Naval Facilities Engineering Systems Command Mid-Atlantic
Norfolk, Virginia

Site Management Plan
Fiscal Years 2023-2024

Naval Weapons Station Yorktown Cheatham Annex
Williamsburg, Virginia

December 2022

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

ACM	Asbestos Containing Material
AM	Action Memorandum
AOC	area of concern
AR	Administrative Record
BERA	baseline ecological risk assessment
bgs	below ground surface
CAD	Cheatham Annex Detachment
CAX	Cheatham Annex
CCR	Construction Completion Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
COC	constituents of concern
COPC	contaminant of potential concern
CTE	central tendency exposure
cy	cubic yard
DCE	dichloroethene
DD	Decision Document
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DoD	Department of Defense
DOI	Department of the Interior
ECLR	excess lifetime cancer risk
EE/CA	Engineering Evaluation/Cost Analysis
ER	Environmental Restoration
ERA	ecological risk assessment
ERP	Environmental Restoration Program
ESI	Expanded Site Inspection
ESS	Explosives Safety Submission
ESV	Ecological Screening Value
ft	feet/foot
ft/day	feet per day
ft^2	square feet
$ft^{2/}$day	square feet per day
FFA	Federal Facilities Agreement
FS	Feasibility Study
FFS	Focused Feasibility Study
FY	Fiscal Year
HHRA	human health risk assessment
HI	hazard index
HRS	Hazard Ranking System
IAS	Initial Assessment Study
LUC	Land Use Control

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
MCL	maximum contaminant level
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MMRP	Military Munitions Response Program
NAVFAC	Naval Facilities Engineering Systems Command
NCP	National Contingency Plan
NFA	no further action
NFRAP	No Further Response Action Plan
ng/kg	nanograms per kilogram
NPL	National Priorities List
NWS	Naval Weapons Station
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PP	Proposed Plan
ppm	parts per million
RA	Remedial Action
RAB	Restoration Advisory Board
RBC	risk-based concentration
RC	response complete
RD	Remedial Design
RDX	cyclotrimethylene trinitroamine
RI	Remedial Investigation
RIP	remedy in place
RME	reasonable maximum exposure
ROD	Record of Decision
SERA	Screening-level Ecological Risk Assessment
SI	Site Investigation/Inspection
SMP	Site Management Plan
SSP	Site Screening Process
SVOC	semivolatile organic compound
TBD	to be determined
TCE	trