unit.
15	3/30/2005	NSN	SWMU 14	Investigation	The Team agreed to further delineate the southern boundary of SWMU 14 near the lagoon. The delineation will consist of: <ul style="list-style-type: none"> • Conduct hand auger soil borings to determine southern boundary by differentiating SWMU 14 soils from dredge fill soils. • The details of study will be outlined in a technical memorandum. • The path forward will be determined by results of soil boring study.
16	3/31/2005	NSA HR	Site 18	Investigation	The Team agreed to the installation of three new monitoring wells at Site 18 (as detailed in the Site 18 presentation for March 31, 2005). The three new monitoring wells and existing wells MW03C, MW03S, and MW05S will be sampled and analyzed for TCL VOCs and natural attenuation parameters.
17	3/31/2005	NSN	Site 23	Remedy	The Team has agreed to an interim action for Site 23 soils in the form of a cap that will be documented in a EE/CA. In addition, LUCs for the Site 23 soils will be documented in a ROD for Site 23.
18	3/31/2005	NSA HR	Site 2	Five-Year Review	The Team agreed to collect one additional round of sediment samples (from locations SD-41, SD-45, and SD-46) at Site 2 one year prior to the next Five-Year Review.
19	9/14/2005	NSN	Site 3 - AOC 2	Remedy	The Team agreed to implement the proposed close-out strategy for Site 3, AOC 2 consisting of enhanced remediation proximal to CMW-202, followed by continued monitoring and ultimately the shut down and dismantling of the system (July 14, 2005 meeting presentation).

Table 1-6. NSN Partnering Team Consensus Statement Summary*Site Management Plan**Fiscal Years 2024 to**Naval Station Norfolk, Norfolk, Virginia*

Number	Date	Facility	Site	Topic	Consensus Statement
20	9/14/2005	NSN	Basewide	Optimization	The Team agrees that the flexibilities may be applied to the active sites regardless of the site's stage in the CERCLA process, where applicable as determined by the Team. The Team agrees that on an individual site basis, the groundwater flexibilities will be utilized through documentation by the Partnering Team of the risk management rationale. The Team will then discuss which specific issues warrant involvement of technical support personnel and how these support personnel will be engaged.
21	7/12/2006	NSA HR	Site 22	RD	The Team agrees to the language changes to the Site 22 RD as stated below: <ul style="list-style-type: none"> • The title of the document will be changed from "Final Remedial Design for Land Use Controls" to "Revised Final Remedial Design for Land Use Controls for Soil and Sediment". • The statement in Section 2.0- "Although the ROD for this site does not include the LUCs for groundwater, institutional controls for groundwater at the entire Camp Allen area are included in the PRAP and Decision Document for Camp Allen Landfill" will be removed from the document and replaced with the following statement – "As detailed in the PRAP and ROD for Site 22, the Navy intends to address groundwater in a separate document through the CERCLA process".
22	9/27/2006	NSN/ NSA HR	Bousch Creek	Ecological Risk	The Team agreed to finalize the Step 7 ERA for Bousch Creek based on the resolution of regulatory comments by the ecological subgroup.
23	9/27/2006	NSN	Site 23	Remedy	The Team agreed to finalize the Site 23 EE/CA based on the proposed language as follows to be added to the ARARs table. <ul style="list-style-type: none"> • 40 CFR 264.101(a) - Based on VDEQ letter of August 20, 2002, VDEQ has determined that the requirements of CERCLA are equivalently protective of requirements set forth in 40 CFR 264.101(a). Therefore, these requirements are not applicable, because they have been replaced by CERCLA equivalently protective standards. (ARAR Determination – TBC). • 40 CFR 265.111 (a) and (b) - Based on VDEQ letter of August 20, 2002, VDEQ has determined that the requirements of CERCLA are equivalently protective of requirements set forth in 40 CFR 265.111 (a) and (b). Therefore, these requirements are not applicable, because they have been replaced by CERCLA equivalently protective standards. (ARAR Determination - TBC). • 40 CFR 265.110 (d) - Based on VDEQ letter of August 20, 2002, VDEQ has determined that the requirements of CERCLA are equivalently protective of requirements set forth in 40 CFR 265.110(d). Therefore, these requirements are not applicable, because they have been replaced by CERCLA equivalently protective standards. (ARAR Determination - TBC). <p>The intent of the consensus statement is that the site will be administered under CERCLA, because CERCLA provides as equivalent a level of protection as RCRA.</p>

Table 1-6. NSN Partnering Team Consensus Statement Summary*Site Management Plan**Fiscal Years 2024 to**Naval Station Norfolk, Norfolk, Virginia*

Number	Date	Facility	Site	Topic	Consensus Statement
24	11/11/2006	NSN/ NSA HR	Bousch Creek		<p>The Team agreed to the following to address the metals-contaminated sediment in Bousch Creek.</p> <ul style="list-style-type: none"> • Removal of 2 feet of sediment (or to concrete) in metals-contaminated area immediately north of Site 1, with no associated confirmation sampling. • Placement of 1 foot of clean soil cover, with no associated sampling for monitoring purposes. • Erosion prevention of the cover through the installation of a barrier (pavers, blanket, or membrane, etc.), if allowed by the design. • LUCs to prevent potential future damage to cover. • One initial inspection of the barrier and cover integrity and follow on inspections as part of each Five-Year Review. <p>An EE/CA and action memorandum will be used to document the sediment removal action. The Site 1 RD will be modified to include LUCs for the area of the cover in Bousch Creek.</p>
25	3/6/2007	NSA HR	Site 1	Five-Year Review	<p>The purpose of this consensus statement is to address comments received on the 2003 Five-Year Review and prepare for the 2008 Five-Year Review. This statement addresses metals in the groundwater at Site 1. The Team agrees that arsenic and manganese in Site 1 groundwater are COPCs, based on a review of the HHRA from the 1994 RI, and will be further evaluated to determine what, if any, appropriate action is necessary. Any subsequent action, if necessary, will be documented in an ESD.</p>
26	3/6/2007	NSA HR	Site 1	Remedy	<p>The purpose of this consensus statement is to address comments received on the 2003 Five-Year Review and prepare for the 2008 Five-Year Review. This statement addresses VOCs in the shallow aquifer groundwater at Site 1. The Team agrees that in the list of Site 1 COCs, from Table 9-2 in the Decision Document, the shallow aquifer PRGs will be changed to the MCLs. This action will be documented in an ESD.</p>
27	5/1/2007	NSA HR	Site 18	Remedy	<p>The Team will move forward with EE/CA including a baseline round of sampling at all site wells. The determination as to whether or not additional delineation is required east of MW10S will be based on baseline sampling and in consideration for site restrictions on well installation.</p>
28	8/8/2007	NSA HR	Site 1	Investigation	<p>The team agrees to move forward with the delineation in the vicinity of Site 1, Area B, MWs 3A & 11A to determine if injection is feasible (as described in the June 1, 2007 tech memo).</p>
29	8/8/2007	NSN	Site 20	Investigation	<p>The team agrees that groundwater associated with Site 23 has been and continues to be addressed as part of Site 20.</p>
30	9/19/2007	NSN HR	Site 18	Remedy	<p>The Team agrees to prepare a Final Site Investigation Report for Site 18 to summarize all of the investigation activities that will be utilized in the Site 18 EE/CA. This report will be distributed for informational purposes as the Final document and therefore review is not required.</p>

Table 1-6. NSN Partnering Team Consensus Statement Summary*Site Management Plan**Fiscal Years 2024 to**Naval Station Norfolk, Norfolk, Virginia*

Number	Date	Facility	Site	Topic	Consensus Statement
31	11/14/2007	NSN	Site 1	Remedy	1) Based upon the information available to make the original decision that there is not a discernable plume of arsenic in groundwater at Site 1, the team agrees with this rationale and concurs that data does not indicate a discernable plume. To ensure the situation has not changed, the team agrees to conduct an additional round of arsenic sampling at select wells and reassess the data prior to the next five-year review 2) The team agrees there is no discernable manganese plume and that a) concentrations in Site 1 groundwater are within background (other NSN sites and regional concentrations) range; and b) the human nutrient analysis indicates manganese concentrations are within an acceptable risk range based upon adequate daily intake Therefore, it is believed that based on the Team consensus, the regulatory comments received during the Five Year Review report (October 2003) have been adequately addressed. However, USEPA recommended that an additional round of sampling be conducted to determine if there has been a change in the plume.
32	11/15/2007	NSN	Site 3	Remedy	The team agrees to revise the Site 3 AOCs 1&2 clean up goals to be MCLs because MCLs are appropriate groundwater clean up goals than the previous risk-derived values.
33	11/15/2007	NSN	Basewide		The team agrees that it is acceptable to provide information/revisions to an approved work plan to the regulators in the form of an informational email or via conference call, depending upon issue (as long as the intent of the work plan is being met and in accordance with applicable regulations).
34	1/15/2008	NSN	Site 3 - AOC 1	Remedy	The team agrees that CMW-103R at AOC 1, Site 3 can be removed from the LTM following the ESD documentation for revision of the cleanup goals to MCLs. This changes is due to the concentrations over numerous monitoring events being at or below the MCLs.
35	5/21/2008	NSN	SWMU 14	Remedy	The Team agrees that the monitoring wells at SWMU 14 located within the footprint of construction activities can be abandoned based on the Team's previous determinations (Rationale for "No-Treatment" Strategy for Groundwater at SWMU 14/Site 9, Q-50 Satellite Accumulation Area, Naval Station Norfolk , CH2M HILL, April 2008) that the water beneath SWMU 14 is not considered to be within an aquifer nor is there a preferential pathway for groundwater to discharge to Willoughby Bay and consequently long term monitoring is not required. Additionally, monitoring well abandonment will remove a man-made conduit to the water bearing zone enhancing the protectiveness of the cap.
36	10/21/2008	NSN	Site 20	Remedy	The team agrees that the groundwater clean up goals at Site 20 will be revised from the risk-based clean up goals to MCLs in order to address USEPA's previous (2003) Five Year Review comment. The revision will be documented in an NSD for Site 20.

Table 1-6. NSN Partnering Team Consensus Statement Summary*Site Management Plan**Fiscal Years 2024 to**Naval Station Norfolk, Norfolk, Virginia*

Number	Date	Facility	Site	Topic	Consensus Statement
37	10/21/2008	NSA HR	Site 1 - Area B	Remedy	The team agrees with the Navy's recommendation for the Site 1 Area B shallow groundwater to shut down the shallow extraction system in the vicinity of B-MW3A & B-MW11A for 2-3 years in order to evaluate natural attenuation conditions. Groundwater will be conducted semiannually in accordance with an approved sampling plan.
38	5/5/2009	NSA HR	Site 1 - Area B	Remedy Optimization	As part of CAL optimization measures in Area B, a single UFP-SAP will be developed to support DPT sampling in the vicinity of B-MW15A and B-MW35A to evaluate the lateral and vertical extent of VOC contamination in the vicinity of these wells and MNA sampling at B-MW3A/B-MW11A and, if appropriate, at B-MW15A/B-MW35A. The objective for evaluating shallow groundwater in these areas is to evaluate the CAL groundwater extraction and treatment system and provide for an optimization measure that no longer requires operation of the shallow portion of the system. An active treatment (such as localized in-situ injection) or monitoring for natural attenuation are the likely recommendations. Groundwater parameters will be collected in accordance with the recommendations made in the May 2008 Area B Tech Memo and the May 2009 Area B partnering presentation.
39	10/14/2009	NSN	Site 3 - AOC 1	Remedy	The team agrees that the low but persistent levels of vinyl chloride at Site 3 AOC 1 CMW01 warrant a pilot study that will be conducted employing an ORC® sock to be expeditiously implemented so the results can be evaluated in prior to the next LTM event in Feb 2010.
40	11/12/2009	NSN	Site 3 - AOC 1	Remedy - Revised Consensus	The team agrees that the low but persistent levels of vinyl chloride and the increase of TCE and cis-1,2- DCE at Site 3 AOC 1 CMW101 warrant a pilot study that will be conducted employing an HRC® sock to be expeditiously implemented so the results can be evaluated in prior to the next LTM event in Feb 2010. Once the HRC® has sufficiently reduced concentrations of TCE and cis-1,2-DCE, an ORC® sock may be inserted into the well to degrade vinyl chloride following the 2010 LTM event.
41	2/9/2011	NSN	Basewide	LTM	The Navy may delay the LTM sampling at Sites 1, 3, and 20 until an alternative plan is accepted by the VDEQ and USEPA. The Navy will complete LTM at Sites 1, 3, and 20 within calendar year 2011. Additionally, the team agreed samples should be collected at Site 2 (total and dissolved metals) and include the Site 18 monitoring wells as noted in the basewide ROD.

Table 1-6. NSN Partnering Team Consensus Statement Summary

Site Management Plan

Fiscal Years 2024 to

Naval Station Norfolk, Norfolk, Virginia

Number	Date	Facility	Site	Topic	Consensus Statement
42	1/10/2012	NSA HR	Site 1	Remedy	In accordance with the attached document, Site 1 CALF, Construction Considerations for Site Redevelopment of Area A at NSN, the site Project Managers who represent their respective agencies in the cleanup activities for CERCLA sites at NSN support the redevelopment of Environmental Restoration Site 1. This determination is based upon the addition of a minimum of 2 feet of soil being applied to the site as soil cover and any proposed buildings or structures within the site requiring review and approval. If dewatering or management of extracted groundwater is necessary during construction activities related to redevelopment, a groundwater management plan shall be prepared and submitted to the Navy, USEPA, and VDEQ for review and approval. Extraction of groundwater, if necessary, will need to be conducted in a manner to prevent adverse impacts to the Site 1 CERCLA groundwater remedy (groundwater extraction and treatment).

ARAR = Applicable or Relevant and Appropriate Requirement

AS = air sparge

AOC = Area of Concern

CALF = Camp Allen Landfill

CASY = Camp Allen Salvage Yard

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = *Code of Federal Regulations*

COC = contaminant of concern

DCE = dichloroethene

DPT = direct-push technology

EE/CA = Engineering Evaluation/Cost Analysis

ESD =

ERA = Environmental Risk Assessment

HHRA = Human Health Risk Assessment

HR = human resources

LTM = long-term monitoring

LUC = land use control

MCL = maximum containment level

MNA = monitored natural attenuation

MW = monitoring well

Navy = Department of the Navy

NFA = No Further Action

NSD = nonsignificant difference

NSN = Naval Station Norfolk

PA = Preliminary Assessment

PRAP = Proposed Remedial Action Plan

PRG = Preliminary Remediation Goal

RCRA = Resource Conservation and Recovery Act

RD = Remedial Design

ROD = Record of Decision

SI = Site Investigation

SWMU = Solid Waste Management Plan

TBC = to be considered

TCE = trichloroethene

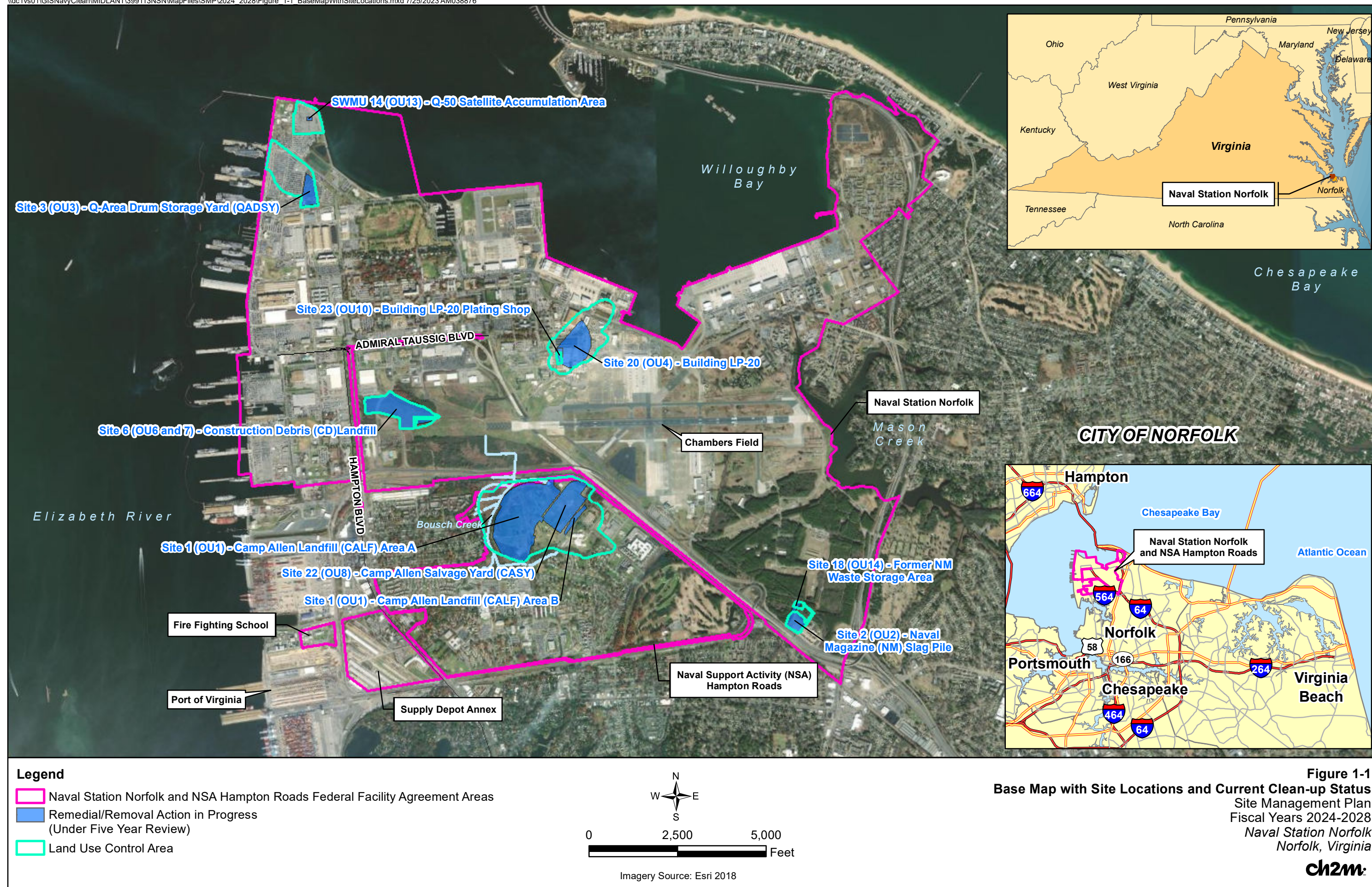
TCL = Target Compound List

UFP-SAP = Uniform Federal Policy Sampling and Analysis Plan

USEPA = U.S. Environmental Protection Agency

VDEQ = Virginia Department of Environmental Quality

VOC = volatile organic compound



Site Descriptions

This section provides information regarding the ERP sites (**Section 2.1**) and SWMUs (**Section 2.2**) at NSN that have been investigated and are currently undergoing remediation, and per- and polyfluoroalkyl substances (PFAS) basewide investigations that are ongoing (**Section 2.3**). The locations of the sites that are currently undergoing remediation are shown on **Figure 1-1**.

Basewide tasks, such as long-term monitoring (LTM), Five-Year Reviews, Preliminary Assessments, and Site Inspections are reviewed in **Section 2.1** and **Section 2.2**, as applicable. The schedule of basewide tasks is depicted on **Schedule 2-1**. As determined appropriate by the Team, community engagement activities, summarized in the Environmental Justice Pilot Project report (USEPA, 2023), may be implemented in conjunction with the Basewide tasks included in **Schedule 2-1**.

2.1 Environmental Restoration Program Sites

Sections 2.1.1 through **2.1.8** provide site-specific descriptions of ERP Sites 1, 2, 3, 6, 18, 20, 22, and 23. The following descriptions include a site summary, site description and history along with a table listing past activities, and a table listing the known constituents of concern (COCs) in each site medium. In addition, the current status of each site is briefly discussed.

2.1.1 Site 1 (OU1)—Camp Allen Landfill

Site 1 Summary

Status:	Remedy in place
Current IR Activities:	Remedy optimization and LTM
Media Investigated:	Soil, groundwater, surface water, sediment, subslab vapor, indoor air
Removal and Remedial Actions:	Soil and debris removal action completed in FY 1995; groundwater extraction and treatment began in 1998; sediment removal of Bousch Creek was completed in 2008; LUCs in place for groundwater
Media Closed:	N/A
Waste and Debris Present Onsite:	Buried debris present onsite

LTM = long-term monitoring

N/A = not applicable

Site Description and History

The Camp Allen Landfill (CALF) site (**Figure 2-1**) includes two distinct areas: Area A, the 45-acre landfill, and Area B, the 2-acre fire disposal area. CALF is located within the Naval Support Activity Hampton Roads, as shown on **Figure 1-1**. The Area A landfill, which operated from the mid-1940s until approximately 1974, was used for the disposal of metal-plating and parts cleaning sludge, paint-stripping residue, various chlorinated organic solvents, overage chemicals, pesticides, asbestos, incinerator ash, fly and bottom ash from the Base power plant, and miscellaneous debris. Wastes from a fire at the Camp Allen Salvage Yard (CASY) (Site 22), including drums containing various chemicals, were buried in 1971 in trenches at Area B.

The primary contaminants found in all media at the site are volatile organic compounds (VOCs). Areas of inorganic contamination in surface water and sediments in the surrounding drainage ditches and in the on-site pond were also identified. Groundwater contamination was found in both the surficial/Columbia aquifer (the shallow water table aquifer) and the Yorktown aquifer (the deep groundwater aquifer) in Areas A and B. The presence of contamination in the deeper Yorktown aquifer is thought to be the result of a discontinuous confining layer between the two aquifers beneath much of the CALF area.

Table 2-1 provides a list of relevant documents and past activities for Site 1.

Table 2-1. Summary of Relevant Documents and Milestones for Site 1

Document Title/Milestone	Summary
RI and FS (Baker, 1994), AR # 000597	The purpose of the RI was to determine the extent and degree of potential contamination associated with Areas A and B through investigation of subsurface and surface soil, sediment, surface water, groundwater, and air. Findings indicated that contamination from prior disposal practices at Areas A and B has affected the aforementioned media to various degrees. During the FS, remedial alternatives were developed to address VOC contaminants in subsurface soil and groundwater and inorganic contaminants in surface water and sediment in Areas A and B.
Soil and Debris Removal Action at Site 1 Area B (OHM, 1995), AR # 000582	An NTCRA was implemented at Area B in May 1994 and completed in January 1995 to remove the primary source areas of contamination. Approximately 11,500 tons of waste were removed, and the final SI occurred February 16, 1995.
DD (Baker, 1995a), AR # 000599	Signed in July 1995, the DD required localized treatment of soil and groundwater using DPVE system and a groundwater extraction and treatment system to remediate groundwater underlying Areas A, B, and CASY. Continuous operation of the groundwater extraction and treatment system began in November 1998 and includes extraction wells installed in Area A (for Yorktown aquifer groundwater in the western part of the area and for Columbia aquifer groundwater in the northern part of the area) and in Area B (for both Columbia and Yorktown aquifer groundwater). The DPVE system was installed and began operation in May 1998 to address a known hotspot in Area A. The extracted groundwater was pumped into a groundwater treatment system. Based on the evaluation of 2008 LTM data, the DPVE system was turned off (but maintained in an operable condition) in 2008 because there were no signs of contaminant migration in groundwater downgradient of the waste material.
Ecological Risk Assessment (CH2M, 2006b), AR # 001594	Sediment in Bousch Creek that was considered to be associated with Site 1 was determined to potentially pose ecological risk.
2007 Area B Delineation Investigations (CH2M, 2008e ^a)	In 2007, additional soil and groundwater sampling were completed in the vicinity of Area B to delineate VOC contamination around monitoring wells B-MW3A and B-MW11A. Results indicated that natural attenuation appeared to be occurring at the site; however, the rate of degradation could not be estimated because of interference with the pump-and-treat system. As a result, it was recommended that pumping from extraction wells in this vicinity be discontinued for a period of 2 to 3 years while semiannual monitoring was completed to demonstrate whether natural attenuation is occurring (CH2M, 2008e).
EECA and AM (CH2M, 2007b), AR # 001594	In the EE/CA, the proposed NTCRA for Site 1 was evaluated. The supporting AM was approved as the DD for the NTCRA in October 2007, and construction activities were completed in 2008.
Construction Closeout Report (AGVIQ and CH2M, 2008c ^a)	A sediment removal action was completed to remove sediment within the upper reaches of Bousch Creek that posed an unacceptable ecological risk.
PP and ROD (Navy, 2010a), AR # 000268	The PP and ROD reaffirmed remedial actions and LUCs for Areas A and B and CASY previously documented in the DD.
2012 Area B Delineation Investigations (CH2M, 2012 ^a)	Additional investigation of Area B was completed in 2012 to determine whether contamination in the area of B-MW16 was migrating toward Navy residential housing to the southwest. Groundwater results indicated that concentrations of chlorinated VOCs exceeded the MCL at multiple locations in the vicinity of the housing area. Additional investigation was recommended to delineate the full extent of contamination in groundwater.
LTM Reports (CH2M, 2013a ^a , 2014a ^a , 2015, 2016 ^a , 2018, 2019a, 2020a), AR # 002752, 002726, 002913, 002881	The 2014 LTM Report identified PFAS in several monitoring wells. However, the extent of PFAS constituents has not been delineated, and the data have not been evaluated to determine whether the PFAS levels render them COCs. The 2018 LTM Report found COCs in groundwater above respective cleanup goals in Upper Columbia aquifer monitoring wells in Area B, Lower Columbia aquifer monitoring wells in Area A and B, and Yorktown aquifer monitoring wells in Area A and B. The report recommended additional investigation to refine the conceptual site model and to evaluate additional remedial options to expedite the reduction of COC concentrations to cleanup goals. Plume boundaries based on data collected during the 2021 LTM event are depicted on Figure 2-1 (CH2M, forthcoming).

Table 2-1. Summary of Relevant Documents and Milestones for Site 1

Document Title/Milestone	Summary
Time-Critical Removal Action (APTIM, 2017 ^a)	The Camp Allen Elementary School, which is located within the LUC area, was demolished and reconstructed in 2018 at the location shown on Figure 2-1 . A buried eight-gallon drum of oil containing polychlorinated biphenyls (PCBs) was uncovered during reconstruction activities. As a result, a time-critical removal action (TCRA) was completed in 2017 to prevent exposure to the assumed potential unacceptable risks to human health from exposure to site contaminated soil and/or buried drums/debris during continued school construction. The location of the TCRA is shown on Figure 2-1 .
Clean Water Lens Investigation	A vapor mitigation system was incorporated into the expansion of the school as a precautionary measure to prevent the potential for future VI from groundwater site-related VOC COCs. The VI mitigation system includes an engineered barrier system as well as a passive subslab venting system constructed with the infrastructure to allow for easy conversion to an active, fan-driven system, if required.
Five-Year Reviews (CH2M, 2019b), AR # 002748	The Fourth Five-Year Review confirmed that the remedy in place is protective in the short term; however, to ensure the remedy is protective in the long term, a Remedial Action Optimization (RAO) investigation was recommended to contain the COC plumes within the site and to remediate potential source areas to effectively reduce the COC concentrations within a reasonable timeframe.
Groundwater Flow Modeling and Capture Analysis (CH2M, 2021c), AR # 002970	A three-dimensional numerical flow model has been developed to estimate hydraulic capture zones associated with on-site groundwater extraction wells in 2019. The hydraulic capture zones calculated by the groundwater flow models for both the Columbia and the Yorktown aquifers generally resemble those generated from the previous modeling efforts with slightly reduced combined capture zones for both aquifers, reflecting the slightly reduced total extraction rates as compared to 2018. A more robust model calibration effort is warranted after site wells are re-surveyed. The extraction system should be rehabilitated to restore pumping rates at the site and improve overall performance. As a part of the RAO, the groundwater extraction model should be used to determine whether increased flow rates of the extraction wells can effectively contain the groundwater contamination plumes.
Basewide PFAS PA (CH2M, 2022a ^a)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 1 (as a grouping with Site 22) was identified as a potential PFAS release area. The PA recommended further evaluation of Site 1 (as a grouping with Site 22).
Environmental Justice Pilot Project (USEPA, 2023)	The EPA completed an Environmental Justice pilot project to develop a process and methods to promote the consistent and systematic application of environmental justice considerations at federal facility NPL sites. NSN participated in the pilot project and Site 1 was selected as the focus of the pilot project for NSN. The report documented potentially vulnerable communities near the site, developed questions to guide community engagement, and reviewed strategies to engage the surrounding communities during forthcoming environmental investigations at Site 1.

^aThis document is not uploaded to the AR.

AFFF = aqueous film-forming foam

AM = Action Memorandum

AR =Administrative Record

DD = Decision Document

DPT = direct-push technology

DPVE = dual-phase vacuum extraction

EE/CA = Engineering Evaluation/Cost Analysis

FS = feasibility study

GAC = granular activated carbon

LUC = land use control

MCL = maximum contaminant level

NTCRA = non-time-critical removal action

PCB = polychlorinated biphenyl

RAO = Remedial Action Optimization

RSL = regional screening level

TCRA = time-critical removal action

VI = vapor intrusion

Site 1 COCs

Identified COCs for each medium at Site 1 are summarized in **Table 2-2**.

Table 2-2. Summary of Constituents of Concern at Site 1

Medium	Potential Risk	COC
Groundwater	Human Health	1,2-DCA, PCE, TCE, cis-1,2-DCE, vinyl chloride, benzene, ethylbenzene, toluene, xylene, 1,1,1-TCA
Soil	Human Health	Arsenic, cadmium, manganese
Surface Water	Ecological Risk	PCBs
Sediment	Ecological Risk	PCBs, arsenic, cadmium, metals
Indoor Air	None Identified	

DCA = dichloroethane

DCE = dichloroethene

PCB = polychlorinated biphenyl

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

Current and Future Activities

A RAO investigation is ongoing to accomplish the following: (1) further delineate the extent of the COC plumes, (2) assess the extent of dioxin/furans recently identified within the groundwater, and (3) evaluate remedial alternatives to expedite the reduction of COCs detected in the groundwater. The fieldwork for this investigation was initiated in June 2020 and is expected to continue through FY 2023 with the inclusion of a soil-groundwater equilibrium assessment and additional sampling east of the elementary school to refine the extent of the groundwater plume. The RAO Report will summarize the results of the RAO investigation and soil-groundwater equilibrium assessment and is expected to be finalized in the first quarter of FY 2024.

As a result of groundwater data collected during the RAO investigation, evaluation of the vapor intrusion (VI) pathway at the Camp Allen Elementary School will be conducted during FY 2023 through FY 2024. The results of the evaluation will be documented in a technical memorandum expected to be finalized in the second quarter of FY 2024. Results from the RAO and VI investigations will be included in an evaluation of the VI pathway at Site 1. The comprehensive VI evaluation is expected to begin in FY 2025.

In addition to the RAO investigation, a TreeWell pilot study is planned to be implemented at Site 1 to evaluate whether phytoremediation technology can be implemented to improve hydraulic capture of the shallow groundwater southwest of the Camp Allen Elementary School. The pilot study, which begins with a technology assessment and data gap investigation, is expected to begin in FY 2024. If the technology assessment indicates that the alternative could be successful, implementation of the pilot project could begin in FY 2025, and performance monitoring would be completed through FY 2029.

As a part of the ongoing LTM at Site 1, all Site 1 monitoring wells will be surveyed in FY 2023 and the groundwater flow model will be recalibrated with the new monitoring well information. This groundwater model update is expected to occur in FY 2025. The most recent round of LTM sampling was completed in the first quarter of FY 2022. The 2021 LTM Report is scheduled to be submitted for regulatory review in FY 2023. The next LTM sampling event is scheduled for the first quarter of FY 2024 and will continue on a biennial basis (**Schedule 2-1**). Site 1 is inspected quarterly to verify the effectiveness of the LUCs, and vegetation in the landfill footprint (Area A) is maintained semiannually.

Planning for the PFAS Remedy Optimization Investigation at Site 1 (as a grouping with Site 22) is expected to begin in the fourth quarter of FY 2023, and will be followed by the field investigation in FY 2024.

In coordination with the Navy, the Virginia Department of Transportation (VDOT) is currently evaluating the feasibility of a new interchange on Interstate 564, north of Site 1; roads from the interchange would be constructed over Site 1 Area A and would connect Interstate 564 to Ingersol Avenue. The feasibility evaluation includes a geotechnical investigation, which was completed in the summer of 2022, and will be followed by completion of the preliminary design, public hearings, and design approval. Construction activities are tentatively planned for the summer of 2025. Similar to previous construction activities occurring at Site 1, the Navy will coordinate planned activities with the Team to ensure the protection of human health and the environment.

The Fifth Five-Year Review will be finalized during the second quarter of FY 2024 (**Schedule 2-1**).

Schedule 2-2 presents the FY 2024 through FY 2028 schedule for Site 1. As determined appropriate by the Team, community engagement activities, summarized in the Environmental Justice Pilot Project report (USEPA, 2023), may be implemented in conjunction with the investigation activities included in **Schedule 2-2**.

2.1.2 Site 2 (OU2)—Naval Magazine Slag Pile

Site 2 Summary

Status:	Remedy in Place
Current IR Activities:	LTM
Media Investigated:	Groundwater, soil, surface water, sediment
Removal and Remedial Actions:	Sediment removal action completed in FY 1999 Asphalt and soil cover completed in FY 2000, LTM, LUCs
Media Closed:	Soil, surface water, sediment
Waste and Debris Present Onsite:	Buried debris present onsite

Site Description and History

The Naval Magazine Slag Pile (**Figure 2-2**) is a 1-acre disposal area for slag generated by an aluminum smelting operation during the 1950s and 1960s. The slag is a residual cindery material formed from the fusion of flux materials, such as limestone, with impurities from the aluminum ore and ash from the blast furnace fuel. In order to create a level surface upon which the slag could be deposited, fly ash and bottom ash (derived from coal burning operations elsewhere at NSN) was used as fill material at the site. During the smelting operation, the slag pile area was defined by a lack of vegetation around the site near the slag pile. The site surface has since been regraded and vegetation planted. Prior to remediation activities, the surface of the site consisted of a gravel parking lot and an open grassy field.

Table 2-3 provides a list of relevant documents and past activities for Site 2.

Table 2-3. Summary of Relevant Documents and Milestones for Site 2

Document Title/Milestone	Summary
Initial Assessment Study (ESE, 1983), AR # 000818	The potential for site contamination from metals, including chromium, cadmium, and zinc, was identified in the 1983 IAS.
RI (Malcolm Pirnie, 1988), AR # 000102	Trace amounts of inorganics were detected in surface soil, surface water, and sediment samples taken during the 1988 RI. However, the samples were taken after site regrading and placement of gravel surfacing. Because these activities disturbed the surface soil, the analytical results may not be representative of potential subsurface contamination at the site.
RI and FS (CH2M, 1998a, 1998c), AR # 001054, 001221, 001053, 000894	During the 1998 RI conducted at the site, it was concluded that the disposal activities had affected the groundwater and soil at the site, as well as sediment and surface water in the adjacent drainage channel. In correlation with the type of material disposed at the site, the primary contaminants consisted of metals, including arsenic, antimony, cadmium, chromium, copper, iron, lead, nickel, silver, and zinc. However, significant concentrations of organic chemicals (4,4'-dichlorodiphenyldichloroethene and TCE) were also detected. Sediment and surface soil sampling were conducted in February 1998 to delineate the contamination limits for a sediment removal action.
Proposed Remedial Action Design (CH2M, 1999), AR # 000626	The final remedial design for the sediment removal program was submitted, and approximately 2,000 yd ³ of sediment were removed in November 1999.

Table 2-3. Summary of Relevant Documents and Milestones for Site 2

Document Title/Milestone	Summary
ROD (CH2M, 2000), AR # 000773	<p>The final ROD was completed in December 2000. In February 2000, an asphalt and soil cover remedy were placed over the site.</p> <p>The ROD called for the collection of sediment, surface water, and groundwater samples for Target Analyte List metals analysis. The first five rounds of sampling were completed annually from 2000 to 2004. In 2004, statistical analysis results indicated that the concentrations of site risk drivers^a were decreasing in groundwater. In addition, the concentrations of site risk drivers in the surface water and sediment demonstrated little change since the remedial actions at the site. Therefore, based on the ROD, it was recommended that the LTM groundwater sampling be reduced to a frequency of once every 5 years, and sediment and surface water LTM sampling be discontinued.</p>
LTM Reports (CH2M, 2008f, 2014a ^b , 2018), AR # 002155, 002726	<p>In preparation for the Second Five-Year Review (CH2M, 2008d), sediment samples collected during the 2007 LTM event were analyzed for lead. The results indicated that concentrations were below the established cleanup goal, and no further sediment sampling was required following this event. Site 2 wells were sampled and analyzed for total and dissolved inorganics during the 2012 LTM event, and thallium and arsenic were detected at concentrations above their respective MCLs. The 2016 LTM event included the sampling of five Site 2 monitoring wells for total and dissolved metals. Although exit strategies for LTM at Site 2 were evaluated in 2018, the NSN Team decided to continue with the existing 5-year LTM plan because of contaminated soils remaining in place and the MCL exceedances for thallium and arsenic.</p>
Five-Year Reviews (CH2M, 2019b), AR # 002748	<p>The Fourth Five-Year Review confirmed that the remedy is protective of human health and the environment; however, as long as contaminated soils remain in place, groundwater monitoring will continue every 5 years to ensure the remedy is protective over the long term.</p>
Basewide PFAS PA (CH2M, 2022a ^b)	<p>The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 2 was not identified as a potential PFAS release area. The PA recommended no further investigation at Site 2; however, if additional information becomes available, Site 2 may be re-evaluated.</p>

^a The ROD did not identify COCs. Total and dissolved metals are risk drivers at Site 2.

^b This document is not uploaded to the AR.

yd³ = cubic yard

Site 2 COCs

Identified COCs for each medium at Site 2 are summarized in **Table 2-4**.

Table 2-4. Summary of Constituents of Concern at Site 2

Medium	Potential Risk	COC
Groundwater	Human Health	Total and dissolved metals ^a
Soil	Human Health	Aluminum, antimony, arsenic, cadmium, chromium, copper, iron, lead, nickel
Surface Water	Ecological	Aluminum, cadmium, copper, iron, lead, silver, zinc
Sediment	Ecological	Aluminum, silver, antimony, arsenic, barium, beryllium, cadmium, cobalt, copper, chromium, iron, lead, nickel, selenium, thallium, vanadium, zinc

^a The ROD did not identify COCs. Total and dissolved metals are risk drivers at Site 2.

Current and Future Activities

Quarterly site inspections are conducted to confirm that LUCs are being implemented. LTM of groundwater is conducted every 5 years to assess the trends in COC concentrations over time. The most recent LTM sampling was completed in the first quarter of FY 2022 in support of the Fifth Five-Year Review (CH2M, 2023). The 2021 LTM

Report is scheduled to be submitted for regulatory review in FY 2023. The next LTM monitoring event is scheduled to be completed in the first quarter of FY 2027.

The Fifth Five-Year Review will be finalized during the second quarter of FY 2024 (**Schedule 2-1**). As a result of the data evaluation in the Fifth Five-Year Review, in order to ensure long-term protectiveness, the residential risk exposure pathway will be evaluated. The risk evaluation is expected to begin in the first quarter of FY 2026.

Schedule 2-3 presents the FY 2024 through FY 2028 schedule for Site 2.

2.1.3 Site 3 (OU3)—Q-Area Drum Storage Yard

Site 3 Summary

Status:	Remedy in place
Current IR Activities:	LTM
Media Investigated:	Groundwater, soil
Removal and Remedial Actions:	Pre-NPL soil removal in 1987 AS/SVE discontinued in FY 2013
Media Closed:	N/A
Waste and Debris Present Onsite:	N/A

AS = air sparge

SVE = soil vapor extraction

Site Description and History

The Q-Area Drum Storage Yard (**Figure 2-3**) was previously a compound that occupied approximately 5 acres in the northwestern corner of the NSN near the carrier piers. This area of NSN was created by dredging operations in the early 1950s as the Base expanded. The Q-Area Drum Storage Yard was an open earthen yard that was used from the 1950s until the late 1980s to store tens of thousands of drums. Most of the drums contained new petroleum products, various chlorinated organic solvents, paint thinners, and pesticides. Previous investigations showed dark stains on the soil and oil-saturated soil throughout the storage yard, indicating past spills. The northern portion of the yard, which was used to store leaking or damaged drums and hazardous materials, was particularly stained.

Table 2-5 provides a list of relevant documents and past activities for Site 3.

Table 2-5. Summary of Relevant Documents and Milestones for Site 3

Document Title/ Milestone	Summary
Pre-NPL Soil Removal	In 1986, Navy fire inspectors expressed concern with the oil-saturated soils at the northern end of the storage area. On the basis of a potential fire hazard, the top 6 inches of soil were excavated from an area of 4,240 square yards (totaling approximately 750 yd ³ of soil removed) in the northern section and disposed of offsite in 1987. Following the removal action, this area of the storage yard was paved. The removal action was documented in the subsequent RI (ESE, 1996a).
RI and FS (ESE, 1996a), AR # 001108	The RI/FS for this site revealed that the soil was contaminated with petroleum hydrocarbons, VOCs, and pesticides. In addition, VOC contamination was found in the groundwater beneath the site and outside the site boundary. The shallow groundwater beneath the hazardous materials area and the northern portion of the petroleum products area was affected the most. Some low VOC levels were also detected in the deep (Yorktown aquifer) wells, which may have resulted from the lack of a confining layer between the two aquifers (Surficial/Columbia and Yorktown) in this area. The general extent of the groundwater plume was estimated to affect approximately 29 acres beneath the fleet parking area west of the site. The Q-Area Drum Storage Yard was subdivided into AOC 1 and AOC 2 to reflect that the yard contained two areas of high VOC concentrations.
DD (ESE, 1996b), AR # 000934	The DD for the site was signed in November 1996 and called for remediation by AS/SVE. A pilot treatability study was performed prior to the system being constructed. Several monitoring wells were sampled for VOCs in 1998 to provide baseline water quality data before the remediation system was started. The remediation system began operation in August 1998.

Table 2-5. Summary of Relevant Documents and Milestones for Site 3

Document Title/ Milestone	Summary
AOC 1 Closeout Strategy Agreement	In July 2002, the Team agreed to a closeout strategy for AOC 1, including the accelerated remediation proximal to CMW-101 to address high concentrations of VC, followed by continued monitoring, and ultimately the shutdown and dismantling of the system. The accelerated remediation was accomplished by installation of a new AS well proximal to well CMW-101. The closeout strategy was implemented on April 4, 2003, when the new AS well began operation. Following the installation of the new AS well, concentrations of VC in well CMW-101 decreased to below the detection limit in February 2005. Subsequent monitoring events indicated relatively low VC concentrations that exceeded the cleanup goal (0.08 micrograms per liter), so the 2002 closeout strategy was suspended.
AOC 2 Closeout Strategy	A closeout strategy for AOC 2 was implemented in June 2006 with the installation of an additional AS well proximal to CMW-202 to treat TCE and VC. However, LTM data indicated that VOC concentrations continued to exceed the cleanup goals.
PP and ROD (Navy, 2010a), AR # 000268	The remedy selected by the 1996 DD (ESE, 1996b) was reaffirmed by the PP and ROD for Sites 1, 3, 18, and 20, which was signed in September 2010. The groundwater cleanup goals, based on the risk-based values presented in the DD (ESE, 1996b) (based on the most likely exposure scenarios), continued to serve as the cleanup goals because the risk-based goals were more protective than the respective MCLs.
LTM Reports (CH2M, 2014a ^b , 2015, 2018, 2019a, 2020a, 2021d, 2022b), AR # 002752, 002726, 002913, 002881, 002941, 002988	In addition to the site COCs, groundwater samples have been analyzed for 1,4-dioxane since the 2013 LTM event per the 2014 Five-Year Review recommendations (CH2M, 2014b). The preliminary remediation goal for 1,4-dioxane was calculated in the human health risk assessment presented in the 2013 LTM Report (CH2M, 2014a). The 2018 LTM Report indicated that COC concentrations exceeded their cleanup goals in seven monitoring wells; however, the concentrations were relatively low and mostly within an order of magnitude of the cleanup goals. The 2019 ^a LTM Report indicated that COC concentrations exceeded their cleanup goals in nine monitoring wells. The 2020 LTM Report indicated that COC concentrations exceeded their cleanup goals in eight monitoring wells. The 2020 LTM Report identified two separate COC plumes onsite (CH2M, 2022b). Despite increasing TCE and VC concentrations at several of the monitoring wells since the AS system was shut down, the remedial action objective of minimizing the threat of potential human receptor (site worker and resident) exposure to contaminated groundwater through inhalation of VOCs in future buildings is still being achieved via the LUCs and LTM. 1,4-dioxane was previously monitored with site COCs during LTM events. Concentrations have remained below the preliminary remediation goal for eight consecutive rounds. 1,4-dioxane has subsequently been removed from the Site 3 LTM program based on Team agreement. Plume boundaries based on data collected during the 2021 LTM event are depicted on Figure 2-3 (CH2M, forthcoming).
Five-Year Reviews (CH2M, 2019b), AR # 002748	Based on Team discussion of the groundwater data collected in 2012, the systems at AOC 1 and AOC 2 were shut down in June 2013 while annual LTM continues to assess remedy effectiveness and identify opportunities for future optimization. The Fourth Five-Year Review concluded that the remedy implemented at Site 3 is protective of human health and the environment (CH2M, 2019b). The following actions will continue at the site: (1) quarterly site inspections will be conducted to confirm implementation of the LUCs, and (2) LTM of groundwater will be conducted every year to assess the trends in COC concentrations.
Basewide PFAS PA (CH2M, 2022a ^b)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 3 was identified as a potential PFAS release area based on historical disposal practices known to have occurred at the site and detections of PFOA and PFOS above the RSLs in a composite purge water sample collected for waste characterization and disposal purposes. The PA recommended further evaluation of Site 3 during the Basewide PFAS SI.

^a Because of schedule delays, the 2019 LTM event was completed in February 2020 and the report was finalized in August 2021.

^b This document is not uploaded to the AR.

PFOA = perfluorooctanoic acid

PFOS = perfluorooctanesulfonic acid

Site 3 COCs

Identified COCs for each medium at Site 3 are summarized in **Table 2-6**.

Table 2-6. Summary of Constituents of Concern at Site 3

Medium	Potential Risk	COC
Groundwater	Human Health	1,1-DCE, PCE, TCE, VC, carbon tetrachloride, chloroform
Soil	Human Health	N/A

Current and Future Activities

The 2021 LTM Report is scheduled to be submitted for regulatory review in FY 2023. The most recent round of LTM sampling was completed in the first quarter of FY 2023 and will continue on an annual basis. Site inspections will be conducted quarterly at Site 3 to confirm that LUCs are being implemented.

The Fifth Five-Year Review will be finalized during the second quarter of FY 2024 (**Schedule 2-1**). As a result of the data evaluation in the Fifth Five-Year Review, the VI exposure pathway will be evaluated. The risk evaluation is expected to begin in the first quarter of FY 2026. In addition, a ROD Amendment is anticipated to follow the VI evaluation to incorporate any recommendations resulting from the VI evaluation and/or modify the cleanup goals of existing COCs.

Further investigation of PFAS at Site 3 during the PFAS SI was completed in the fourth quarter of FY 2022. The PFAS SI Report is expected to be finalized in the first quarter of FY 2024 (**Schedule 2-1**).

Schedule 2-4 presents the FY 2024-2028 schedule for Site 3.

2.1.4 Site 6 (OU1 for Sediment and OU2 for Soil, Surface Water, and Groundwater)—Construction Debris Landfill

Site 6 Summary

Status:	Remedy in place
Current IR Activities:	LTM
Media Investigated:	Groundwater, soil, surface water, sediment
Removal and Remedial Actions:	Sediment removal action, synthetic cap, LTM, LUCs
Media Closed:	N/A
Waste and Debris Present Onsite:	Buried debris present onsite

Site Description and History

The CD Landfill (**Figure 2-4**) occupies approximately 22 acres and is located just east of Hampton Boulevard and south of the Naval Exchange. The site incorporates two areas of landfilling operations: the easternmost (unpermitted) section and the western (permitted) section. The unpermitted portion of the landfill operated from 1974 to 1979, and was used for demolition debris and inert solid waste, fly ash, and incinerator residue.

In October 1979, NAVFAC received a permit from the Virginia Department of Health to use the landfill (western portion) for disposal of demolition debris and other non-putrescible wastes, excluding fly ash, incinerator residues, chemicals, and asbestos. Blasting grit used for sandblasting cadmium-plated aircraft parts was deposited at the landfill until 1981, when the blasting grit was tested and found to exceed the USEPA extraction procedure toxicity limit for cadmium. The grit was classified as a hazardous waste, and on-site disposal of the material ceased. Landfilling operations continued in the western portion of the site until 1987. At the time the landfill permit was granted, a portion of the southeastern corner of the site was regraded to allow for runway expansion at the Naval Air Station. The design of the runway expansion specified that excess material was to be spread over the landfill and not removed from the site.

In 1993, Seabee Road was constructed over the site and opened to the public. Construction plans required only the addition of fill material; no cutting or grading into the existing landfill occurred. Most of the existing debris mounds situated in the north-central portion of the landfill were leveled and spread around the site to reduce the amount of standing water that accumulated after rain events.

Table 2-7 provides a list of relevant documents and past activities for Site 6.

Table 2-7. Summary of Relevant Documents and Milestones for Site 6

Document Title/Milestone	Summary
RI/Baseline Risk Assessment (Baker, 1995b), AR # 000578	The RI was completed in three separate rounds of sampling. Soil, sediment, groundwater, and surface water samples were collected. The results of the RI/Baseline Risk Assessment were used to prepare the FS (Baker, 1996b).
FS (Baker, 1996b), AR # 001073	The FS was prepared in July 1996 to address contaminated media at the CD Landfill site. Potential risks associated with contaminants in the soil, sediments, groundwater, and surface water were identified, and these guided the development and evaluation of the media-specific remedial action alternatives. In addition to the FS, a separate geostatistical analysis was performed to evaluate and better define the areas of sediment contamination.

Table 2-7. Summary of Relevant Documents and Milestones for Site 6

Document Title/Milestone	Summary
DD (Baker, 1996c), AR # 001074	A 1996 DD for the contaminated sediments (designated as OU1) at the CD Landfill outlined a removal action for sediments that exceeded the Effects Range–Median levels. Removal of heavy metal- and pesticide-contaminated sediments was partially completed in fall 1997 but was postponed during the winter because of inclement weather. When the OU2 (soil and groundwater) landfill cap was designed, the cap was extended to cover the remaining contaminated sediments so no further removal would be required. In June 1997, the Team agreed to an additional sampling event to characterize the fill material and determine closure requirements. A statistical sampling approach was developed to determine within a specified confidence interval whether the fill material would be classified as hazardous. All of the samples collected and analyzed during the June event were below the regulatory standards. Based on the statistical findings, the fill material at the CD Landfill was not considered a hazardous waste and it was agreed that the site would be closed under Virginia Solid Waste Management Regulations.
PRAP (Baker, 1998a), AR # 001079	The PRAP identified the preferred alternative, a synthetic flexible liner-capping system with groundwater monitoring and institutional controls, for the CD Landfill.
ROD (Baker, 1998b), AR # 001056	The final ROD was issued on September 28, 1998. The construction of the landfill cap was completed in December 1999.
Post-closure Monitoring Report (AGVIQ and CH2M, 2004 ^a)	As a requirement of Virginia Solid Waste Management Regulations (Part D of 9 Virginia Administrative Code 20-80-270), the CD Landfill was part of the NSN LTM program for the first 4 years of monitoring as discussed in the 2003 Post-closure Monitoring Report (AGVIQ and CH2M, 2004) and in the 2004 First Determination Report for Site 6 (CH2M, 2004a).
LTM Reports (CH2M, 2006a, 2018), AR # 002748, 002726	<p>Following the post-closure monitoring, LTM was initiated in 2005.</p> <p>The LTM network includes eight monitoring wells, which are sampled every 5 years for site COCs. If COCs are detected at concentrations exceeding the MCLs or risk-based alternate concentration limits, or if COC concentrations have increased, then the NSN Team will determine the appropriate action and modify the existing remedy if, warranted.</p> <p>In May 2013, the VDEQ Landfill Permit was revoked and the NSN Team agreed that any subsequent oversight, including the LTM program, would be conducted under the CERCLA program by the NSN Team.</p> <p>The 2016 LTM event data showed that only one of the groundwater samples contained a COC (arsenic) at concentrations above the MCL (CH2M, 2018). However, the arsenic concentration was lower than the concentration previously detected at the same location in 2007. In addition, there were no other exceedances of the MCLs. As a result, no modifications to the remedy or the LTM program were recommended.</p>
HHRA (CH2M, 2013b ^a)	An HHRA was conducted using the data collected from 2007 and 2011 to evaluate any changes in the contaminants driving risk in groundwater as established in the 1994 RI/HHRA, to determine whether contaminants detected in groundwater warranted further evaluation. The report concluded that potential contact with groundwater by future adult and child residents may result in reasonable maximum exposure and central tendency exposure noncarcinogenic hazards and carcinogenic risks above USEPA's acceptable risk range. Groundwater elevations indicated groundwater flow to the east at the site.
Five-Year Reviews (CH2M, 2019b), AR # 002748	The Fourth Five-Year Review concluded that the remedy implemented at Site 6 is protective of human health and the environment. The following actions will continue at the site: (1) quarterly site inspections will be conducted to confirm implementation of the LUCs, and (2) LTM of groundwater will be conducted every 5 years to assess the trends in COC concentrations.
Basewide PFAS PA (CH2M, 2022a ^a)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 6 was not identified as a potential PFAS release area. The PA recommended no further investigation at Site 6; however, if additional information becomes available, Site 6 may be re-evaluated.

^a This document is not uploaded to the AR.

CD = Construction Debris

OU = operable unit

PRAP = Proposed Remedial Action Plan

Site 6 COCs

Identified COCs for each medium at Site 6 are summarized in **Table 2-8**.

Table 2-8. Summary of Constituents of Concern at Site 6

Medium	Potential Risk	COC
Groundwater	Human Health	PCBs, arsenic, antimony, beryllium, chlorobenzene
Soil	Human Health	Arsenic, beryllium, lead, manganese, antimony, cadmium, chromium, copper, nickel, vanadium, zinc
Surface Water	Ecological	Dieldrin, 4,4-dichlorodiphenyldichloroethane, cobalt, copper, iron, manganese, nickel
Sediment	Ecological	Semivolatile organic compounds, 4,4-dichlorodiphenyltrichloroethane, PCBs, arsenic, cadmium, chromium, copper, lead, nickel, mercury, zinc

Current and Future Activities

The most recent LTM sampling event was completed in the first quarter of FY 2022 in support of the Fifth Five-Year Review (CH2M, 2023). The 2021 LTM Report is scheduled to be submitted for regulatory review in FY 2023. The next LTM monitoring event is scheduled to be completed in the first quarter of FY 2027 (**Schedule 2-1**). Site inspections will be conducted quarterly at Site 6 to confirm that LUCs are being implemented. Vegetation at Site 6 is maintained semiannually.

The Fifth Five-Year Review will be finalized during the second quarter of FY 2024 (**Schedule 2-1**).

2.1.5 Site 18 (OU14)—Former Naval Magazine Waste Storage Area

Site 18 Summary

Status:	Remedy in place
Current IR Activities:	LTM
Media Investigated:	Groundwater, soil, surface water, sediment
Removal and Remedial Actions:	Emulsified oil/zero-valent iron injections
Media Closed:	Soil, sediment
Waste and Debris Present Onsite:	Buried debris present onsite

Site Description and History

The former Naval Magazine Waste Storage Area (**Figure 2-5**) is located in the southeastern corner of NSN and was used from 1975 to 1979 to store drums of hazardous waste, consisting of waste oil, metal-plating solutions and sludges, chlorinated organic acids (including TCE and 1,1,1-trichloroethane), and paint-stripping solutions. Spillage of waste oil and hazardous wastes occurred in this area. A pit was excavated, and an existing drainage ditch was widened and lengthened to channel waste oil and contaminated runoff into an unlined pit. Oil and contaminated water were periodically pumped from the pit and transported to a wastewater treatment plant.

Table 2-9 provides a list of relevant documents and past activities for Site 18.

Table 2-9. Summary of Relevant Documents and Milestones for Site 18

Document Title/Milestone	Summary
SI Report (CH2M, 2002), AR # 000938	Additional investigation was recommended for soil to delineate the extent of VOC impacts, evaluate current site conditions, and perform an HHRA. Additional investigation was recommended for surface water and sediment in the creek north of the site to evaluate the groundwater to surface water/ sediment pathway. Additional groundwater sampling was recommended to evaluate migration of contaminants to the Yorktown-Eastover aquifer and evaluate natural attenuation of contaminants in groundwater.
Expanded SI (CH2M, 2004b), AR # 001159	The Final Expanded SI Report for Site 18 concluded that soil and sediment were no longer to be considered media of concern, and investigations were focused on VOCs in groundwater. Based on the analytical data and a preliminary monitored natural attenuation evaluation, it was determined that there was evidence of biodegradation of TCE at Site 18.
EE/CA Memorandum (CH2M, 2008a, 2008c), AR # 001765, 001782	An EE/CA was finalized in March 2008, detailing an interim groundwater remedial action focused on a VOC hotspot. In April 2008, an AM recommended the implementation of enhanced reductive dechlorination to mitigate the potential human health risk. An interim remedial action of amendment injections in the area of the MW03 cluster, and extending to MW10, was completed in July 2008 in accordance with the work plan (AGVIQ and CH2M, 2008b).
Performance Monitoring Report (AGVIQ and CH2M, 2009), AR # 000038	Quarterly performance monitoring of VOCs in groundwater was initiated in October 2008 and was completed July 2009. A Performance Monitoring Report documenting the effectiveness of the NTCRA was completed in December 2009. The report recommended an additional amendment injection to encourage further reduction of VOCs in groundwater.
AM Addendum (CH2M, 2010a), AR # 000176	In May 2010, an additional DPT injection was implemented in accordance with an Addendum to the 2008 AM. Performance monitoring was conducted through March 2013 to evaluate the effectiveness of the injection. Groundwater monitoring demonstrated that the VOCs in groundwater were reduced by more than 90 percent.
ROD (Navy, 2010a), AR # 000268	Site 18 is included in the NSN ROD for Sites 1, 3, 18, and 20, which was signed in September 2010. The selected remedy documented by the ROD was continued enhanced bioremediation with groundwater monitoring and LUCs. It was anticipated that additional injections may be necessary if cleanup goals were not met in a reasonable timeframe, in accordance with the ROD.

Table 2-9. Summary of Relevant Documents and Milestones for Site 18

Document Title/Milestone	Summary
Five-Year Reviews (CH2M, 2019b), AR # 002748	The Fourth Five-Year Review concluded that the remedy in place at Site 18 is currently protective of human health and the environment in the short term due to the potential presence of PFAS.
LTM Report (CH2M, 2021d, 2022b), AR # 002941, 002988	The 2019 and 2020 LTM Reports concluded that overall COC concentrations have decreased by more than 95% since the NTCRA. Concentrations of VC in groundwater fluctuate above and below the cleanup goal at NBS18-MW03S and NBS18-MW10S. During the 2020 LTM event, concentrations of VC were above the cleanup goal at NBS18-MW03S and below the cleanup goal at NBS18-MW10S. The TCE concentration at NBS18-MW10S was above the cleanup goal in 2020 after it was below the cleanup goal during the 2019 LTM event. This fluctuation is consistent with historical trend data. The natural attenuation indicator parameters suggest conditions are generally mildly reducing in the historical hot spot location, NBS18-MW03S; and while oxidation-reduction potential is somewhat neutral, other parameters indicate methanogenic conditions (on the reducing end of the reduction reaction sequence). The VC plume boundary, based on data collected during the 2021 LTM event, is depicted on Figure 2-5 (CH2M, 2023).
Basewide PFAS PA (CH2M, 2022a ^a)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 18 was identified as a potential PFAS release area based on detections of PFAS above the RSLs in a composite purge water sample collected for waste characterization and disposal purposes; the source of the PFAS may be attributed to documented disposal of unknown hazardous wastes and sludges. The PA did not identify evidence of AFFF or other PFAS-containing materials being used, released, or transferred at this location during document review and site visits; however, an unlined pit was present at the site during years of disposal operations and used to contain disposed liquids and sludge. The PA recommended further evaluation of Site 18 during the Basewide PFAS SI.

^a This document is not uploaded to the AR.

Site 18 COCs

Identified COCs for each medium at Site 18 are summarized in **Table 2-10**.

Table 2-10. Summary of Constituents of Concern at Site 18

Medium	Potential Risk	COC
Groundwater	Human Health	cis-1,2-DCE, 1,1-DCE, TCE, VC

Current and Future Activities

The 2021 LTM Report is scheduled to be submitted for regulatory review in FY 2023. The most recent round of LTM sampling was completed in the first quarter of FY 2023 and future LTM events will continue on an annual basis until cleanup goals are achieved (**Schedule 2-1**). Site inspections will be conducted quarterly at Site 18 to confirm that LUCs are being implemented.

Further investigation of PFAS at Site 18 during the PFAS SI was completed in the fourth quarter of FY 2022. The PFAS SI Report is expected to be finalized in the first quarter of FY 2024 (**Schedule 2-1**).

The Fifth Five-Year Review will be finalized by the second quarter of FY 2024 (**Schedule 2-1**). As a result of the data evaluation in the Fifth Five-Year Review, the VI exposure pathway will be evaluated. The risk evaluation is expected to begin in the first quarter of FY 2026.

Schedule 2-5 presents the FY 2024 through FY 2028 schedule for Site 18.

2.1.6 Site 20 (OU4)—Building LP-20

Site 20 Summary

Status:	Remedy in place
Current IR Activities:	RAO and LTM
Media Investigated:	Groundwater, soil, subslab vapor, indoor air
Removal and Remedial Actions:	AS/SVE
Media Closed:	N/A
Waste and Debris Present Onsite:	N/A

Site Description and History

Building LP-20 (**Figure 2-6**) is one of many large buildings located northwest of the Naval Air Station main runway. Currently, the building houses the Public Works Center Transportation Department. In the past, a portion of the building was used for aircraft engine overhaul and maintenance. Previous activities at the building included painting, facilities for x-ray work, cleaning and blasting, and a metal-plating operation. Waste products generated from these activities were conveyed to the industrial wastewater treatment plant via underground piping. In addition, a large fuel storage area (Fuel Farm) is located south of the building. An underground pipeline extends from the Fuel Farm to Buildings LP-78 and LP-176, located east of the site. Between the 1940s and 1990s, numerous spills or releases of wastewater and petroleum have been documented. Significant releases were associated with damage to underground wastewater lines during construction activities, and leakage of the underground petroleum pipeline.

Investigations at the site began in 1986 following a release of jet propulsion-5 fuel from the underground pipeline. Since 1986, numerous investigations have been conducted to evaluate the extent of releases from underground fuel pipelines, the industrial wastewater line, and various underground storage tanks at the site. These investigations determined that significant amounts of free product (petroleum) and chlorinated solvents were present.

Table 2-11 provides a list of relevant documents and past activities for Site 20.

Table 2-11. Summary of Relevant Documents and Milestones for Site 20

Document Title/Milestone	Summary
RI and FS (Baker, 1995c, 1996b), AR # 001304, 001218	The RI and FS summarizing the previous investigation data were completed in 1995 and 1996, respectively. The data generated during the RI indicated that VOCs were the primary COCs detected within groundwater in the area. Specifically, chlorinated VOCs were detected in the vicinity of Buildings LP-20 and LP-26. In addition, petroleum products were present within the groundwater east of Building LP-22 and south of Building LP-179. Vinyl chloride, 1,1- DCE, 1,2-DCE, 1,2-DCA, TCE, and benzene were detected in the shallow aquifer (Columbia). VC, 1,2-DCE, and TCE were also detected in the deep aquifer (Yorktown).
DD (Baker, 1996d), AR # 001161	The DD (Baker, 1996d) for Site 20 required that contamination at the site be treated to reduce the potential risk to human health and the environment. The goal of the remedial action was to treat the contaminant plume in the shallow aquifer using an AS/SVE system to prevent migration of the plume offsite and into the deep aquifer, and to reduce the contaminant concentrations to established cleanup goal levels. In addition, aquifer use restrictions (for both the shallow and deep aquifer) were mandated to prevent the groundwater from being used for either a potable or non-potable (industrial water) source.
LTM Plan (CH2M, 1998b ^a)	The treatment system began operating on April 14, 1998. The shallow aquifer AS/SVE system consisted of 31 AS wells and 21 SVE wells. The system was placed throughout the center and downgradient extent of the contaminant plume in accessible areas. In addition, several monitoring wells were sampled for VOCs in February 1998 to provide baseline water quality data before the remediation system was started.

Table 2-11. Summary of Relevant Documents and Milestones for Site 20

Document Title/Milestone	Summary
LTM Reports (CH2M, 2001 ^a ; AGVIQ and CH2M, 2005 ^a , 2007a ^a , 2007b ^a , 2008a ^a , 2011 ^a ; CH2M, 2013a ^a , 2014a ^a , 2015, 2016 ^a , 2018, 2019a, 2020a, 2021d, 2022b), AR # 002752, 002726, 002913, 002881, 002941, 002988	<p>The first round of LTM was performed in February 1999, after approximately 10 months of system operation, and annual LTM has continued since. Monitoring currently consists of annual sampling of shallow and deep monitoring wells to track the levels of contaminants at the site and to determine whether these constituents are migrating offsite or into the deep aquifer.</p> <p>Based on LTM data through 2013, the AS/SVE system was turned off (but maintained in an operable condition) in 2013, and LTM continued.</p> <p>The 2014 LTM Report identified PFAS in several monitoring wells. However, the extent of PFAS constituents has not been delineated, and the data have not been evaluated to determine whether the PFAS should be designated as COCs. The 2019 and 2020 LTM Reports indicated that groundwater samples from 10 of 18 wells screened in the shallow aquifer and 4 of 8 samples from the wells screened in the deep aquifer contained concentrations that exceeded the cleanup goals for one or more COCs (including 1,4-dioxane). Since active groundwater remediation was discontinued in 2013, the COC concentrations within the shallow aquifer have remained relatively stable; however, the COC concentrations continue to exceed the cleanup goals. LUCs are achieving protectiveness of receptors while the site remedy is being implemented.</p> <p>The Columbia and Yorktown aquifer plume boundaries, based on data collected during the 2021 LTM event, are depicted on Figure 2-6 (CH2M, 2023).</p>
PRAP and ROD (Navy, 2010a), AR # 000268	The remedy selected by the DD was reaffirmed in the PRAP and ROD for Sites 1, 3, 18, and 20 (ROD signed September 2010). The groundwater cleanup goals were revised from the risk-based values presented in the 1996 DD (Baker, 1996d) (based upon the most likely exposure scenarios) to the federal MCLs.
Remedy Optimization	Following recommendations from the Remedial Process Optimization Team, a groundwater extraction system was installed at the site to supplement the existing AS/SVE system. The enhanced system (groundwater extraction and AS/SVE systems) began operation in August 2010. The groundwater that was extracted contained high concentrations of VOCs, successfully reducing the mass of VOCs remaining in groundwater at Site 20. However, high iron concentrations in groundwater caused scaling in the air stripper, which had to be taken offline to perform maintenance. Additionally, the extraction system captured residual petroleum, oil, and lubricants from an adjacent site, which clogged the filter bags. Because of the operational issues requiring significant maintenance activities, the extraction system ceased operation in 2011.
Five-Year Reviews (CH2M, 2019b), AR # 002748	The Fourth Five-Year Review concluded that the remedy at Site 20 is currently protective of human health and the environment in the short term. Exposure pathways that could pose an unacceptable risk are being controlled through LUCs. In order for the remedy to be protective over the long term, the following actions need to be undertaken: (1) conduct a VI investigation to assess whether the vapors from the underlying COC plumes pose an unacceptable risk to human health, (2) complete the installation of a pilot-scale SBGR and conduct 1 year of performance monitoring to assess whether the SBGR can reduce the COC concentrations to meet the remedial action objectives, and (3) evaluate SBGR effectiveness in treating the 1,4-dioxane and consider potential modifications necessary for full-scale deployment. In addition, conduct an expanded PA/SI to further characterize the nature and extent of PFAS constituents onsite. ¹
Vapor Intrusion Investigation (CH2M, 2020b ^a)	The VI investigation was completed in 2019 and identified elevated levels of VOCs within the indoor air at Office 120 inside Building LP-26. As a result, two air purifying units have been installed and air monitoring has been ongoing to keep indoor air concentrations of TCE below acceptable risk-based guidelines.

¹ The Basewide PFAS investigation is further discussed in **Section 2.3**.

Table 2-11. Summary of Relevant Documents and Milestones for Site 20

Document Title/Milestone	Summary
Draft Expanded Vapor Intrusion Investigation Report (CH2M, 2021b)	<p>The Expanded VI investigations resulted in the following recommendations: no further response is warranted for the VI pathway at Buildings U-111, U-132, V-61, and V-147 since the multiple lines of evidence evaluation and HHRA results did not identify current or future risks related to VI and the VI pathway warrants consideration during evaluation of the overall site remedy as part of the CERCLA process for Buildings LP-20, LP-22, LP-24, and LP-26 based on potential risks above the risk target range of 1×10^{-6} to 1×10^{-4} to future industrial and residential receptors.</p> <p>The finalization of the Expanded VI report has been delayed as a result of a discrepancy between the Navy and USEPA, which is pending resolution from Navy and USEPA Headquarters.</p>
Basewide PFAS PA (CH2M, 2022a ^a)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 20 was identified as a potential PFAS release area based on detections of PFAS above the RSLs in shallow (Columbia aquifer) and deep (Yorktown aquifer) monitoring wells. The PA recommended further evaluation of Site 20 in the form of an RI.
Performance Monitoring of Air Purifying Units Report Site 20, Building LP-26, Office 120, August 2020 to July 2021 (CH2M, 2022d ^a)	The indoor air monitoring at Office 120 within Building LP-26 is conducted to evaluate the effectiveness of two air purifying units deployed to reduce the concentration of TCE in indoor air. The results of indoor-air sampling events conducted between August 2020 and July 2021 indicate that the air purifying units are effective in maintaining indoor air concentrations of TCE in Office 120 below the agreed-upon target levels with a carbon changeout frequency of approximately four months. The target levels are identified in the <i>Sampling and Analysis Plan, Performance Monitoring of Air Purifying Units Site 20, Building LP26, Office 120</i> (CH2M, 2021e). The Performance Monitoring Report recommended the continuation of monthly indoor air monitoring and the use of air purifying units, and that carbon filters be replaced every four months.

^a This document is not uploaded to the AR.

SBGR = subgrade biogeochemical reactor

Site 20 COCs

Identified COCs for each medium at Site 20 are summarized in **Table 2-12**.

Table 2-12. Summary of Constituents of Concern at Site 20

Medium	Potential Risk	COC
Groundwater	Human Health	1,2-DCA, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, benzene, TCE, VC
Soil	Human Health	Arsenic, beryllium, benzo(a)pyrene

Current and Future Activities

To expedite the reduction of COC concentrations in groundwater, an alternative remediation strategy involving a SBGR will be pilot-tested at Site 20. The SBGR installation is scheduled for completion in FY 2023, and quarterly SBGR performance monitoring will be conducted for 1 year. The SBGR Performance Monitoring Report that will summarize these results is expected to be finalized in the second quarter of FY 2025. In addition, enhanced in situ bioremediation substrate injections into existing AS wells are also planned to be completed in FY 2023 and will include 1 year of performance monitoring. The Substrate Injection Performance Monitoring Report that will summarize these results is expected to be finalized in the fourth quarter of FY 2025.

Prior to the SBGR construction completion and injections, soil sampling beneath Buildings LP-20 and LP-26 was collected and the SVE system was put back into operation to evaluate potential sources of subsurface vapor concentrations as a part of an SVE evaluation. After the SVE system was put back into operation, subsurface, indoor, and outdoor air samples were collected in FY 2022 and FY 2023 to evaluate the effectiveness of the SVE system in mitigating VI in LP-20 and LP-26. During the study, the Team found the SVE system ineffective at mitigating VI in LP-20 and LP-26 and elected to discontinue data collection as sufficient information was collected to make a

decision. The results of the study will be summarized in a Remedy Optimization SVE Evaluation Report, which is expected to be finalized in the second quarter of FY 2024. Following completion of the Remedy Optimization SVE Evaluation Report, and in consideration of the ongoing action in Office 120 and the VI pathway evaluation (discussed herein), a Focused Feasibility Study to address the VI pathway will be completed.

Air purifying units continue to operate in Office 120 at LP-26 to address TCE concentrations in indoor air. Indoor air is monitored monthly to ensure concentrations of TCE remain below risk thresholds identified by the Team. The next Performance Monitoring Report, which will summarize August 2021 through July 2022 indoor air data, is expected to be finalized in the first quarter of FY 2024. Following the finalization of the Performance Monitoring Report, the sampling frequency will be optimized.

The 2021 LTM Report is scheduled to be submitted for regulatory review in FY 2023. The most recent LTM sampling event was completed in the first quarter of FY 2023 and will continue to be conducted on an annual basis (**Schedule 2-1**). Site inspections will be conducted quarterly at Site 20 to confirm that LUCs are being implemented.

The PFAS RI at Site 20 is expected to begin in the third quarter of FY 2024. Following completion of the PFAS RI, and in consideration of the outcomes of the alternative remediation strategies that are under evaluation, a Feasibility Study to address all COCs in groundwater will be completed.

The Fifth Five-Year Review will be finalized by the second quarter of FY 2024 (**Schedule 2-1**). As a result of the data evaluation in the Fifth Five-Year Review, the VI exposure pathway will be evaluated. The VI evaluation is expected to begin in the third quarter of FY 2024 and will support the Focused Feasibility Study for the VI pathway.

Schedule 2-6 presents the FY 2024 through FY 2028 schedule for Site 20.

2.1.7 Site 22 (OU8)—Camp Allen Salvage Yard

Site 22 Summary

Status:	Remedy in place
Current IR Activities:	LTM
Media Investigated:	Groundwater, soil, surface water, sediment
Removal and Remedial Actions:	Soil removal action, soil cover, and LUCs
Media Closed:	Soil, sediment
Waste and Debris Present Onsite:	Buried debris present onsite

Site Description and History

The CASY (**Figure 2-7**) operated from the 1940s until 1995, salvaging and processing scrap materials generated at NSN. The CASY is located between Area A and Area B of the CALF site (Site 1). The CASY activities included storage and management of waste oils, used chemicals, and scrap industrial and commercial equipment. Metal smelting, various recycling activities, and miscellaneous burning also occurred at the CASY. In addition, the facility was used to store acids, paint thinners, solvents, pesticides, and transformers. A PCB spill occurred at the CASY in 1989, when a transformer was damaged by a forklift. The Public Works Center responded to the spill and conducted a preliminary cleanup at that time. When operations ceased in 1995, the buildings, incinerators, and rail lines were demolished.

Table 2-13 provides a list of relevant documents and past activities for Site 22.

Table 2-13. Summary of Relevant Documents and Milestones for Site 22

Document Title/Milestone	Summary
ROD (Baker, 2004), AR # 001233	<p>A removal action of PCB-contaminated soils began in August 1998. Additional delineation of site contaminants in 2001 identified six metals hotspots throughout the site (Baker, 2004). As an interim measure, the Navy began removal of the hotspot soils in conjunction with the ongoing PCB removal action. The removal continued through 2001, with the ultimate excavation of more than 16,000 yd³ of material. The removal action achieved the soil PCB cleanup goals; however, the additional soil analytical data indicated that the areal extent of metal contamination was more widespread than previously estimated. It was estimated that approximately 29,000 yd³ of soil remained at the site, with concentrations exceeding the cleanup goals for metals. Based on the more comprehensive confirmation sampling and anticipated future land use of the site, the RAOs for the site were re-evaluated. The Navy determined that the placement of a soil cover was more cost-effective than removal of the metals-contaminated soils, and Team agreement on this approach was obtained in March 2002.</p> <p>The soil cover and the cover for the sediments in the pond were completed in June 2004. The final ROD addressing the soil and sediment at the site, encompassing the overall soil and sediment cleanup strategy for the site, was signed by USEPA in September 2004 (Baker, 2004). The ROD identifies the risks to human health and ecological receptors exposed to soil and sediment, establishes the RAOs, and defines the LUCs for the CASY.</p>
Remedial Action Completion Report (CH2M and Baker, 2009 ^a)	In accordance with the closeout procedures for NPL sites, a Remedial Action Completion Report for Site 22 was signed by the Navy in January 2009. Quarterly site inspections continue to be completed to assess the enforcement of the LUCs. Because of the proximity of Site 22 to Site 1, groundwater is being managed and addressed as a single unit.
LTM Reports (CH2M, 2020a), AR # 002881	The 2018 LTM Report indicates that the groundwater directly downgradient from Site 1 Area B and Site 22 has exhibited increases of COC concentrations for the last few years, indicating that either of these areas may be a source of the detected COCs.

Table 2-13. Summary of Relevant Documents and Milestones for Site 22

Document Title/Milestone	Summary
Five-Year Reviews (CH2M, 2019b), AR # 002748	The Fourth Five-Year Review concluded that the remedy in place for Site 22 is currently protective of human health and the environment in the short term due to the potential presence of PFAS.
Basewide PFAS PA (CH2M, 2022a ^a)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 22 (as a grouping with Site 1) was identified as a potential PFAS release area. In 2014, samples collected from the shallow and deep well networks at Site 1 indicated the presence of PFAS, with select PFAS exceeding applicable screening criteria. In addition, it is not known, but possible that AFFF was used to fight the fire that occurred at Site 22 as fires containing solvents and oils are classified as Class B and AFFF was typically used to extinguish Class B fires. Since PFAS were detected above screening criteria, the PA recommended further evaluation of Site 22 (as a grouping with Site 1).

^a This document is not uploaded to the AR.

Site 22 COCs

Identified COCs for each medium at Site 22 are summarized in **Table 2-14**.

Table 2-14. Summary of Constituents of Concern at Site 22

Medium	Potential Risk	COC
Groundwater	N/A ^a	N/A ^a
Soil	Human Health	Arsenic, antimony, iron, lead, PCBs
Sediment	Ecological	Pesticides, PCBs, metals

^a Groundwater at Site 22 is currently managed as one unit with groundwater at Site 1.

Current and Future Activities

Because of the proximity of Site 22 to Site 1, groundwater is managed and addressed with Site 1 (**Section 2.1.1.3**). Site inspections will be conducted quarterly at Site 22 to confirm that LUCs are being implemented.

Planning for the PFAS Remedy Optimization Investigation at Site 1 (as a grouping with Site 22) is expected to begin in the fourth quarter of FY 2023 and will be followed by the field investigation in FY 2024 (**Schedule 2-2**).

The Fifth Five-Year Review will be finalized during the second quarter of FY 2024 (**Schedule 2-1**).

2.1.8 Site 23 (OU10)—Building LP-20 Plating Shop

Site 23 Summary

Status:	Remedy in place
Current IR Activities:	LTM
Media Investigated:	Groundwater, soil, subslab vapor, indoor air
Removal and Remedial Actions:	Soil removal action, concrete cover, and LUCs
Media Closed:	Soil
Waste and Debris Present Onsite:	N/A

Site Description and History

Site 23, the former Plating Shop, is located on the western side of Building LP-20 (**Figure 2-8**). The Plating Shop, which is not currently in use, occupied approximately 9,500 square feet of building space. The Plating Shop contained seven process pits that extended beneath the concrete slab floor and were used for cleaning, stripping, and plating engine parts. The concrete floor of the shop and the pits were lined with corrosion resistant brick tiles. Underground pipes carried rinse water from the metal-plating activities at Building LP-20 to the industrial wastewater treatment plant. In May 2005, the NSN Team agreed to conduct an interim removal action to address the site soils (fill the plating pits, cap the pits, and install impermeable sealant over the cap). The Team also agreed that the groundwater beneath Site 23 was being treated as part of Site 20.

Table 2-15 provides a list of relevant documents and past activities for Site 23.

Table 2-15. Summary of Relevant Documents and Milestones for Site 23

Document Title/Milestone	Summary
EE/CA (CH2M, 2006c), AR # 001646	A final EE/CA was submitted in December 2006, summarizing the soil removal action (a new concrete floor to serve as a cover). The construction activities associated with the interim action were initiated in June of 2006.
Completion Report Site 23, Building LP-20 Plating Shop (Shaw, 2008), AR # 002131	Between June and November 2007, a removal action consisting of removing all debris and brick tiling within the Plating Shop, filling the plating pits with flow-able fill, and covering the Plating Shop floor with a concrete pad and impermeable sealant was completed. In addition, concrete pads within adjacent blower rooms #1 and #2 were removed to grade, pressure washed and replaced with concrete slab.
PRAP and ROD (CH2M, 2008g; Navy, 2008 ^a), AR # 002133	In September 2008, a PP for Site 23 presented LUCs to effectively limit site access and to protect against human exposure to unacceptable risk in the soil at the site. The ROD for Site 23 was finalized in September 2008, implementing LUCs as the remedy. The remedial design was finalized in July 2009 to implement LUCs and maintenance actions, including periodic inspections and reporting to ensure that residential development, or any other development inconsistent with the specific RAOs and selected remedy, would not be allowed on the site and that the concrete cover would be properly maintained until contaminant levels diminished so as to allow unrestricted use and unlimited exposure. Quarterly site inspections are conducted to verify the implementation of the LUCs. Groundwater associated with Site 23 and Site 20 is considered one hydrogeologic unit and is currently being remediated as part of Site 20.
Five-Year Reviews (CH2M, 2019b), AR # 002748	The Fourth Five-Year Review concluded that the remedy at Site 23 is protective of human health and the environment in the short term due to the potential presence of PFAS.
Vapor Intrusion Investigation (CH2M, 2020b ^a)	Because of the presence of elevated VOC concentrations in the groundwater beneath Site 23, a VI investigation was completed in January 2019 and during summer 2019 as discussed in Section 2.1.6 .

Table 2-15. Summary of Relevant Documents and Milestones for Site 23

Document Title/Milestone	Summary
Basewide PFAS PA (CH2M, 2022a ^a)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. Site 23 was not identified as a potential PFAS release area. The PA recommended no further investigation at Site 23; however, if additional information becomes available, Site 23 may be re-evaluated (groundwater beneath Site 23 will be evaluated as part of Site 20).

^a This document is not uploaded to the AR.

Site 23 COCs

Identified COCs for each medium at Site 23 are summarized in **Table 2-16**.

Table 2-16. Summary of Constituents of Concern at Site 23

Medium	Potential Risk	COC
Groundwater	N/A ^a	
Soil	Human Health	Semivolatile organic compounds, arsenic, cadmium, chromium, lead, nickel

^a Groundwater at Site 23 is currently managed as one unit with groundwater at Site 20.

Current and Future Activities

Groundwater associated with Site 23 and Site 20 is considered one unit and is managed and addressed with Site 20 (**Section 2.1.6.3**). Site inspections will be conducted quarterly at Site 23 to confirm that LUCs are being implemented.

The Fifth Five-Year Review will be finalized during the second quarter of FY 2024 (**Schedule 2-1**).

2.2 Solid Waste Management Units

SWMU 14 is the only SWMU at NSN with a remedy (LUCs). All other SWMUs have been closed out and require no action. The following description includes a summary, site description and history along with a table describing past activities at SWMU 14, and a table listing the known COCs in each site medium. In addition, the current status of SWMU 14 is briefly discussed.

2.2.1 Solid Waste Management Unit 14 (OU13)—Q-50 Satellite Accumulation Area

SWMU 14 Summary

Status:	LTM
Current IR Activities:	LUC inspections
Media Investigated:	Groundwater, soil, surface water, sediment
Removal and Remedial Actions:	Asphalt cover and LUCs
Media Closed:	Soil, surface water, sediment
Waste and Debris Present Onsite:	Removed

Site Description and History

The Q-50 Satellite Accumulation Area (SWMU 14) (**Figure 2-9**) is located in the northwestern corner of NSN, as shown on **Figure 1-1**. SWMU 14 consisted of a concrete storage pad surrounded by a grass-covered field. The pad served as a 90-day hazardous waste accumulation area where wastes generated by various operations were processed (sampled, identified, labeled, and packaged) before being shipped for eventual disposal. The original concrete pad for the accumulation area has since been removed.

Table 2-17 provides a list of relevant documents and past activities for SWMU 14.

Table 2-17. Summary of Relevant Documents and Milestones for SWMU 14

Document Title/Milestone	Summary
RI (CH2M, 2004c), AR # 001222	The 2004 RI concluded that there are no unacceptable human health risks at the site under the land use; however, unacceptable risks associated with surface soil, subsurface soil, and groundwater are present in most future scenarios. In addition, there were no unacceptable risks to ecological receptors at the site's terrestrial portion; however, unacceptable ecological risks for sediment and groundwater discharging to surface water are present at the site.
Technical Memorandum Trident Probe Survey Results (CH2M, 2007a), AR # 001643	The results of the Trident probe study indicated that there were no strong areas of groundwater discharge from SWMU 14 to the James River or Willoughby Bay and that there is significant attenuation in the discharge zones. Based on the results of the Trident Probe survey and Ecological Risk Assessment (CH2M, 2004c), the technical memorandum recommended NFA for ecological receptors.
EE/CA and ROD (CH2M, 2008b), AR # 001767	In March 2008, an EE/CA was prepared for an NTCRA at SWMU 14. The objective of the NTCRA was to mitigate potential unacceptable human health risk from exposure to contaminated surface soil, subsurface soil, and subsurface debris at SWMU 14 by constructing an asphalt cover. The supporting AM was signed April 8, 2008. Construction activities, consisting of construction of the asphalt cover (parking lot) and bioretention areas and removal of construction debris as encountered, were initiated in early June 2008 and were completed in January 2009.
Focused FS (CH2M, 2009), AR # 000002	The Focused FS was finalized in July 2009. The FS was completed to evaluate remedial action alternatives to address remaining COCs in soil and groundwater.

Table 2-17. Summary of Relevant Documents and Milestones for SWMU 14

Document Title/Milestone	Summary
PRAP and ROD (CH2M, 2010b), AR # 000248	The PP was completed in September 2009, recommending LUCs to prevent exposure to soil by human receptors by maintaining the asphalt cover. The ROD was signed in August 2010 to document LUCs as the selected remedy. As documented in the ROD, potential risks associated with groundwater were deemed acceptable, and no action for groundwater was required; however, the LUC objectives for SWMU 14 prohibit the withdrawal of groundwater.
Five-Year Reviews (CH2M, 2019b), AR # 002748	The Fourth Five-Year Review Report concluded that the remedy at SWMU 14 is protective of human health and the environment.
Basewide PFAS PA (CH2M, 2022a ³)	The 2022 Basewide PFAS PA was completed to identify and catalog all potential or confirmed PFAS release areas and identify areas requiring further PFAS investigation. SWMU 14 was not identified as a potential PFAS release area. The PA recommended no further investigation at SWMU 14; however, if additional information becomes available, SWMU 14 may be re-evaluated.

SWMU 14 COCs

Identified COCs for each medium at SWMU 14 are summarized in **Table 2-18**.

Table 2-18. Summary of Constituents of Concern at SWMU 14

Medium	Potential Risk	COC
Groundwater	None Identified	
Soil	Human Health	Iron, thallium, vanadium, antimony, benzo(a)pyrene
Surface Water	N/A	N/A
Sediment	N/A	N/A
Indoor Air	N/A	N/A

Current and Future Activities

Quarterly site inspections at SWMU 14 will be conducted to ensure that LUCs are maintained. If the quarterly inspections identify any breaches in the asphalt surface or soil cover, the information will be presented to the NSN Team to discuss whether any mitigation measures are needed to maintain protectiveness.

The Fifth Five-Year Review will be finalized during the second quarter of FY 2024 (**Schedule 2-1**).

2.3 Contaminants of Emerging Environmental Concern

Contaminants of Emerging Environmental Concern are a “chemical or material that is characterized by perceived or real threat to human health or the environment with no published health standard or an evolving standard” and the DoD has established Emerging Chemicals of Environmental Concern instruction (DoDI 4715.18) which establishes the policy for the identification, assessment and risk management of contaminants of emerging environmental concern that have the potential to impact the DoD. Contaminants of emerging environmental concern have been evaluated at NSN during the Five-Year Review Process and incorporated into the ERP as appropriate (e.g. 1,4-dioxane, perchlorate, dioxins and furans). PFAS was identified as a contaminant of emerging environmental concern and this section provides information regarding investigations associated with the assessment of PFAS at NSN.

2.3.1 Sites with PFAS Contaminants

In October 2014, the Assistant Secretary of the Navy, Energy, Installations, and Environment issued a statement requiring evaluation of sites with the potential for PFAS contamination under the Defense ERP (ASD, 2014). As a result of the site review, the following sites were identified for further evaluation of PFAS:

- Site 1 – CALF
- Site 22 – Salvage Yard
- Site 23 – LP-20 Plating Shop
- SWMU 6 – Building V-28 Waste Pit
- SWMU 8 – Firefighting School
- Site 16 – Chemical Fire Building X-136
- Site 17 – Chemical Fire Building SDA-21
- Area of Interest (AOI) 01 – LP/V Area PFAS OU Spill Response
- AOI 02 – Pier Area PFAS OU Spill Response
- AOI 03 – Landfill Area PFAS OU Spill Response
- AOI 04 – Sewells Point Area PFAS OU Spill Response

The PFAS investigation is being conducted under CERCLA. PFAS have been identified as chemicals of emerging concern that could have been historically released. PFAS are primarily associated with the use of aqueous film-forming foam used during firefighting and fire-training activities; however, they are also present in a variety of pesticides, paints, cleaners, and waxes. PFAS are environmentally persistent and can be present in environmental media long after a release. There are currently no legally enforceable federal or Virginia drinking water standards for PFAS constituents.

The Fourth Five-Year Review Report (CH2M, 2019b) identified Site 1 (CALF), Site 18, Site 22 (CASY), and Site 20 (Building LP-20) as having the potential for historical PFAS releases. In 2014, groundwater at these sites was sampled for PFAS (CH2M, 2015). PFAS compounds PFOA and PFOS were detected at concentrations exceeding applicable screening criteria at Sites 1, 20, and 22 (groundwater at Site 22 is evaluated under Site 1 groundwater). In addition, PFAS has also been detected in purge water generated during LTM at Site 3 and Site 18.

The Basewide PFAS PA includes comprehensive review of historical documents to identify potential PFAS release areas in addition to the sites previously identified. The report was finalized in FY 2022. The PA (CH2M, 2022a) identified 41 potential or confirmed release areas for further evaluation. **Table 2-19** summarizes the potential or confirmed release areas, the rationale for further action, and the recommended action. Regulatory concurrence was not achieved on 134 areas, listed in **Table 2-20**, where the PA recommended no additional investigation at this time. Additional documentation of the non-concurrence items is captured in the PA and in comments and Response to Comments (CH2M, 2022c) on the draft PA. At a future date these sites will be discussed by the Team to determine a path forward and final disposition.

The Basewide PFAS SI fieldwork, which included sampling at Site 3 and Site 18, was completed in FY 2022. The PFAS SI Report is anticipated to be finalized in the fourth quarter of FY 2023. Upon finalization of the SI Report, sites to be carried forward in the CERCLA process will be incorporated into the NSN SMP to support the planning, scheduling, and priority setting for environmental remedial response activities.

Table 2-19. Areas Identified as Potential or Confirmed PFAS Release Areas and Recommendations

Area	Rationale for Further Action	Recommended Action
Building CEP178	<ul style="list-style-type: none"> Building CEP178 operated as a fire station during the timeframe for AFFF use and an AFFF release could have occurred while washing AFFF residues from fire trucks or during refilling of AFFF tanks on fire trucks. 	SI
Building W146	<ul style="list-style-type: none"> Building W146 operated as a fire station during the timeframe for AFFF use and an AFFF release could have occurred while washing AFFF residues from fire trucks or during refilling of AFFF tanks on fire trucks. 	SI
W-Fuel Farm (Pier Area A)	<ul style="list-style-type: none"> PFOA, PFOS, and perfluorohexanesulfonic acid (PFHxS) were detected above the SLs in groundwater at W-Fuel Farm. 	SI
CEP Tank Farm Area, which includes: <ul style="list-style-type: none"> Tanks CEP3 and CEP11 	<ul style="list-style-type: none"> Bilge water was stored at CEP3 and CEP11. Bilge water has the potential to contain PFAS as a result of discharge of AFFF-containing PFAS aboard vessels while firefighting system maintenance is conducted and because of the presence of PFAS-containing AFFF in AFFF systems used to present oily bilge waste ignition. A spill from CEP3 occurred in 2013. Waste from the oil/water separators at the Fire Fighting School (FFS) is also sent to Tanks CEP3 and CEP11. It is possible that the waste contains AFFF because of its use during firefighter training activities. Documented releases have occurred from Tanks CEP3 and CEP11. 	SI
Q50 Area, which includes: <ul style="list-style-type: none"> Building Q50 Building Q50D 	<ul style="list-style-type: none"> Reported AFFF releases during transfer of AFFF from vacuum trucks. AFFF transfer from tanks for disposal. 	SI
Pier 2	<ul style="list-style-type: none"> Documented releases of AFFF into the Elizabeth River from a docked ship occurred at Pier 2. 	RI ²
Pier 4	<ul style="list-style-type: none"> A documented release of AFFF into the Elizabeth River occurred during emergency response at Pier 4. 	RI ²
Pier 6	<ul style="list-style-type: none"> A documented release of AFFF into the Elizabeth River from a docked ship occurred at Pier 6. 	RI ²
Pier 9	<ul style="list-style-type: none"> Documented releases of AFFF into the Elizabeth River from a docked ship occurred at Pier 9. 	RI ²
Pier 10	<ul style="list-style-type: none"> Documented releases of AFFF into the Elizabeth River from a docked ship occurred at Pier 10. 	RI ²
Pier 11	<ul style="list-style-type: none"> Documented releases of AFFF into the Elizabeth River from a docked ship occurred at Pier 11. 	RI ²
Pier 12	<ul style="list-style-type: none"> Documented releases of AFFF into the Elizabeth River from a docked ship occurred at Pier 12. 	RI ²
Pier 14	<ul style="list-style-type: none"> Documented releases of AFFF into the Elizabeth River from a docked ship occurred at Pier 14. 	RI ²
Bunker Hill and Maryland Avenue	<ul style="list-style-type: none"> AFFF was spilled at this location. 	SI

² Pier 2, Pier 4, Pier 6, Pier 9, Pier 10, Pier 11, Pier 12, and Pier 14 will be investigated during the RI, once confirmed PFAS releases and migration pathways from all SI sites to the Elizabeth River have collectively been identified upon completion of the Basewide SI.

Table 2-19. Areas Identified as Potential or Confirmed PFAS Release Areas and Recommendations

Area	Rationale for Further Action	Recommended Action
Pier Area C	<ul style="list-style-type: none"> PFOA, PFOS, and PFHxS were detected above RSLs in groundwater at Pier Area C. 	SI
Site 3 Q-Area Drum Storage	<ul style="list-style-type: none"> Undocumented disposal occurred here, and it is possible that AFFF was disposed of here. PFOA and PFOS were detected above RSLs in a composite sample of purge water from monitoring wells at Site 3. 	SI
Frac Tanks	<ul style="list-style-type: none"> Reported AFFF releases during transfer of AFFF from vacuum trucks. 	SI
Building KBB	<ul style="list-style-type: none"> Building KBB operated as a fire truck maintenance shop during the timeframe for AFFF use and an AFFF release could have occurred while washing AFFF residues from fire trucks or during transfer of AFFF from tanks on fire trucks during maintenance. Firefighting training and equipment testing also occurred here; it is possible that AFFF was used during testing or training. 	SI
Building R43	<ul style="list-style-type: none"> Building R43 operated as a fire station during the timeframe for AFFF use and an AFFF release could have occurred while washing AFFF residues from fire trucks or during refilling of AFFF tanks on fire trucks. AFFF could have been used during firefighting training activities at Building R43. 	SI
Building LF59	<ul style="list-style-type: none"> A documented release of AFFF occurred from the fire-suppression system at Building LF59. 	SI
Building LF60	<ul style="list-style-type: none"> Documented releases of AFFF occurred from the fire-suppression system at Building LF60. 	SI
Building V147	<ul style="list-style-type: none"> A documented release of AFFF occurred from the fire-suppression system at Building V147. 	SI
Building LF34	<ul style="list-style-type: none"> A documented release of AFFF occurred at Building LF34. 	SI
Building V52	<ul style="list-style-type: none"> A documented release of AFFF occurred at Building V52 during emergency response. 	SI
Site 19 Area, which includes: <ul style="list-style-type: none"> Building V70 	<ul style="list-style-type: none"> A documented release of AFFF occurred from the fire-suppression system at Building V70. 	SI
Building V49	<ul style="list-style-type: none"> Potential AFFF releases at Building V49 may have occurred during equipment testing. 	SI
FFTA and LP166 Area, which includes: <ul style="list-style-type: none"> Building LP35 Building LP166 	<ul style="list-style-type: none"> Documented AFFF release during firefighting training. Potential AFFF releases during AFFF disposal within the bermed wash rack. The area in front of LP35 was previously used both for the mixing and spray-testing of AFFF. Building LP166 operated as a fire station during the timeframe for AFFF use and an AFFF release could have occurred while washing AFFF residues from fire trucks or during refilling of AFFF tanks on fire trucks. 	SI
LP Hangar Area, which includes: <ul style="list-style-type: none"> Building LP27 Building LP33 Building LP34 	<ul style="list-style-type: none"> Seven documented releases of AFFF occurred within the LP Hangar Area. 	SI

Table 2-19. Areas Identified as Potential or Confirmed PFAS Release Areas and Recommendations

Area	Rationale for Further Action	Recommended Action
LP Industrial Area, which includes: <ul style="list-style-type: none"> • Building LP21 • Building LP24 • Site 20 	<ul style="list-style-type: none"> • PFOA, PFOS, and PFHxS have been detected above RSLs in groundwater in the LP Industrial Area. • Eight documented releases of AFFF occurred within the LP Industrial Area. 	RI
Chambers Field Runway	<ul style="list-style-type: none"> • Documented releases of firefighting foam have occurred during emergency responses at the runway. Based on the years of the incidents, the foam was likely AFFF containing PFAS. • Air show demonstrations and AFFF "salutes" potentially occurred at Chambers Field Runway. 	SI
SP Hangar Area, which includes: <ul style="list-style-type: none"> • Building SP35 • Building SP40 	<ul style="list-style-type: none"> • Documented releases of AFFF have occurred from the fire-suppression systems at the hangars in the SP Hangar Area. 	SI
SP Spray Area and Fuel Farm Area, which includes: <ul style="list-style-type: none"> • SP Spray Area 	<ul style="list-style-type: none"> • Potential AFFF releases may have occurred during equipment testing at the SP Spray Area. 	SI
Site 18 – Former NM Hazardous Waste Storage Area	<ul style="list-style-type: none"> • Documented disposal of unknown hazardous wastes and sludges. • PFOA, PFOS, and PFHxS were detected above the RSLs in an aqueous composite sample of purge water generated from sampling groundwater wells within Site 18. 	SI
Site 1 and Site 22 Area, which includes: <ul style="list-style-type: none"> • Site 1 • Site 22 	<ul style="list-style-type: none"> • Landfill was operated during the time period that AFFF and other materials containing PFAS were used at NSN, and it is possible that materials containing PFAS were disposed here. • There is a potential that AFFF was used to fight the fire at Site 22. • PFOA, PFOS, PFHxS, and perfluorononanoic acid (PFNA) were detected above the RSLs in groundwater in the Site 1 and Site 22 Area. 	Further Investigation
Building BEN154	<ul style="list-style-type: none"> • Building BEN154 operated as a fire station during the timeframe for AFFF use and an AFFF release could have occurred while washing AFFF residues from fire trucks, during refilling of AFFF tanks on fire trucks, or during equipment testing. 	SI
FFS	<ul style="list-style-type: none"> • Documented releases of AFFF during firefighting training. 	SI

Table 2-20. Areas Identified as Potential PFAS Release Areas where Regulatory Concurrence Not Achieved

Facility	Area
Naval Station Norfolk	Building CEP171
Naval Station Norfolk	Pit To Craney, Q50 Area
Naval Station Norfolk	Building CEP200 and Building CEP209
Naval Station Norfolk	Building X218
Naval Station Norfolk	Building W174
Naval Station Norfolk	Pier 1
Naval Station Norfolk	Pier 3
Naval Station Norfolk	Pier 5
Naval Station Norfolk	Pier 5T
Naval Station Norfolk	Pier 7
Naval Station Norfolk	Pier 8
Naval Station Norfolk	1975 USS Independence Explosion ³
Naval Station Norfolk	1976 Elmer Montgomery Fire ³
Naval Station Norfolk	1979 USS Comte de Grasse Fire ³
Naval Station Norfolk	Site 16 – Building X136
Naval Station Norfolk	Lift and Pump Stations
Naval Station Norfolk	Oil/Water Separators
Naval Station Norfolk	Building Z309
Naval Station Norfolk	SWMU 14 – Q50 Satellite Accumulation Area
Naval Station Norfolk	Building A81
Naval Station Norfolk	Building A123
Naval Station Norfolk	Building CEP166
Naval Station Norfolk	Building CEP201
Naval Station Norfolk	Building W135
Naval Station Norfolk	Building W313
Naval Station Norfolk	Building X137
Naval Station Norfolk	Building X275
Naval Station Norfolk	Building X374
Naval Station Norfolk	Building W143
Naval Station Norfolk	Building Z93
Naval Station Norfolk	Building Z105
Naval Station Norfolk	Building Z140
Naval Station Norfolk	Z200 Area

³ The exact location of this explosion or fire is unknown and could not be identified during document review.

Table 2-20. Areas Identified as Potential PFAS Release Areas where Regulatory Concurrence Not Achieved

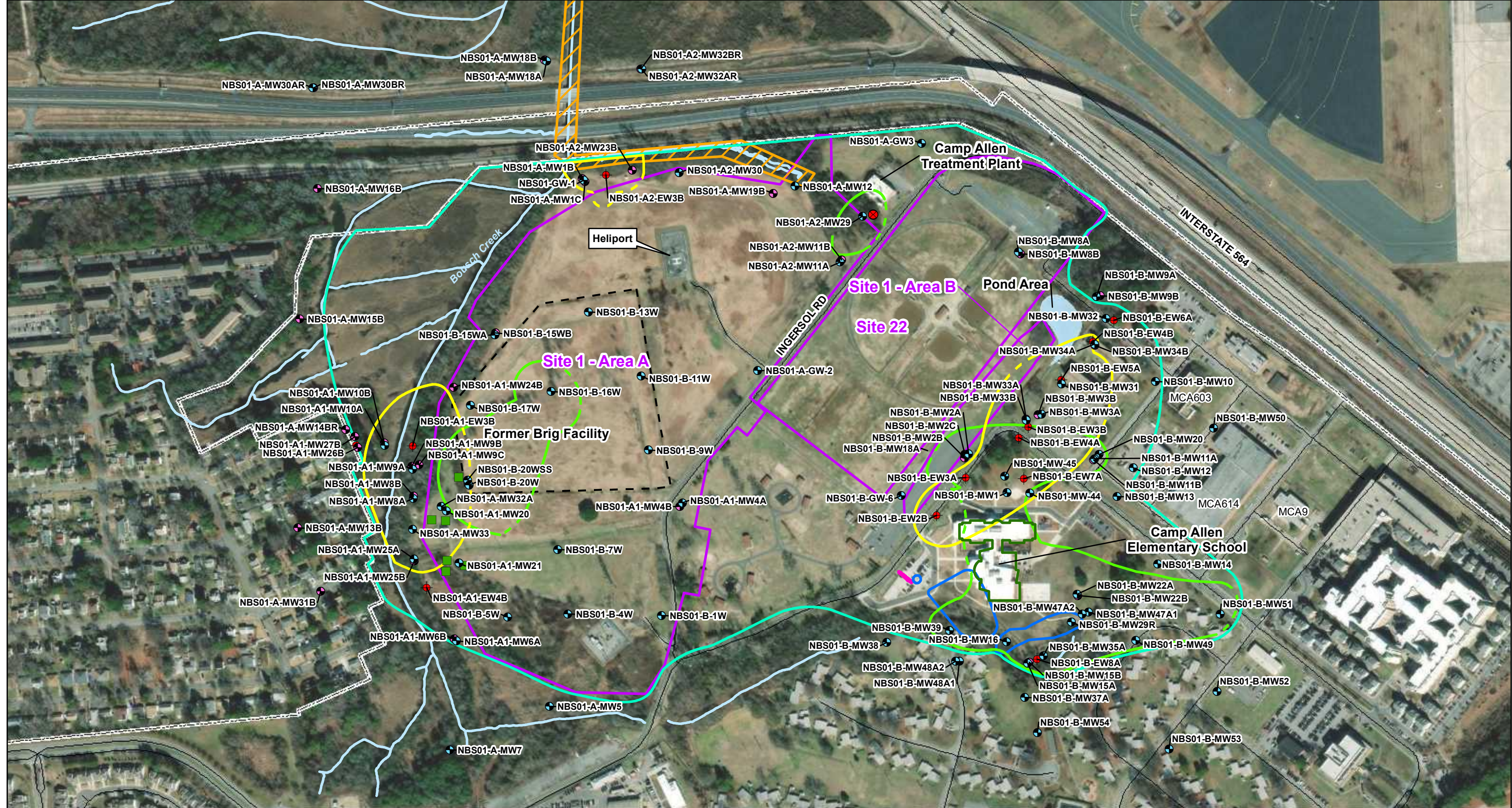
Facility	Area
Naval Station Norfolk	Building Z398
Naval Station Norfolk	Building W5
Naval Station Norfolk	Building A127
Naval Station Norfolk	SWMU 15 – Hazardous Waste Accumulation Area
Naval Station Norfolk	Building W131
Naval Station Norfolk	Building W7
Naval Station Norfolk	Pier Area B and Pier Area D
Naval Station Norfolk	Pier 8 Storm Drain Area
Naval Station Norfolk	Oil/Water Separators (NSN-KBB-OWS-02)
Naval Station Norfolk	Site 6 – Construction Debris (CD) Landfill
Naval Station Norfolk	SWMU 30 – Sludge Fill Disposal Area
Naval Station Norfolk	SWMU 38 – CD Area Behind Compost Yard
Naval Station Norfolk	Building IAA
Naval Station Norfolk	Building J50
Naval Station Norfolk	Building KCC
Naval Station Norfolk	Building KQ
Naval Station Norfolk	Building M52
Naval Station Norfolk	Building M113
Naval Station Norfolk	Building N19
Naval Station Norfolk	N26B
Naval Station Norfolk	Building P76
Naval Station Norfolk	Building P72
Naval Station Norfolk	Building MB28
Naval Station Norfolk	Building P71
Naval Station Norfolk	Building P1
Naval Station Norfolk	Building CD2
Naval Station Norfolk	Building CD30
Naval Station Norfolk	Building O28
Naval Station Norfolk	Building U120
Naval Station Norfolk	Building U128
Naval Station Norfolk	Building U113
Naval Station Norfolk	Site 5 – Pesticide Disposal Site
Naval Station Norfolk	Building V109
Naval Station Norfolk	Building V136

Table 2-20. Areas Identified as Potential PFAS Release Areas where Regulatory Concurrence Not Achieved

Facility	Area
Naval Station Norfolk	Building LF18, WDA 3 Area
Naval Station Norfolk	Building V71, Site 19 Area
Naval Station Norfolk	Oil/Water Separators
Naval Station Norfolk	Building LF38, SWMU 5 Area
Naval Station Norfolk	Building LF50, SWMU 5 Area
Naval Station Norfolk	Building LF53, SWMU 5 Area
Naval Station Norfolk	Building R60
Naval Station Norfolk	Building V58
Naval Station Norfolk	Building V88
Naval Station Norfolk	Building V143
Naval Station Norfolk	Building V146
Naval Station Norfolk	Building V4, Building V28 Area
Naval Station Norfolk	Building V28
Naval Station Norfolk	SWMU 6 – Building V28 Waste Pit
Naval Station Norfolk	Aircraft Bone Yard
Naval Station Norfolk	Building LF69
Naval Station Norfolk	LF64
Naval Station Norfolk	Buildings R61 and R62
Naval Station Norfolk	Building R63
Naval Station Norfolk	Building LP2
Naval Station Norfolk	Building LP4
Naval Station Norfolk	Building LP12, Former LP12 Area
Naval Station Norfolk	LP123, Former LP12 Area
Naval Station Norfolk	Building LP167, LP167 Area
Naval Station Norfolk	Building LP205A, LP167 Area
Naval Station Norfolk	Building LP3, LP Hangar Area
Naval Station Norfolk	LP 48, LP Hangar Area
Naval Station Norfolk	LP Fuel Farm
Naval Station Norfolk	Building LP45, LP Fuel Farm Area
Naval Station Norfolk	Lift Stations
Naval Station Norfolk	Oil/Water Separators
Naval Station Norfolk	Building SP31
Naval Station Norfolk	Building SP36
Naval Station Norfolk	Buildings SP356 and SP363
Naval Station Norfolk	Building SP381

Table 2-20. Areas Identified as Potential PFAS Release Areas where Regulatory Concurrence Not Achieved

Facility	Area
Naval Station Norfolk	Building SP65
Naval Station Norfolk	Building SP300
Naval Station Norfolk	Lift and Pump Stations
Naval Station Norfolk	Oil/Water Separators (SP35-OWS-01 and -02)
Naval Station Norfolk	SWMU 1– SP2B Hazardous Waste Accumulation Area
Naval Station Norfolk	Building SP10
Naval Station Norfolk	Building SP38
Naval Station Norfolk	Building SP85
Naval Station Norfolk	Building SP123
Naval Station Norfolk	Building SP233
Naval Station Norfolk	Building SP237
Naval Station Norfolk	Building SP234
Naval Station Norfolk	Building SP383
Naval Station Norfolk	SP13
Naval Station Norfolk	Building SP41
Naval Station Norfolk	SP285
Naval Station Norfolk	SP296
Naval Station Norfolk	Lift and Pump Stations
Naval Station Norfolk	SWMU 27 – Mason Creek Embankment
Naval Station Norfolk	Building NM95
Naval Station Norfolk	Building NM92
Naval Station Norfolk	Building NM110
Naval Station Norfolk	Building NM111
NSA Hampton Roads	Building MC604
NSA Hampton Roads	Lift and Pump Stations (8)
NSA Hampton Roads	Oil/Water Separators (3)
NSA Hampton Roads	Building CA484
NSA Hampton Roads	SWMU 39A – Open Dump/Disposal NH3 Area
NSA Hampton Roads	Building NH34
Supply Depot Annex	Building SDA204
Supply Depot Annex	Site 17 – Chemical Fire Building SDA215



Legend

■ DPVE Well	▨ Bousch Creek Sediment Removal Action (2008)	2021 LTM and 2020/2021 RAO Data COC Plume Extent Above Cleanup Goals (Dashed Where Inferred): ■ Lower Columbia Aquifer ■ Upper Columbia Aquifer ■ Yorktown Aquifer
● Columbia Aquifer Monitoring Well	▨ Time-Critical Removal Action (2017)	
● Yorktown Aquifer Monitoring Well	▨ Land Use Control Area	
● Extraction Well	▨ Former Brig Facility	
● Treatment Plant Discharge Point	▨ IRP Site Boundary	
— Surface Water Features	▨ Installation Boundary	
— Elevation Contour (5ft interval)		

Figure 2-1
Site 1 - Camp Allen Landfill
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia

ch2m

0 200 400 800 Feet

ESRI Streaming Imagery, 2016



Legend

- | | |
|-------------------------------------|-------------------------|
| ● Monitoring Well | ▨ Area of Asphalt Cover |
| — Elevation Contour (1ft interval) | ▨ Land Use Control Area |
| — Wastewater Utility Main | |
| — Surface Water Feature | |
| ▨ Area of Sediment Removal | |
| ▨ Area of Soil Cover | |
| ▨ Approximate Location of Slag Pile | |



0 125 250
Feet








Imagery Source: Esri 2019

Figure 2-2
Site 2 - Naval Magazine Slag Pile
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia

ch2m



Legend

-  Monitoring Well
-  Air Sparge Well (AS)
-  Piping for AS System
-  Topographic Contour (2ft Interval)
-  Land Use Control Area
-  AOC Boundary
-  Installation Boundary

2021 LTM Data COC Plume Extent Above Cleanup Goals (Dashed Where Inferred):

- 1,1-Dichloroethene greater than 0.38 µg/L
— TCE greater than 5 µg/L
— Vinyl Chloride greater than 0.08 µg/L

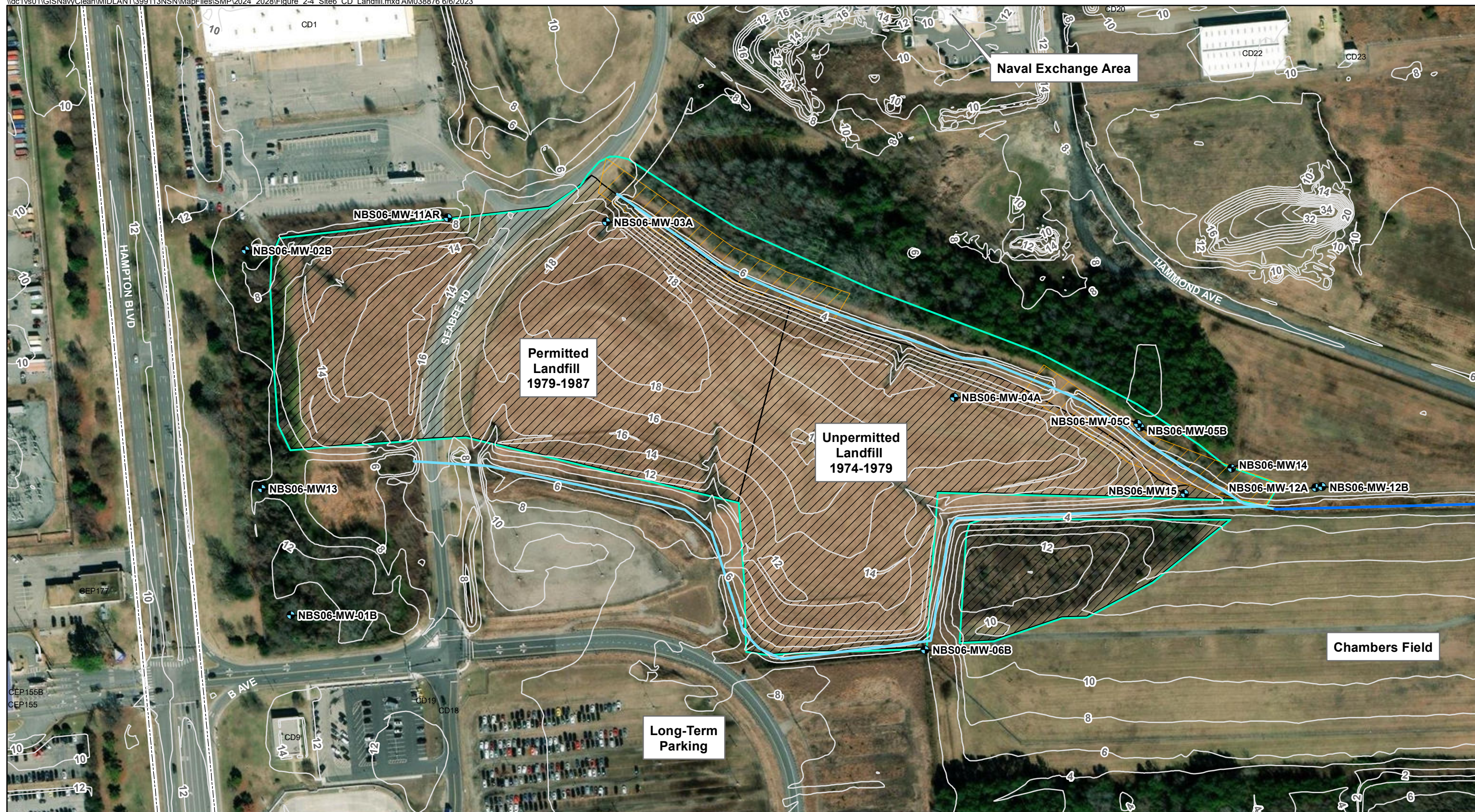


0 300 600

Feet

Imagery Source: Esri 2019

Figure 2-3
Site 3 - Q-Area Drum Storage Yard
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia



- Legend**
- Site 6 MW Locations from CDLF PLAT
 - Tributary to Bousch Creek
 - Drainage Ditch
 - Elevation Contour (2ft interval)
 - ▨ Areas of Sediment Removal
 - ▨ Land Use Control Area
 - ▨ Engineered Landfill Cover
 - ▨ Installation Boundary

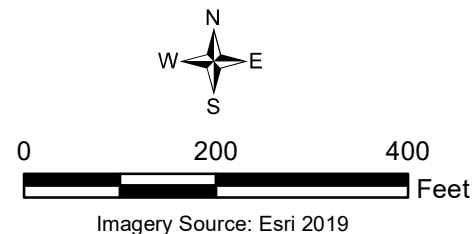
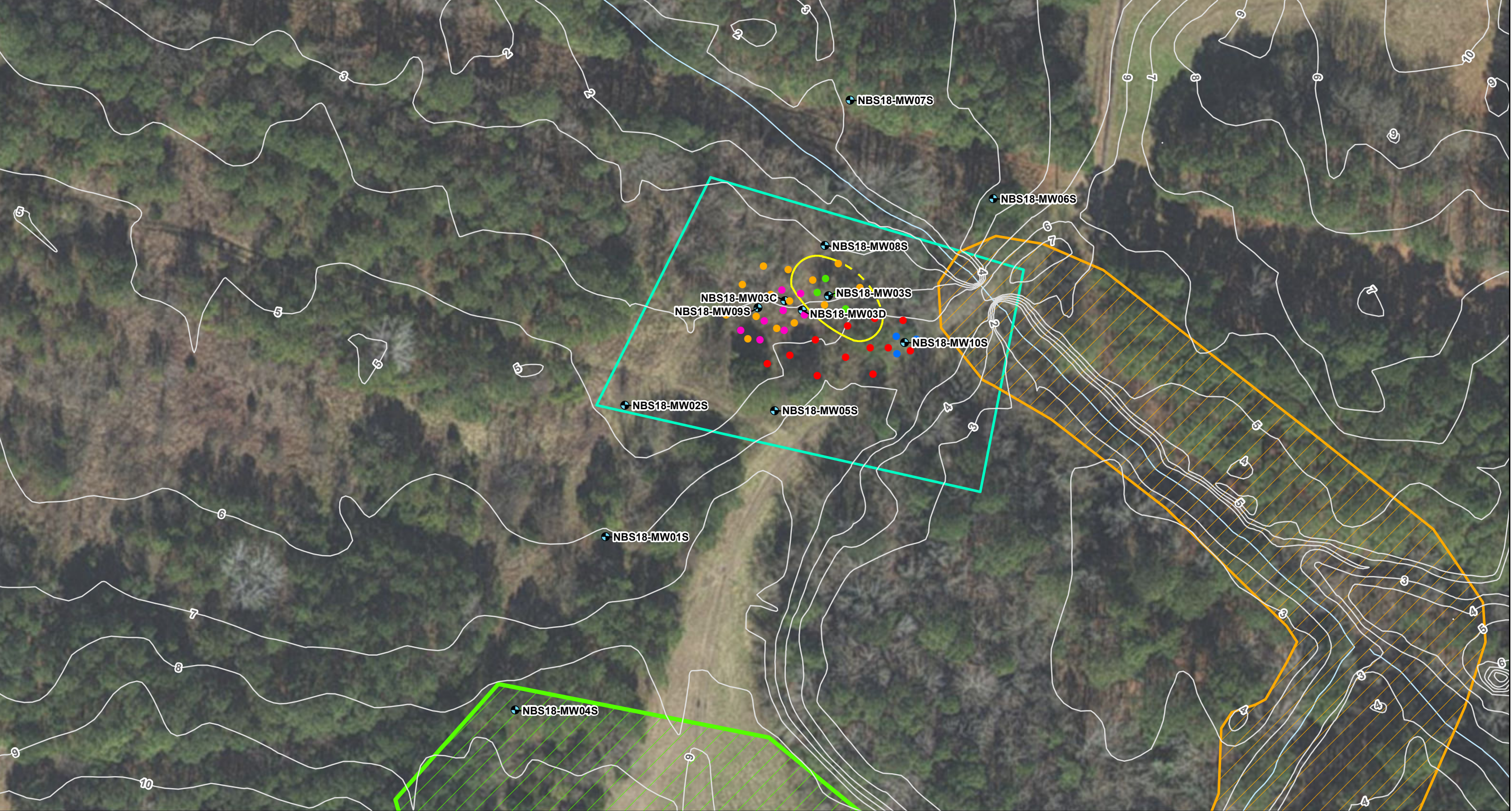


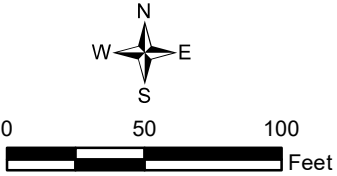
Figure 2-4
Site 6 - Construction Debris Landfill
Site Management Plan
Fiscal Years 2024-2028
 Naval Station Norfolk
 Norfolk, Virginia



Legend

- Monitoring Well
- 2008 Injection Location (6 to 16 feet below ground surface)
- 2008 Injection Location (12 to 22 feet below ground surface)
- 2010 Supplemental Injection Location (16 to 22 feet below ground surface)
- 2010 Supplemental Injection Location (3 to 13 feet below ground surface)
- 2010 Supplemental Injection Location (7 to 14 feet below ground surface)
- Surface Water Features
- Elevation Contour (1ft interval)
- Land Use Control Area
- Site 2 Area of Sediment Removal
- Site 2 Area of Soil Cover

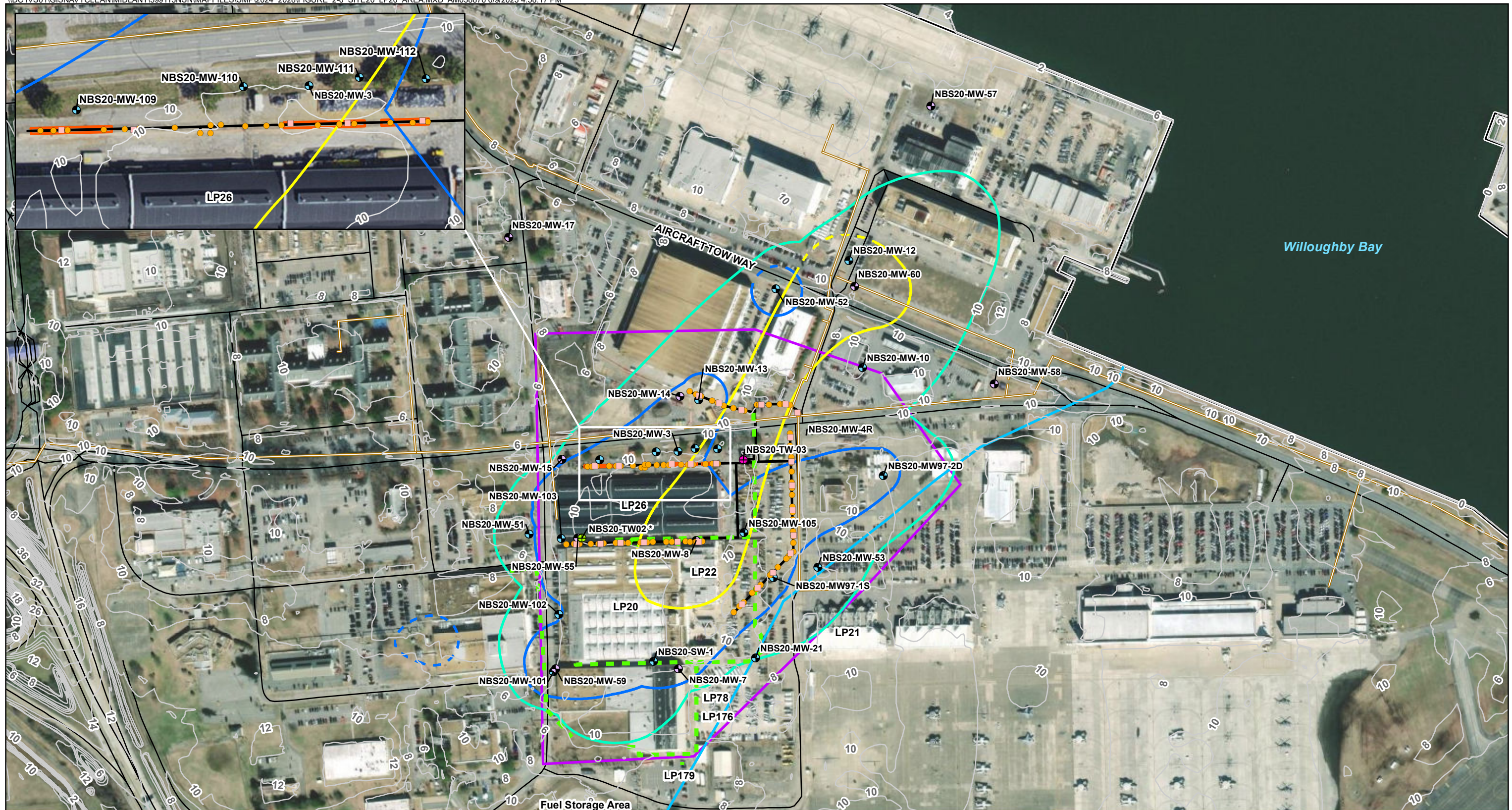
2021 LTM Data COC Plume Extent Above Cleanup Goals (Dashed Where Inferred):
— Vinyl Chloride greater than 2 µg/L



Imagery Source: Virginia Commonwealth, March 8, 2021

Figure 2-5
Site 18 - Former Naval Magazine Waste Storage Area
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia





- Legend**
- | | |
|------------------------------------|---------------------------------------|
| ● Columbia Aquifer Monitoring Well | — Underground Portion of Bousch Creek |
| ● Yorktown Aquifer Monitoring Well | — Piping for AS/SVE Systems |
| ⊕ TW-2 | — Elevation Contour (2ft interval) |
| ■ Soil Vapor Extraction Well | — SBGR Trench |
| ● Air Sparge Wells | — Land Use Control Area |
| ● SBGR Extraction Well | — Site 20 Boundary |
| ■ Industrial Waste Sewer Line | — Installation Boundary |
| — Gas Main Line | |

2021 LTM Data COC Plume Extent Above Cleanup Goals (Dashed Where Inferred):

- Columbia Aquifer Plume
- Yorktown Aquifer Plume

Notes:
*DNAPL Present at TW-2 in 2014

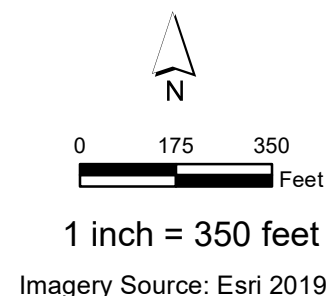
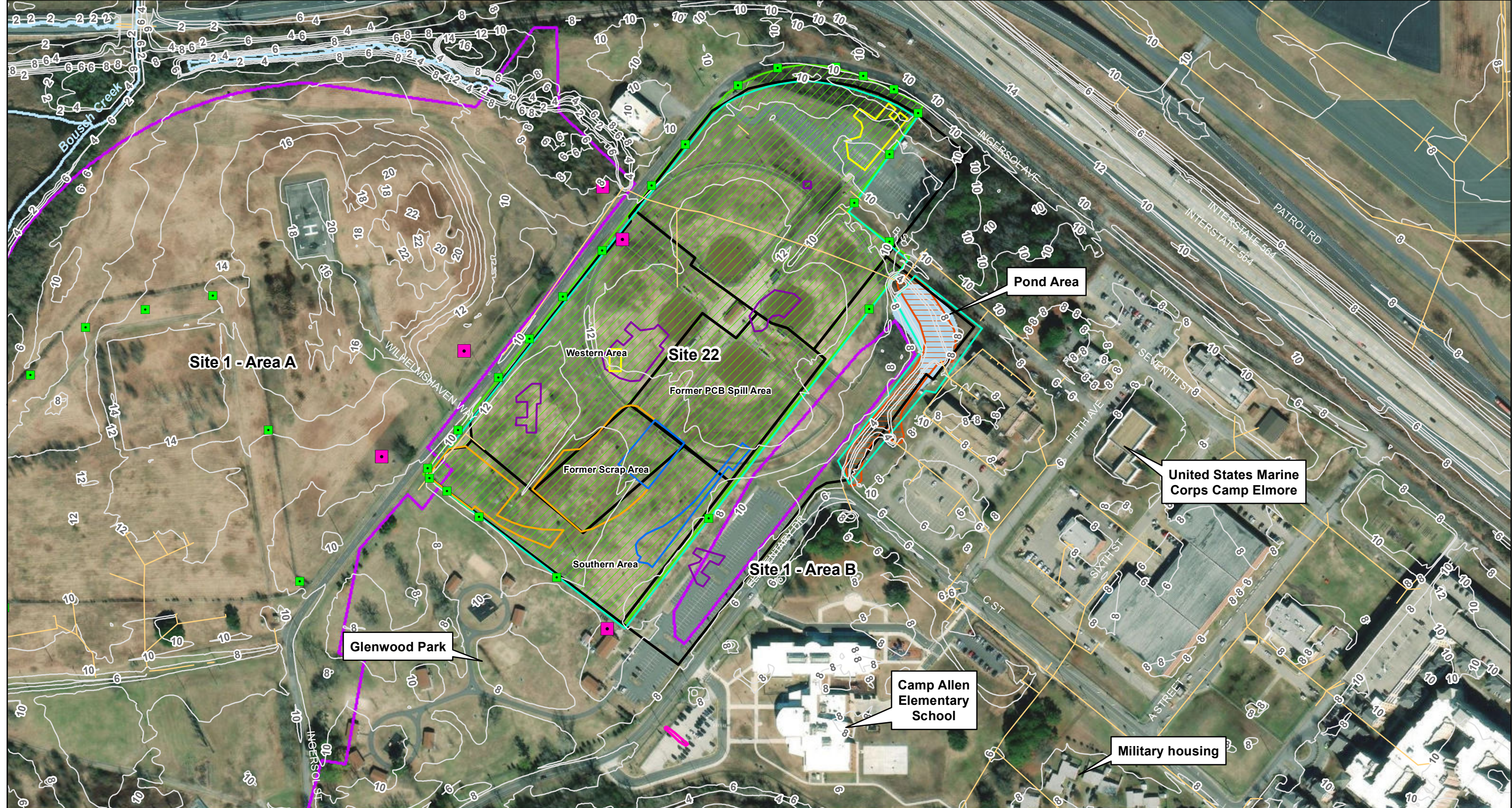


Figure 2-6
Site 20 - Building LP-20 Area
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia





- Legend**
- Small Sign
 - Large Sign
 - Storm Sewer Line
 - Elevation Contour (2ft interval)
 - Surface Water Features
 - Site 1 Boundary
 - Sediment Cover Installed in 2003
 - Soil Cover Installed in 2002
 - Time-Critical Removal Action (2017)
 - Former Area
 - Land Use Control Area
 - PCB Contaminated Soil Removed in 1998
 - PCB/Metals Contaminated Soil Removed in 2001
 - Metals 'Hot Spot' Soil Removed (0-4 Foot) in 2001
 - Metals 'Hot Spot' Soil Removed (0-1.5 Foot) in 2001

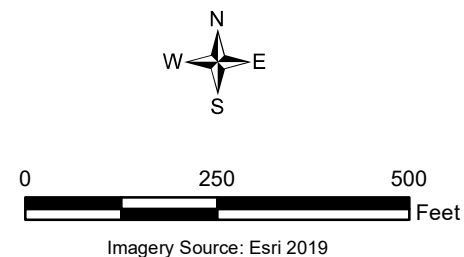
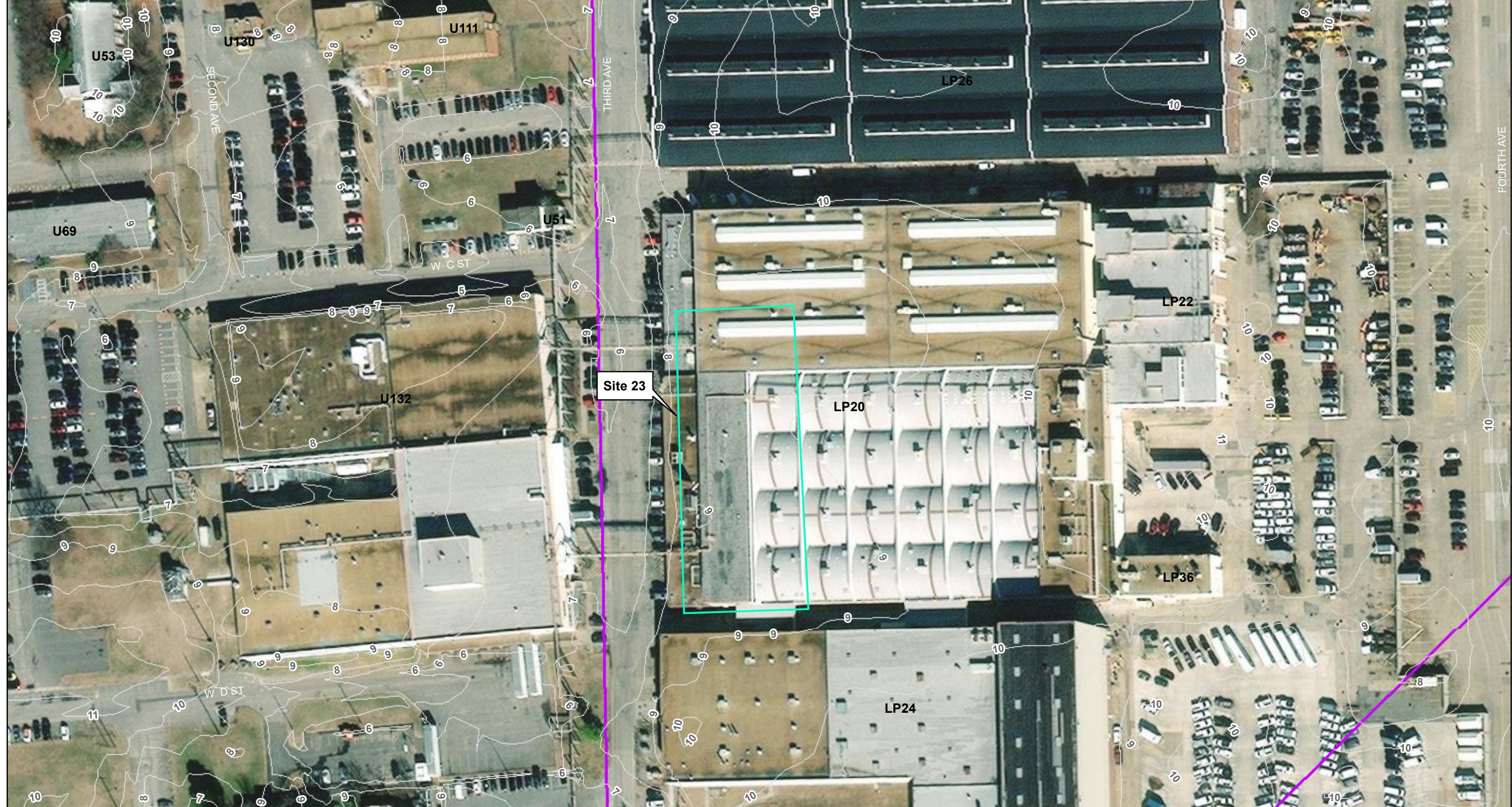


Figure 2-7
Site 22 - Camp Allen Salvage Yard
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia



- Legend**
- Land Use Control Area
 - Site 20 Boundary
 - Elevation Contour (1ft interval)

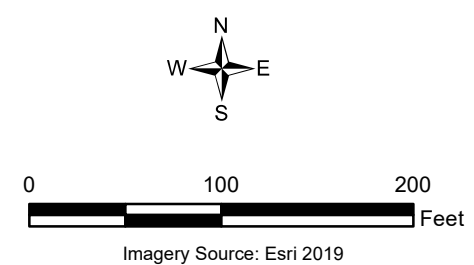


Figure 2-8
Site 23 - Building LP-20 Plating Shop
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia



- Legend**
- Asphalt Cover
 - Bioretention Areas
 - Historical Location of Original Satellite Accumulation Area Concrete Pad
 - Land Use Control Area
 - Elevation Contour (1ft interval)

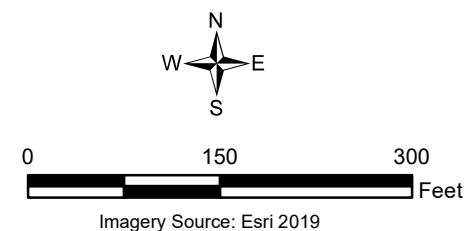





















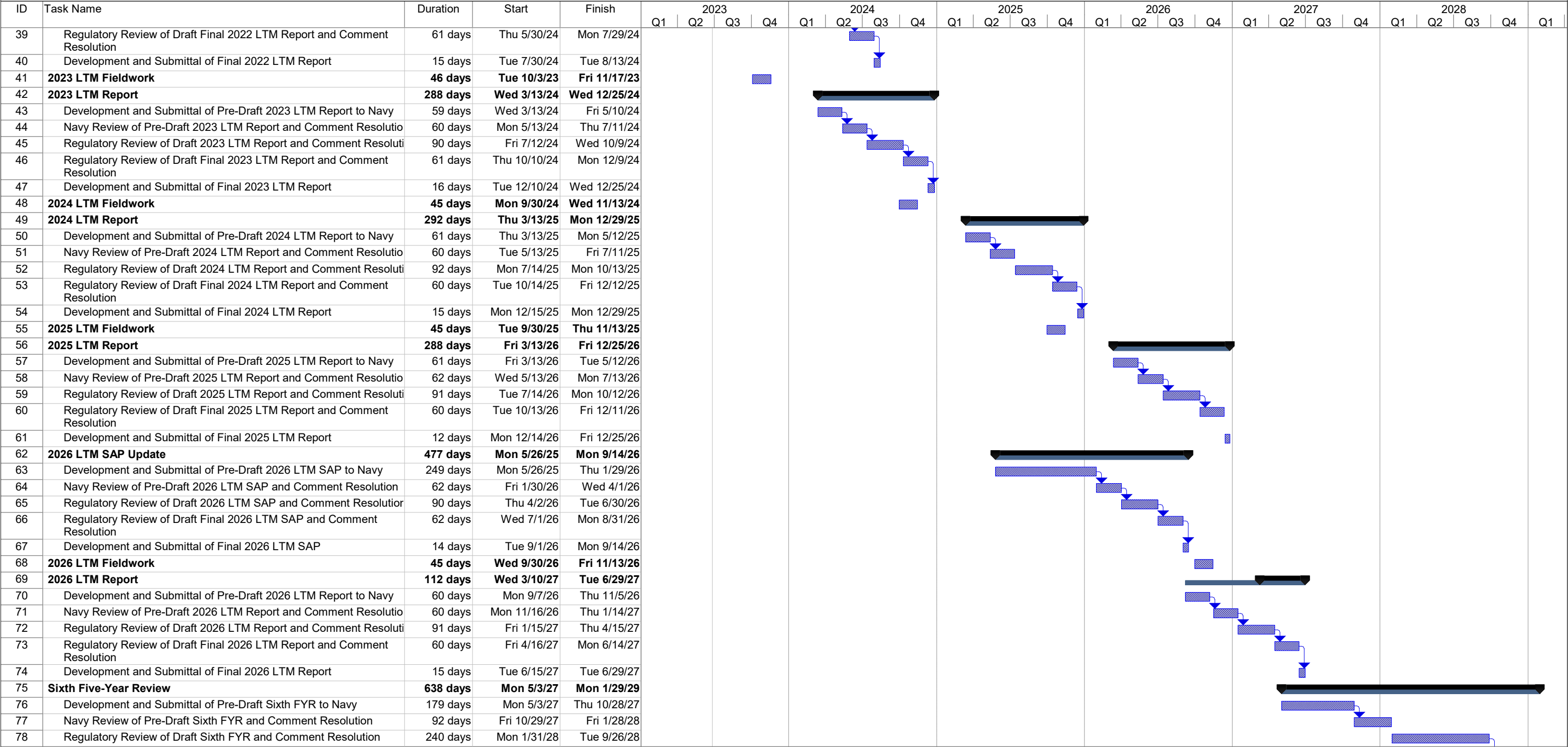
Figure 2-9
SWMU 14 - Q-50 Satellite Accumulation Area
Site Management Plan
Fiscal Years 2024-2028
Naval Station Norfolk
Norfolk, Virginia

Schedule 2-1
Basewide Tasks FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish	2023				2024				2025				2026				2027				2028				Q1
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1	Basewide PFAS SI Fieldwork	78 days	Mon 6/20/22	Mon 9/5/22																									
2	Basewide PFAS SI Report	324 days	Thu 1/5/23	Fri 11/24/23																									
3	Development and Submittal of Pre-Draft Basewide PFAS SI Report to Navy	113 days	Thu 1/5/23	Thu 4/27/23																									
4	Navy Review of Pre-Draft Basewide PFAS SI Report and Comment Resolution	60 days	Fri 4/28/23	Mon 6/26/23																									
5	Regulatory Review of Draft Basewide PFAS SI Report and Comment Resolution	91 days	Tue 6/27/23	Mon 9/25/23																									
6	Regulatory Review of Draft Final Basewide PFAS SI Report and Comment Resolution	60 days	Tue 9/26/23	Fri 11/24/23																									
7	Development and Submittal of Final Basewide PFAS SI Report	1 day	Sat 11/25/23	Sat 11/25/23																									
8	Site Management Plan FY 2024-2028	153 days	Thu 6/1/23	Tue 10/31/23																									
9	Development and Submittal of Pre-Draft SMP to Navy	30 days	Thu 6/1/23	Fri 6/30/23																									
10	Navy Review of Pre-Draft SMP and Comment Resolution	15 days	Mon 7/3/23	Mon 7/17/23																									
11	Regulatory Review of Draft SMP and Comment Resolution	60 days	Tue 7/18/23	Fri 9/15/23																									
12	Regulatory Review of Draft Final SMP and Comment Resolution	30 days	Sat 9/16/23	Sun 10/15/23																									
13	Development and Submittal of Final SMP	16 days	Mon 10/16/23	Tue 10/31/23																									
14	Fifth Five-Year Review	638 days	Mon 5/2/22	Mon 1/29/24																									
15	Development and Submittal of Pre-Draft Fifth FYR to Navy	213 days	Mon 5/2/22	Wed 11/30/22																									
16	Navy Review of Pre-Draft Fifth FYR and Comment Resolution	148 days	Thu 12/1/22	Thu 4/27/23																									
17	Regulatory Review of Draft Fifth FYR and Comment Resolution	141 days	Fri 4/28/23	Fri 9/15/23																									
18	Regulatory Review of Draft Final Fifth FYR and Comment Resolution	112 days	Mon 9/18/23	Sun 1/7/24																									
19	Development and Submittal of Final Fifth FYR for CO Signature	21 days	Mon 1/8/24	Sun 1/28/24																									
20	Fifth FYR Signed	1 day	Mon 1/29/24	Mon 1/29/24																									
21	2021 LTM Fieldwork	30 days	Mon 11/15/21	Tue 12/14/21																									
22	2021 LTM Report	623 days	Wed 4/6/22	Tue 12/19/23																									
23	Development and Submittal of Pre-Draft 2021 LTM Report to Navy	205 days	Wed 4/6/22	Thu 10/27/22																									
24	Navy Review of Pre-Draft 2021 LTM Report and Comment Resolution	250 days	Fri 10/28/22	Tue 7/4/23																									
25	Regulatory Review of Draft 2021 LTM Report and Comment Resolution	91 days	Wed 7/5/23	Tue 10/3/23																									
26	Regulatory Review of Draft Final 2021 LTM Report and Comment Resolution	62 days	Wed 10/4/23	Mon 12/4/23																									
27	Development and Submittal of Final 2021 LTM Report	15 days	Tue 12/5/23	Tue 12/19/23																									
28	LTM SAP Addendum Revision 2	318 days	Mon 8/1/22	Wed 6/14/23																									
29	Development and Submittal of Pre-Draft LTM SAP Addendum Revision 2 to Navy	68 days	Mon 8/1/22	Fri 10/7/22																									
30	Navy Review of Pre-Draft LTM SAP Addendum Revision 2 and Comment Resolution	61 days	Mon 10/10/22	Fri 12/9/22																									
31	Regulatory Review of Draft LTM SAP Addendum Revision 2 and Comment Resolution	177 days	Thu 12/15/22	Fri 6/9/23																									
32	Regulatory Review of Draft Final LTM SAP Addendum Revision 2 and Comment Resolution	30 days	Sat 6/10/23	Sun 7/9/23																									
33	Development and Submittal of Final LTM SAP Addendum Revision 2	15 days	Mon 7/10/23	Mon 7/24/23																									
34	2022 LTM Fieldwork	10 days	Fri 1/13/23	Sun 1/22/23																									
35	2022 LTM Report	426 days	Thu 6/15/23	Tue 8/13/24																									
36	Development and Submittal of Pre-Draft 2022 LTM Report to Navy	138 days	Thu 6/15/23	Mon 10/30/23																									
37	Navy Review of Pre-Draft 2022 LTM Report and Comment Resolution	121 days	Tue 10/31/23	Wed 2/28/24																									
38	Regulatory Review of Draft 2022 LTM Report and Comment Resolution	91 days	Thu 2/29/24	Wed 5/29/24																									

Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			




















Schedule 2-1
Basewide Tasks FY 2024-2028 Schedule



Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			




















Schedule 2-1
Basewide Tasks FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish	2023				2024				2025				2026				2027				2028				
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
79	Regulatory Review of Draft Final Sixth FYR and Comment Resolution	90 days	Wed 9/27/28	Mon 12/25/28																									
80	Development and Submittal of Final Sixth FYR for CO Signature	35 days	Tue 12/26/28	Mon 1/29/29																									
81	Sixth FYR Signed	1 day	Tue 1/30/29	Tue 1/30/29																									

Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			




















Schedule 2-2
Site 1 FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish	23		2024				2025				2026				2027				2028				2029								
					Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3						
1	Phase Equilibrium Assessment Fieldwork	91 days	Tue 8/1/23	Mon 10/30/23																															
2	Remedial Action Optimization Report	409 days	Wed 11/1/23	Fri 12/13/24																															
3	Development and Submittal of Pre-Draft Remedial Action Optimization Report to Navy	178 days	Wed 11/1/23	Fri 4/26/24																															
4	Navy Review of Pre-Draft Remedial Action Optimization Report and Comment Resolution	60 days	Mon 4/29/24	Thu 6/27/24																															
5	Regulatory Review of Draft Remedial Action Optimization Report and Comment Resolution	91 days	Fri 6/28/24	Thu 9/26/24																															
6	Regulatory Review of Draft Final Remedial Action Optimization Report and Comment Resolution	60 days	Fri 9/27/24	Mon 11/25/24																															
7	Development and Submittal of Final Remedial Action Optimization Report	18 days	Tue 11/26/24	Fri 12/13/24																															
8	Remedial Action Optimization - Vapor Intrusion Evaluation SAP Addendum	348 days	Thu 12/1/22	Mon 11/13/23																															
9	Development and Submittal of Pre-Draft Remedial Action Optimization - VI Evaluation SAP Addendum to Navy	89 days	Thu 12/1/22	Mon 2/27/23																															
10	Navy Review of Pre-Draft Remedial Action Optimization - VI Evaluation SAP Addendum and Comment Resolution	123 days	Tue 2/28/23	Fri 6/30/23																															
11	Regulatory Review of Draft Remedial Action Optimization - VI Evaluation SAP Addendum and Comment Resolution	91 days	Sat 7/1/23	Fri 9/29/23																															
12	Regulatory Review of Draft Final Remedial Action Optimization - VI Evaluation SAP Addendum and Comment Resolution	60 days	Sat 9/30/23	Tue 11/28/23																															
13	Development and Submittal of Final Remedial Action Optimization - VI Evaluation SAP Addendum	15 days	Wed 11/29/23	Wed 12/13/23																															
14	Remedial Action Optimization - Vapor Intrusion Evaluation Fieldwork	182 days	Tue 8/1/23	Mon 1/29/24																															
15	Remedial Action Optimization - Vapor Intrusion Evaluation Report	418 days	Thu 2/1/24	Mon 3/24/25																															
16	Development and Submittal of Pre-Draft Remedial Action Optimization - VI Evaluation Report to Navy	177 days	Thu 2/1/24	Fri 7/26/24																															
17	Navy Review of Pre-Draft Remedial Action Optimization - VI Evaluation Report and Comment Resolution	60 days	Mon 7/29/24	Thu 9/26/24																															
18	Regulatory Review of Draft Remedial Action Optimization - VI Evaluation Report and Comment Resolution	91 days	Fri 9/27/24	Thu 12/26/24																															
19	Regulatory Review of Draft Final Remedial Action Optimization - VI Evaluation Report and Comment Resolution	60 days	Fri 12/27/24	Mon 2/24/25																															
20	Development and Submittal of Final Remedial Action Optimization - VI Evaluation Report	28 days	Tue 2/25/25	Mon 3/24/25																															
21	Vapor Intrusion Pathway Evaluation	364 days	Tue 10/1/24	Mon 9/29/25																															
22	Development and Submittal of Pre-Draft VI Pathway Evaluation to Navy	88 days	Tue 10/1/24	Fri 12/27/24																															
23	Navy Review of Pre-Draft VI Pathway Evaluation and Comment Resolution	61 days	Mon 12/30/24	Fri 2/28/25																															
24	Regulatory Review of Draft VI Pathway Evaluation and Comment Resolution	92 days	Mon 3/3/25	Mon 6/2/25																															
25	Regulatory Review of Draft Final VI Pathway Evaluation and Comment Resolution	60 days	Tue 6/3/25	Fri 8/1/25																															
26	Development and Submittal of Final VI Pathway Evaluation	57 days	Mon 8/4/25	Mon 9/29/25																															
27	PFAS Remedy Optimizaition SAP	441 days	Thu 6/1/23	Wed 8/14/24																															
28	Development and Submittal of Pre-Draft PFAS Remedy Optimization SAP to Navy	197 days	Fri 6/16/23	Fri 12/29/23																															
29	Navy Review of Pre-Draft PFAS Remedy Optimization SAP and Comment Resolution	60 days	Mon 1/1/24	Thu 2/29/24																															
30	Regulatory Review of Draft PFAS Remedy Optimization SAP and Comment Resolution	90 days	Fri 3/1/24	Wed 5/29/24																															

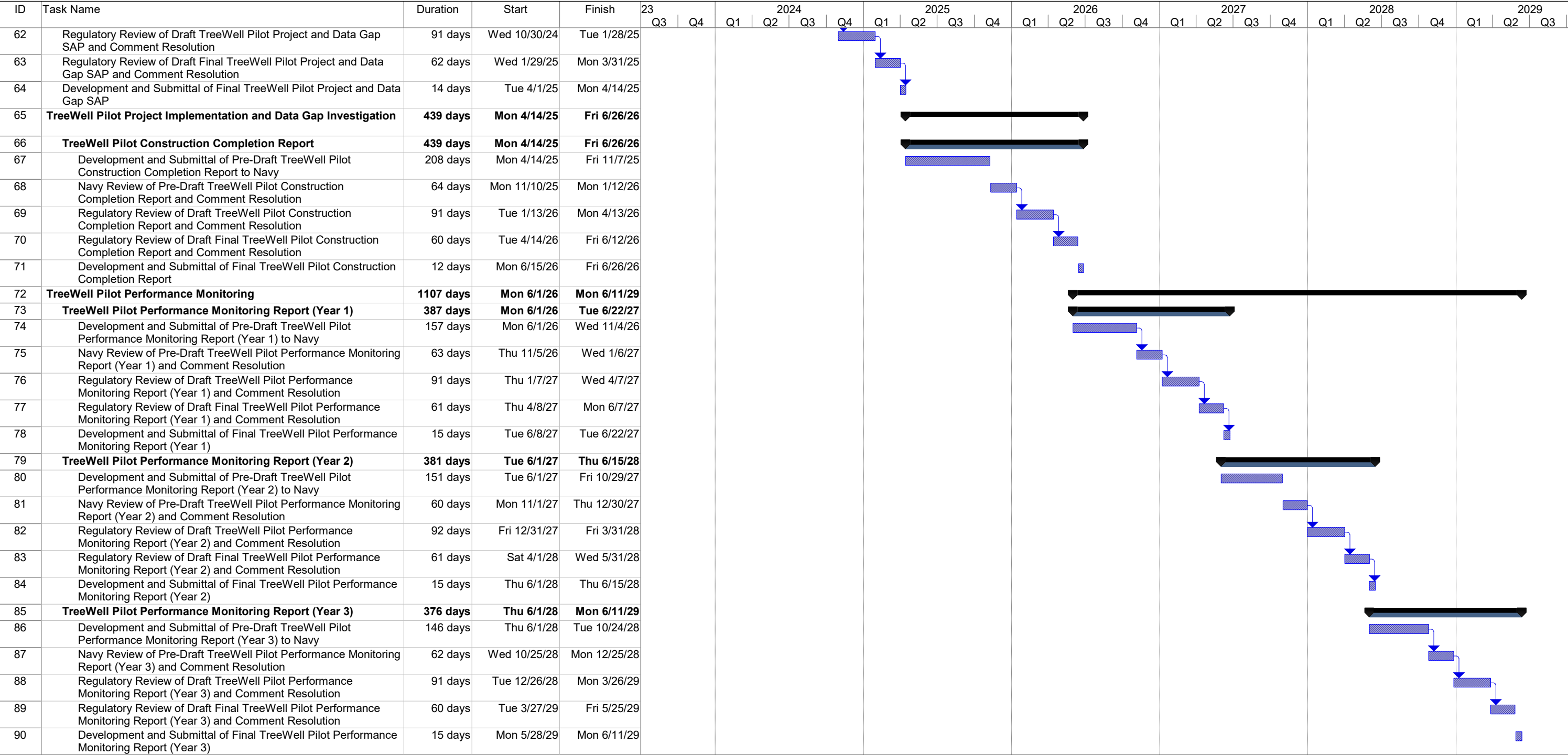
Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			

Schedule 2-2
Site 1 FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish	23	2024				2025				2026				2027				2028				2029		
					Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
31	Regulatory Review of Draft Final PFAS Remedy Optimization SAP and Comment Resolution	61 days	Thu 5/30/24	Mon 7/29/24																								
32	Development and Submittal of Final PFAS Remedy Optimization SAP	16 days	Tue 7/30/24	Wed 8/14/24																								
33	PFAS Remedy Optimization Fieldwork	120 days	Wed 8/14/24	Wed 12/11/24																								
34	PFAS Remedy Optimization Report	386 days	Wed 1/1/25	Wed 1/21/26																								
35	Development and Submittal of Pre-Draft PFAS Remedy Optimization Report to Navy	160 days	Wed 1/1/25	Mon 6/9/25																								
36	Navy Review of Pre-Draft PFAS Remedy Optimization Report and Comment Resolution	60 days	Tue 6/10/25	Fri 8/8/25																								
37	Regulatory Review of Draft PFAS Remedy Optimization Report and Comment Resolution	90 days	Mon 8/11/25	Sat 11/8/25																								
38	Regulatory Review of Draft Final PFAS Remedy Optimization Report and Comment Resolution	60 days	Sun 11/9/25	Wed 1/7/26																								
39	Development and Submittal of Final PFAS Remedy Optimization Report	14 days	Thu 1/8/26	Wed 1/21/26																								
40	Comprehensive Monitoring Well Survey (Area A & B)	122 days	Thu 6/1/23	Sat 9/30/23																								
41	Groundwater Flow Fate & Transport Model	481 days	Mon 6/3/24	Fri 9/26/25																								
42	Development and Submittal of Pre-Draft Groundwater Flow Fate & Transport Model to Navy	211 days	Mon 6/3/24	Mon 12/30/24																								
43	Navy Review of Pre-Draft Groundwater Flow Fate & Transport Model and Comment Resolution	60 days	Tue 12/31/24	Fri 2/28/25																								
44	Regulatory Review of Draft Groundwater Flow Fate & Transport Model and Comment Resolution	92 days	Mon 3/3/25	Mon 6/2/25																								
45	Regulatory Review of Draft Final Groundwater Flow Fate & Transport Model and Comment Resolution	60 days	Tue 6/3/25	Fri 8/1/25																								
46	Development and Submittal of Final Groundwater Flow Fate & Transport Model	54 days	Mon 8/4/25	Fri 9/26/25																								
47	Groundwater Treatment System Optimization	772 days	Mon 6/3/24	Tue 7/14/26																								
48	Development and Submittal of Pre-Draft Groundwater Treatment System Optimization to Navy	120 days	Sat 9/27/25	Sat 1/24/26																								
49	Navy Review of Pre-Draft Groundwater Treatment System Optimization and Comment Resolution	60 days	Sun 1/25/26	Wed 3/25/26																								
50	Regulatory Review of Draft Groundwater Treatment System Optimization and Comment Resolution	90 days	Thu 3/26/26	Tue 6/23/26																								
51	Regulatory Review of Draft Final Groundwater Treatment System Optimization and Comment Resolution	61 days	Wed 6/24/26	Sun 8/23/26																								
52	Development and Submittal of Final Groundwater Treatment System Optimization	15 days	Mon 8/24/26	Mon 9/7/26																								
53	TreeWell Pilot Project Technology Assessment	441 days	Thu 6/1/23	Wed 8/14/24																								
54	Development and Submittal of Pre-Draft TreeWell Pilot Project Technology Assessment to Navy	211 days	Thu 6/1/23	Thu 12/28/23																								
55	Navy Review of Pre-Draft TreeWell Pilot Project Technology Assessment and Comment Resolution	62 days	Fri 12/29/23	Wed 2/28/24																								
56	Regulatory Review of Draft TreeWell Pilot Project Technology Assessment and Comment Resolution	92 days	Thu 2/29/24	Thu 5/30/24																								
57	Regulatory Review of Draft Final TreeWell Pilot Project Technology Assessment and Comment Resolution	60 days	Fri 5/31/24	Mon 7/29/24																								
58	Development and Submittal of Final TreeWell Pilot Project Technology Assessment	16 days	Tue 7/30/24	Wed 8/14/24																								
59	TreeWell Pilot Project and Data Gap SAP	412 days	Wed 2/28/24	Mon 4/14/25																								
60	Development and Submittal of Pre-Draft TreeWell Pilot Project and Data Gap SAP to Navy	183 days	Wed 2/28/24	Wed 8/28/24																								
61	Navy Review of Pre-Draft TreeWell Pilot Project and Data Gap SAP and Comment Resolution	62 days	Thu 8/29/24	Tue 10/29/24																								

	Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
	Split		External Tasks		Manual Task		Start-only		Progress	
	Milestone		External Milestone		Duration-only		Finish-only		Deadline	
	Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			




















Schedule 2-2
Site 1 FY 2024-2028 Schedule



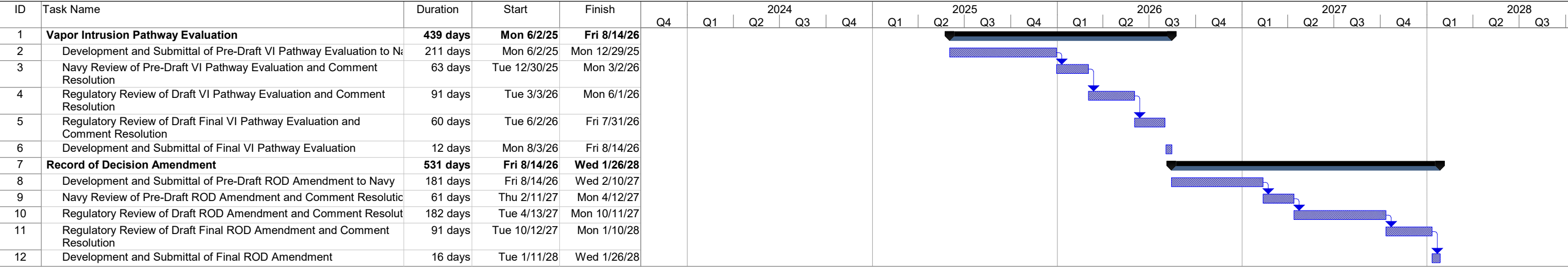
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Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			

Schedule 2-3
Site 2 FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish		2025				2026		
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1	Residential Risk Evaluation	439 days	Mon 6/2/25	Fri 8/14/26								
2	Development and Submittal of Pre-Draft Residential Risk Evaluation to Navy	211 days	Mon 6/2/25	Mon 12/29/25								
3	Navy Review of Pre-Draft Residential Risk Evaluation and Comment Resolution	63 days	Tue 12/30/25	Mon 3/2/26								
4	Regulatory Review of Draft Residential Risk Evaluation and Comment Resolution	91 days	Tue 3/3/26	Mon 6/1/26								
5	Regulatory Review of Draft Final Residential Risk Evaluation and Comment Resolution	60 days	Tue 6/2/26	Fri 7/31/26								
6	Development and Submittal of Final Residential Risk Evaluation	12 days	Mon 8/3/26	Fri 8/14/26								

Task		Inactive Milestone		Finish-only	
Split		Inactive Summary		External Tasks	
Milestone		Manual Task		External Milestone	
Summary		Duration-only		Progress	
Project Summary		Manual Summary Rollup		Deadline	
External Tasks		Manual Summary			
External Milestone		Start-only			

Schedule 2-4
Site 3 FY 2024-2028 Schedule



Task

Split

Milestone

Summary

Project Summary

External Tasks

External Milestone

Inactive Milestone

Inactive Summary

Manual Task

Duration-only

Manual Summary Rollup

Manual Summary

Start-only

Finish-only

External Tasks




















External Milestone

Progress

Deadline




















Schedule 2-5 Site 18 FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish		2025					2026		
						Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1	Vapor Intrusion Pathway Evaluation	439 days	Mon 6/2/25	Fri 8/14/26									
2	Development and Submittal of Pre-Draft VI Pathway Evaluation to Navy	211 days	Mon 6/2/25	Mon 12/29/25									
3	Navy Review of Pre-Draft VI Pathway Evaluation and Comment Resolution	60 days	Tue 12/30/25	Fri 2/27/26									
4	Regulatory Review of Draft VI Pathway Evaluation and Comment Resolution	92 days	Mon 3/2/26	Mon 6/1/26									
5	Regulatory Review of Draft Final VI Pathway Evaluation and Comment Resolution	60 days	Tue 6/2/26	Fri 7/31/26									
6	Development and Submittal of Final VI Pathway Evaluation	12 days	Mon 8/3/26	Fri 8/14/26									

Task		Inactive Milestone		Finish-only	
Split		Inactive Summary		External Tasks	
Milestone		Manual Task		External Milestone	
Summary		Duration-only		Progress	
Project Summary		Manual Summary Rollup		Deadline	
External Tasks		Manual Summary			
External Milestone		Start-only			

Schedule 2-6
Site 20 FY 2024-2028 Schedule

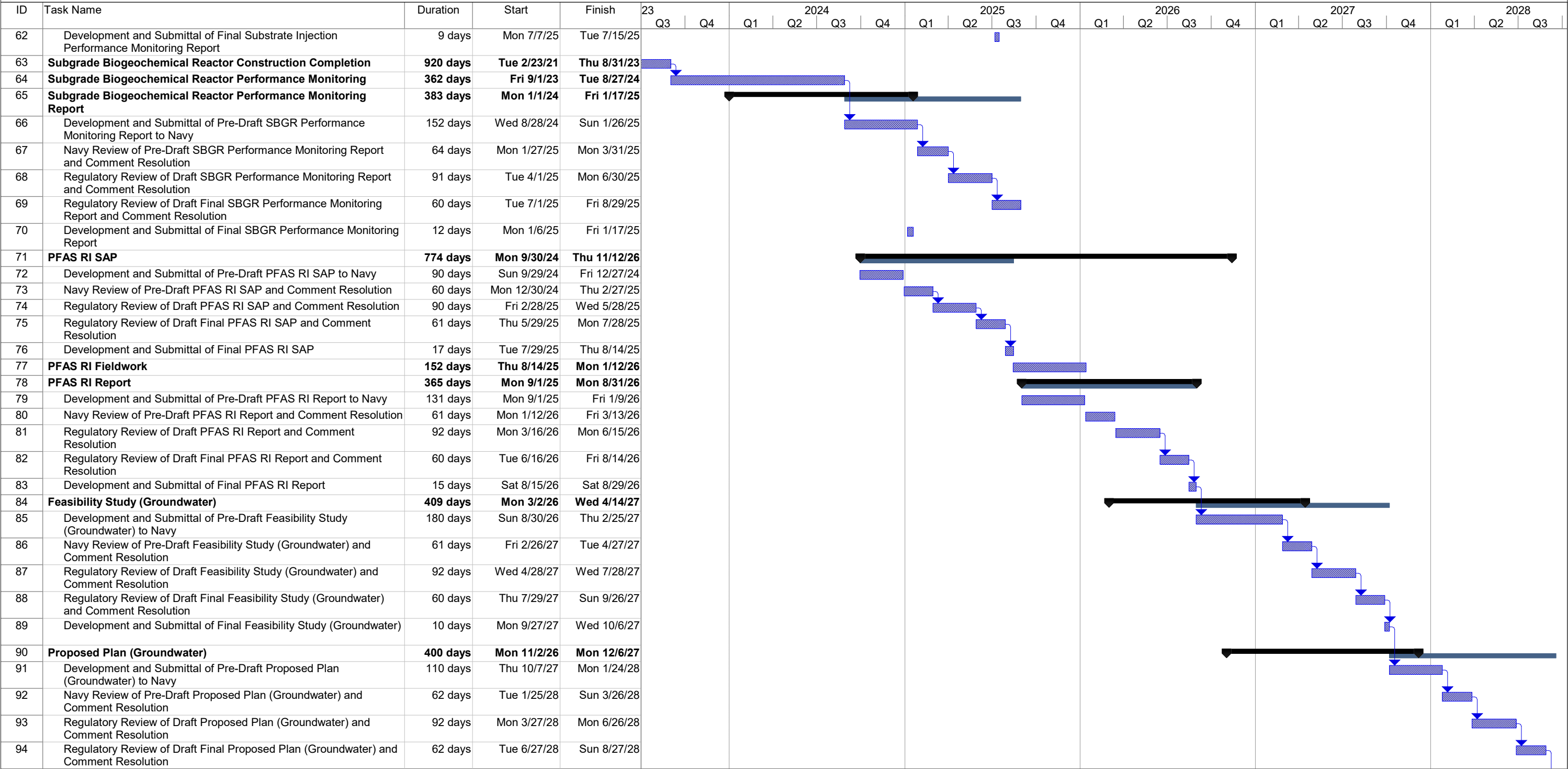
ID	Task Name	Duration	Start	Finish	23		2024				2025				2026				2027				2028		
					Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
1	Expanded Vapor Intrusion Report	1382 days	Wed 1/1/20	Fri 10/13/23																					
2	Development and Submittal of Pre-Draft VI Pathway Evaluation to Navy	308 days	Wed 1/1/20	Tue 11/3/20																					
3	Navy Review of Pre-Draft VI Pathway Evaluation and Comment Resolution	149 days	Wed 11/4/20	Thu 4/1/21																					
4	Regulatory Review of Draft VI Pathway Evaluation and Comment Resolution	148 days	Fri 4/2/21	Fri 8/27/21																					
5	Regulatory Review of Draft Final VI Pathway Evaluation and Comment Resolution	760 days	Sat 8/28/21	Tue 9/26/23																					
6	Development and Submittal of Final VI Pathway Evaluation	17 days	Wed 9/27/23	Fri 10/13/23																					
7	Air Purifying Unit Performance Monitoring Report (August 2021 - July 2022)	427 days	Tue 8/2/22	Mon 10/2/23																					
8	Development and Submittal of Pre-Draft Air Purifying Unit Performance Monitoring Report (August 2021 - July 2022) to Navy	182 days	Tue 8/2/22	Mon 1/30/23																					
9	Navy Review of Pre-Draft Air Purifying Unit Performance Monitoring Report (August 2021 - July 2022) and Comment Resolution	78 days	Tue 1/31/23	Tue 4/18/23																					
10	Regulatory Review of Draft Air Purifying Unit Performance Monitoring Report (August 2021 - July 2022) and Comment	91 days	Wed 4/19/23	Tue 7/18/23																					
11	Regulatory Review of Draft Final Air Purifying Unit Performance Monitoring Report (August 2021 - July 2022) and Comment	62 days	Wed 7/19/23	Mon 9/18/23																					
12	Development and Submittal of Final Air Purifying Unit Performance Monitoring Report (August 2021 - July 2022)	14 days	Tue 9/19/23	Mon 10/2/23																					
13	Air Purifying Unit Performance Monitoring Report (August 2022 - July 2023)	345 days	Thu 8/3/23	Fri 7/12/24																					
14	Development and Submittal of Pre-Draft Air Purifying Unit Performance Monitoring Report (August 2022 - July 2023) to Navy	119 days	Thu 8/3/23	Wed 11/29/23																					
15	Navy Review of Pre-Draft Air Purifying Unit Performance Monitoring Report (August 2022 - July 2023) and Comment Resolution	61 days	Thu 11/30/23	Mon 1/29/24																					
16	Regulatory Review of Draft Air Purifying Unit Performance Monitoring Report (August 2022 - July 2023) and Comment	91 days	Tue 1/30/24	Mon 4/29/24																					
17	Regulatory Review of Draft Final Air Purifying Unit Performance Monitoring Report (August 2022 - July 2023) and Comment	60 days	Tue 4/30/24	Fri 6/28/24																					
18	Development and Submittal of Final Air Purifying Unit Performance Monitoring Report (August 2022 - July 2023)	12 days	Mon 7/1/24	Fri 7/12/24																					
19	Soil Vapor Extraction Fieldwork	240 days	Mon 6/6/22	Tue 1/31/23																					
20	Remedy Optimization Soil Vapor Extraction Evaluation Report	321 days	Fri 3/31/23	Wed 2/14/24																					
21	Development and Submittal of Pre-Draft Remedy Optimization Soil Vapor Extraction Evaluation Report to Navy	91 days	Fri 3/31/23	Thu 6/29/23																					
22	Navy Review of Pre-Draft Remedy Optimization Soil Vapor Extraction Evaluation Report and Comment Resolution	61 days	Fri 6/30/23	Tue 8/29/23																					
23	Regulatory Review of Draft Remedy Optimization Soil Vapor Extraction Evaluation Report and Comment Resolution	91 days	Wed 8/30/23	Tue 11/28/23																					
24	Regulatory Review of Draft Final Remedy Optimization Soil Vapor Extraction Evaluation Report and Comment Resolution	62 days	Wed 11/29/23	Mon 1/29/24																					
25	Development and Submittal of Final Remedy Optimization Soil Vapor Extraction Evaluation Report	16 days	Tue 1/30/24	Wed 2/14/24																					
26	Vapor Intrusion Pathway Evaluation	469 days	Wed 5/1/24	Tue 8/12/25																					
27	Development and Submittal of Pre-Draft VI Pathway Evaluation to Navy	241 days	Wed 5/1/24	Fri 12/27/24																					
28	Navy Review of Pre-Draft VI Pathway Evaluation and Comment Resolution	60 days	Mon 12/30/24	Thu 2/27/25																					
29	Regulatory Review of Draft VI Pathway Evaluation and Comment Resolution	90 days	Fri 2/28/25	Wed 5/28/25																					
30	Regulatory Review of Draft Final VI Pathway Evaluation and Comment Resolution	61 days	Thu 5/29/25	Mon 7/28/25																					





















Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			

Schedule 2-6
Site 20 FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish	23		2024				2025				2026				2027				2028		
					Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
31	Development and Submittal of Final VI Pathway Evaluation	15 days	Tue 7/29/25	Tue 8/12/25																					
32	Focused Feasibility Study (Vapor Intrusion Only)	334 days	Thu 5/1/25	Mon 3/30/26																					
33	Development and Submittal of Pre-Draft Focused Feasibility Study (VI Only) to Navy	103 days	Thu 5/1/25	Mon 8/11/25																					
34	Navy Review of Pre-Draft Focused Feasibility Study (VI Only) and Comment Resolution	60 days	Tue 8/12/25	Fri 10/10/25																					
35	Regulatory Review of Draft Focused Feasibility Study (VI Only) and Comment Resolution	92 days	Mon 10/13/25	Mon 1/12/26																					
36	Regulatory Review of Draft Final Focused Feasibility Study (VI Only) and Comment Resolution	60 days	Tue 1/13/26	Fri 3/13/26																					
37	Development and Submittal of Final Focused Feasibility Study (VI Only) to Navy	15 days	Mon 3/16/26	Mon 3/30/26																					
38	Proposed Plan (Vapor Intrusion Only)	315 days	Thu 1/1/26	Wed 11/11/26																					
39	Development and Submittal of Pre-Draft Proposed Plan (VI Only) to Navy	89 days	Thu 1/1/26	Mon 3/30/26																					
40	Navy Review of Pre-Draft Proposed Plan (VI Only) and Comment Resolution	60 days	Tue 3/31/26	Fri 5/29/26																					
41	Regulatory Review of Draft Proposed Plan (VI Only) and Comment Resolution	92 days	Mon 6/1/26	Mon 8/31/26																					
42	Regulatory Review of Draft Final Proposed Plan (VI Only) and Comment Resolution	60 days	Tue 9/1/26	Fri 10/30/26																					
43	Development and Submittal of Final Proposed Plan (VI Only) to Navy	10 days	Mon 11/2/26	Wed 11/11/26																					
44	Record of Decision Amendment (Vapor Intrusion Only)	513 days	Mon 6/1/26	Tue 10/26/27																					
45	Development and Submittal of Pre-Draft ROD Amendment (VI Only) to Navy	163 days	Mon 6/1/26	Tue 11/10/26																					
46	Navy Review of Pre-Draft ROD Amendment (VI Only) and Comment Resolution	62 days	Wed 11/11/26	Mon 1/11/27																					
47	Regulatory Review of Draft ROD Amendment (VI Only) and Comment Resolution	182 days	Tue 1/12/27	Mon 7/12/27																					
48	Regulatory Review of Draft Final ROD Amendment (VI Only) and Comment Resolution	91 days	Tue 7/13/27	Mon 10/11/27																					
49	Development and Submittal of Final ROD Amendment (VI Only) to Navy	15 days	Tue 10/12/27	Tue 10/26/27																					
50	Substrate Injections and Quarterly Performance Monitoring Fieldwork	361 days	Tue 6/6/23	Fri 5/31/24																					
51	Substrate Injection Construction Completion Report	449 days	Tue 6/6/23	Tue 8/27/24																					
52	Development and Submittal of Pre-Draft Substrate Injection Construction Completion Report to Navy	147 days	Tue 6/6/23	Mon 10/30/23																					
53	Navy Review of Pre-Draft Substrate Injection Construction Completion Report and Comment Resolution	63 days	Tue 10/31/23	Mon 1/1/24																					
54	Regulatory Review of Draft Substrate Injection Construction Completion Report and Comment Resolution	91 days	Tue 1/2/24	Mon 4/1/24																					
55	Regulatory Review of Draft Final Substrate Injection Construction Completion Report and Comment Resolution	60 days	Tue 4/2/24	Fri 5/31/24																					
56	Development and Submittal of Final Substrate Injection Construction Completion Report	86 days	Tue 6/6/23	Wed 8/30/23																					
57	Substrate Injection Performance Monitoring Report	411 days	Fri 5/31/24	Tue 7/15/25																					
58	Development and Submittal of Pre-Draft Substrate Injection Performance Monitoring Report to Navy	183 days	Fri 5/31/24	Fri 11/29/24																					
59	Navy Review of Pre-Draft Substrate Injection Performance Monitoring Report and Comment Resolution	61 days	Mon 12/2/24	Fri 1/31/25																					
60	Regulatory Review of Draft Substrate Injection Performance Monitoring Report and Comment Resolution	92 days	Mon 2/3/25	Mon 5/5/25																					
61	Regulatory Review of Draft Final Substrate Injection Performance Monitoring Report and Comment Resolution	60 days	Tue 5/6/25	Fri 7/4/25																					
		Task		Project Summary		Inactive Summary		Manual Summary		External Milestone															
		Split		External Tasks		Manual Task		Start-only		Progress															
		Milestone		External Milestone		Duration-only		Finish-only		Deadline															
		Summary		Inactive Milestone		Manual Summary Rollup		External Tasks																	




















Schedule 2-6
Site 20 FY 2024-2028 Schedule



Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			

Schedule 2-6
Site 20 FY 2024-2028 Schedule

ID	Task Name	Duration	Start	Finish	23		2024				2025				2026				2027				2028		
					Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
95	Development and Submittal of Final Proposed Plan (Groundwater)	21 days	Mon 8/28/28	Sun 9/17/28																					
96	Record of Decision Amendment (Groundwater)	520 days	Tue 6/15/27	Wed 11/15/28																					
97	Development and Submittal of Pre-Draft ROD Amendment (Groundwater) to Navy	75 days	Mon 9/18/28	Fri 12/1/28																					
98	Navy Review of Pre-Draft ROD Amendment (Groundwater) and Comment Resolution	61 days	Sat 12/2/28	Wed 1/31/29																					
99	Regulatory Review of Draft ROD Amendment (Groundwater) and Comment Resolution	180 days	Thu 2/1/29	Mon 7/30/29																					
100	Regulatory Review of Draft Final ROD Amendment (Groundwater) and Comment Resolution	90 days	Tue 7/31/29	Sun 10/28/29																					
101	Development and Submittal of Final ROD Amendment (Groundwater)	10 days	Mon 10/29/29	Wed 11/7/29																					

Task		Project Summary		Inactive Summary		Manual Summary		External Milestone	
Split		External Tasks		Manual Task		Start-only		Progress	
Milestone		External Milestone		Duration-only		Finish-only		Deadline	
Summary		Inactive Milestone		Manual Summary Rollup		External Tasks			

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Appendix A

CERCLA Process Activities

CERCLA Process Activities

As discussed in Section 1 of the Site Management Plan for Naval Station Norfolk (NSN), NSN was listed on the United States Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List on April 1, 1997. The Base is being investigated through the Environmental Restoration Program (ERP). Because the Department of the Navy (Navy) structured the ERP to be consistent with the terminology and structure of the CERCLA program, the placement of NSN on the CERCLA National Priorities List has had a limited effect on the cleanup processes that were already established. The CERCLA cleanup process is described in this attachment. The ERP at NSN is being implemented in accordance with applicable federal and state environmental regulations and requirements.

The Federal Facility Agreement (FFA) developed for NSN by USEPA Region 3 and the Navy will assist the Navy in meeting the provisions of CERCLA, Resource Conservation and Recovery Act, and applicable state law. The FFA will establish a procedural framework and provide detailed guidance on all phases of the remedial process, from investigation through remedial action. The FFA also incorporates the effects of team partnering on the remediation process. The modified remedial process, incorporating the provisions of the FFA, is discussed in this attachment.

CERCLA Process

CERCLA RI/FS Process

The CERCLA Remedial Investigation (RI)/Feasibility Study (FS) process refers to the process of site investigation and remedial action that is used for CERCLA sites.

The objectives of the CERCLA RI/FS process are to evaluate the nature and extent of contamination at a site, and to identify, develop, and implement appropriate remedial actions in order to protect human health and the environment. The RI/FS process includes the following major elements:

- RI
- Risk Assessment
- FS
- Proposed Remedial Action Plan (PP)
- Record of Decision (ROD) or Decision Document

These steps ultimately lead to either implementation of a remedial design (RD)/remedial action or the decision to take no action at the site. Where No Further Action (NFA) is required at a site, a no-action ROD would be signed and the site removed from the program.

The RI, risk assessment, FS, and PP documents are maintained in information repositories for review by the public. A formal public comment period and a public meeting (if required) generally follow the issuance of the final PP. Public comments received on the final PP are addressed as part of the responsiveness summary in the ROD. Subsequent to completion of the ROD, RD/remedial action activities are initiated. In accordance with CERCLA, remedial action is required to begin within 15 months of the final ROD.

Removal Action Process

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

Removal actions are classified as either time-critical or non-time-critical. Actions taken immediately to mitigate an imminent threat to human health or the environment, such as the removal of corroded or leaking drums, are classified

as time-critical removal actions. Removal actions that may be delayed for 6 months or more without significant additional harm to human health or the environment are classified as non-time-critical removal actions (NTCRAs).

For NTCRAs, an Engineering Evaluation and Cost Analysis (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 remedial action if the risk assessment results indicate that no further remedial action is required to protect human health and the environment.

An NTCRA was completed at Area B of the Camp Allen Landfill (CALF) in 1994; however, the NTCRA was not considered a final remedy for the site. A soil removal action also was completed in the Q-Area that involved the removal of 750 cubic yards of petroleum-contaminated soil from the northwestern corner of the site to allow construction of a parking lot. In addition, a soil removal action was completed in the Naval Magazine Area (Taussig Can Area) in 1979 with the approval of the Commonwealth of Virginia.

A soil removal action was completed at the Building W-316 site that involved the removal of polychlorinated biphenyl-contaminated soil, and a removal action was completed at the SP-2B Accumulation Area that involved the removal of lead-contaminated soil. NTCRAs have been completed for pesticide-contaminated soil at the Pesticide Disposal Site, metals and polychlorinated biphenyl-contaminated soil at the Camp Allen Salvage Yard, lead-contaminated sediment at the Naval Magazine Slag Pile, and metals and pesticide-contaminated sediment at the Construction Debris Landfill.

NTCRAs were completed at four sites in 2007 and 2008. These sites (along with the Site Management Plan section where details are provided) are the following:

- Upper Reaches of Bousch Creek (as associated with Site 1) – Section 2.1.1
- Site 18 – Section 2.1.5
- Site 23 – Section 2.1.8
- SWMU 14 – Section 2.2.1

Remedial Action Process

Remedial actions may be considered interim remedial actions (IRA) or final remedial actions. IRAs are implemented to provide temporary mitigation of human health risks or to mitigate the spread of contamination in the environment. Similar to removal actions, remedial actions may be implemented at any time during the RI/FS process. An IRA is implemented to attain applicable or relevant and appropriate requirements to the extent required by CERCLA or the National Contingency Plan. It is also consistent with and contributes to the efficient performance of a final remedial action taken at an area or operable unit (OU). Examples of IRAs include installation of a pump-and-treat system for product recovery from the groundwater or installation of a fence to prevent direct contact with hazardous materials.

For IRAs, a Focused Feasibility Study is prepared rather than the more extensive FS. As with the removal action, an IRA may become the final remedial action if the risk assessment results indicate that no further remedial action is required in order to protect human health and the environment. In this case, a no-action ROD would be signed and the site removed from the program upon completion of the IRA.

Following the more extensive FS process, a preliminary/conceptual RD, a pre-final RD, and then a final RD are developed for final remedial action at an area or OU. After completion of the remedial action at each area or OU, a Remedial Action Completion Report will be prepared. If necessary, a Long-term Monitoring Plan and an Operation and Maintenance Plan will also be prepared for each remedial action site.

Remedial actions have been constructed at three sites at NSN: Site 1 - CALF, Site 20 – Building LP-20 Area, and Site 3 - Q-Area Drum Storage Yard. A groundwater extraction and treatment system and dual-phase vapor extraction system became operational at CALF in July 1997. An air sparge/soil vapor extraction (AS/SVE) system to address chlorinated solvents in the groundwater at the Building LP-20 Area started operations on April 14, 1998. An AS/SVE system to address total petroleum hydrocarbons and chlorinated solvents in the groundwater started operations at the Q-Area Drum Storage Yard in Area of Concern (AOC) 2 and AOC 1 on August 18, 1998 and

August 20, 1998, respectively. Baseline monitoring, supplemental testing, and long-term monitoring are currently performed at each site..

Treatability Studies

Treatability studies are performed to assist in the evaluation of a potentially promising remedial technology. The primary objectives of treatability testing are the following:

- To provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the FS
- To support the RD of a selected alternative

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

Treatability studies may be classified as either bench-scale (laboratory study) or pilot-scale (field studies). Bench-scale studies are often sufficient to evaluate performance for technologies that are well developed and tested. For more innovative technologies, pilot tests may be required 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.

Pilot-scale treatability studies had been conducted at the CALF site to evaluate air stripping and dual-phase vapor extraction technologies. Additionally, SVE and AS pilot-scale treatability studies were completed at the Q-Area Drum Storage Yard and Building LP-20 Area.

Federal Facility Agreement CERCLA Integration Process

Area of Concern Evaluation

Sites identified as AOCs in the FFA will undergo a document evaluation. This document evaluation will involve a thorough review of existing or easily obtainable documentation and information on the identified sites. If the Navy and USEPA agree, the evaluation could include obtaining discrete samples from the AOC without the development of a work plan. If both parties do not agree, the AOC evaluation process will continue without the performance of sampling.

The document evaluation will also involve assessing information concerning the handling of hazardous wastes at each AOC, the actions taken at each AOC, or actions that will be occurring under other regulatory programs at each AOC. Based on the AOC evaluation, a decision will be made by the management team regarding which AOCs will proceed to the Site Screening Process (SSP) as Site Screening Areas (SSAs) and which AOCs will require NFA and can be closed out. For those AOCs requiring NFA, an AOC closeout document will be prepared.

Site Screening Process

The SSP refers to the process described in the FFA that will be used to identify whether SSAs should proceed into the RI/FS process under CERCLA. SSAs are those areas that may pose a threat to public health, welfare, or the environment. SSAs can be identified by either the Navy or USEPA. Upon identification of an SSA, an SSP Work Plan will be prepared outlining the activities necessary to determine whether there have been releases of hazardous substances, pollutants, contaminants, hazardous waste, or other hazardous constituents to the environment. After investigation activities have been performed, an SSP report will be prepared. The report provides the basis for a determination of one of the following:

- An RI/FS will be performed at the SSA.
- The area does not pose a threat to public health, welfare, or the environment and, therefore, should be removed from further study.

For SSAs that do not warrant an RI/FS under CERCLA, a brief Decision Document will be prepared and signed by all project managers on the management team.

Appendix B
Screening, Categorizing, and
Prioritizing Sites at Naval Station Norfolk

Screening, Categorizing, and Prioritizing Sites at Naval Station Norfolk

Federal Facility Agreement

On February 18, 1999, the United States Environmental Protection Agency (USEPA) Region 3 and the Department of the Navy (Navy) entered into a Federal Facility Agreement (FFA) for Naval Station Norfolk (NSN). One of the objectives of the FFA is to define a site screening process (SSP) intended to provide a simplified investigative method to identify site screening areas (SSAs) and areas of concern (AOCs) for evaluation and determine whether Remedial Investigations (RIs) are required for these areas.

Determining Site Screening Areas

If the USEPA or Navy determines that an area on NSN, which has not been previously identified as an SSA, poses a threat to public health or the environment, the other party will be notified. The parties will then have 45 days from the notification to discuss the site conditions and determine whether the site will be addressed under the FFA as an SSA.

Establishing a Site Screening Area

Any site that is established as an SSA will be added to the list in Appendix B of the FFA as an additional SSA. This may lead to an investigation and possible remediation in accordance with the requirements of the FFA. For any new SSAs, the Navy will include a proposed time schedule for the submittal of an SSP Work Plan in the next draft Amended Site Management Plan (SMP). This schedule will be approved in accordance with Section XI of the FFA.

Site Screening Process

The Navy will submit to the USEPA an SSP Work Plan, which outlines the activities necessary to determine whether there has been a release of hazardous constituents to the environment. The scope of work will be mutually agreed to by the USEPA and the Navy. The SSP Work Plan will also include a schedule for the submittal of the SSP Report, which will be incorporated into the SMP. The SSP will also include the following:

1. Upon conclusion of an SSP, the Navy will submit to the USEPA a draft SSP Report, which will provide the basis for determining one of the following:
 - RI/Feasibility Study (FS) will be performed on the area addressed by the SSP.
 - The area does not pose a threat to the environment, and therefore, the area should be removed from further study under the FFA.
2. Within 60 days of receipt of the final SSP Report, the USEPA and the Navy will determine whether the SSA will require an RI/FS.
3. For those SSAs that the USEPA and Navy agree do not warrant an RI/FS, the Navy will prepare a Decision Document that reflects that agreement. The agreement is to be signed by all the project managers.
4. For those SSAs that are to proceed with an RI/FS, operable units (OUs) will be established. A schedule for the submission of the RI/FS Work Plans will be developed and incorporated into the next update of the SMP.

Areas of Concern

For those areas that have been identified as AOCs, the Navy and USEPA will go through a screening process as follows:

1. A document evaluation will be undertaken to review existing documentation and assess information concerning the handling of hazardous waste at each AOC. The evaluation could also include (if agreed to by both USEPA and the Navy) discrete sampling without developing a work plan.
2. Based on the document evaluation, the project managers will decide which AOCs will proceed to the SSP as SSAs and which AOCs will require No Further Action (NFA).
3. For those AOCs that will not proceed to the SSP, the Navy will prepare, with USEPA assistance, a brief AOC closeout document. USEPA will provide a response to the Navy within 30 days of receipt of the supporting documentation.
4. Those AOCs that are not agreed upon by USEPA and the Navy to be closed out will proceed to the SSP. These sites will have schedules established for submittal of SSP Work Plans. The schedules will be incorporated into the SMP.

Site Screening Process Tools

Although the FFA provides an outline of the SSP for closing out SSAs, the FFA does not provide a detailed process for site screening. As a result, the Tier I Partnering Team has developed several tools for rapidly screening a site to determine whether the site will require a full RI/FS or if it can be removed from further study. The following section describes the screening tools used at NSN.

Relative Risk Ranking

The Department of Defense developed a relative risk framework to evaluate the potential risk posed by a site in relation to other sites. The relative risk evaluation of NSN sites will be performed to give each of the sites a relative risk designation. Relative risk is a management tool that uses actual media concentrations, potential exposure, and potential migration to indicate which sites may pose a risk to human health and the environment. Based on the relative risk results, the Navy can focus available resources for study and remediation on the sites ranked “high.”

The current version of the SMP does not update the prior ranking of the sites at NSN. The decision to defer the re-ranking of sites is based on the fact that the sites discussed in the SMP are either undergoing remediation, are in an active site characterization phase, or have been closed out based on a determination of no significant risk to human health or the environment. It is anticipated that the sites undergoing site characterization will be re-ranked in a future update of the SMP. The framework for future ranking is provided in the following paragraphs.

The primary factors considered in the relative risk methodology are human health and ecological risks associated with receptor exposure to constituents at the site. The site ranking is based on the best information available at the time the report is submitted. The relative risk model is both quantitative and qualitative in nature.

To initially categorize the sites, contaminant hazard factors (CHF) for human health and ecological risk are calculated based on available chemical data at the time the ranking is performed for each site. The CHF values are determined by dividing the maximum detected concentration of particular compounds in the environmental media (groundwater, soil, surface water, and sediment) by the appropriate corresponding screening value. To perform this analysis, the most up-to-date version of the relative risk ranking model should be used.

For the quantitative screening analysis, human health risk will be evaluated assuming that the groundwater is used as drinking water (both ingestion and inhalation exposure scenarios will be included in the drinking water determination). To be conservative, soil ingestion will be assumed under a residential use scenario. Ecological risk will be determined for the aquatic environment only (surface water and sediment) because benchmark values for terrestrial ecological risk are not readily available.

Once the quantitative assessment is complete, a qualitative assessment addressing potential exposure pathways and potential contaminant transport will be performed. This analysis will be conducted to ensure that sites where human or ecological exposure to the contaminated media exists and the potential for contaminant migration is significant will be ranked higher than sites with less potential to affect human health and the environment. This analysis will be performed by qualitative analysis of the CHF, receptor factors (exposure potential), and migration pathway factors (contaminant transport potential), as described in the following sections.

A detailed description of the procedures and equations used to complete the relative risk ranking of the sites at NSN is included in the *1999-2000 Site Management Plan, Naval Station Norfolk* (CH2M, 1999).

Aerial Photo Analysis

The September 1994 study by USEPA Photographic Interpretation Center of aerial photography identified 37 potential waste disposal areas at NSN (USEPA, 1994). This study provided a useful tool for identifying potential SSAs for further investigation by ascertaining such potential indicators of contamination as disturbed areas, ponded liquids, excavated areas, fill areas, stressed vegetation, and discolored soils.

However, a more detailed review of additional aerial photos and field verification can also provide supporting documentation for removing sites from further study. Examples of this photographic documentation include demonstrating that the disturbed areas are associated with new building construction activities, confirming that ponded areas are attributed to natural drainage patterns, and illustrating from historical photos that disturbed areas occurred over a short period of time.

Geoprobe Sampling

The use of direct-push soil and groundwater sampling techniques, such as the Geoprobe, can provide a rapid, cost-effective alternative to traditional sampling techniques. These direct-push techniques offer the following advantages over traditional sampling methods: the need for the installation of permanent wells may be reduced or eliminated, the generation of IDW is minimized, the effort to achieve decontamination is reduced, the mobility is much easier than with drilling equipment, and the collection of samples can be conducted much more rapidly.

Although the Geoprobe data generally provide representative soil analytical data, the groundwater data can be used only on a qualitative basis for risk assessments (RAs) for the following reasons:

- The data cannot be reproduced as is the case with well data.
- Metals data may not be representative because of the high turbidity of the samples.

However, the data generated from the Geoprobe investigations can be used to provide a conservative assessment of the nature and extent of soil and groundwater contamination at a particular site. Confirmation data may be required with the installation of monitoring wells; however, the number of wells will likely be significantly reduced.

Streamlined Risk Assessments

Several sites were identified where the available data indicated that the sites seemed to pose minimal risk to human health or the environment. However, a quantitative risk evaluation was warranted before a determination could be made on whether the sites could be closed as NFA sites, or classified as SSAs for further investigation. Conversely, the slight exceedances above the risk-based criteria did not justify a full-scale RA for these sites. Therefore, a streamlined RA process has been applied to these sites, which is described as follows:

- Concentrations of detected chemicals were compared to the following current USEPA screening and regulatory screening criteria for each sample matrix: risk-based concentrations for residential and industrial soil, USEPA tap water risk-based concentrations and maximum contaminant levels for groundwater, and the USEPA Region 3 Biological Technical Assistance Group screening values for surface water and sediment. The solid waste management units (SWMUs) were initially categorized based on the comparison to screening and regulatory criteria (comparison criteria).

- In addition, the maximum, minimum, arithmetic mean, and median concentrations for the contaminant concentrations exceeding the comparison criteria were calculated using the detected concentrations from all samples collected during the Relative Risk Ranking Study and the SWMU Supplemental Investigation. Although these values were not used in determining the recommendations for each SWMU, this evaluation was performed to identify the detected range for contaminants exceeding the comparison criteria.

References

CH2M. 1999. *Draft Final 1999-2000 Site Management Plan, Naval Base Norfolk, Norfolk, Virginia*. January.

United States Environmental Protection Agency (USEPA). 1994. *EPA Aerial Photographic Site Analysis, Norfolk Naval Base, Norfolk, Virginia*. September.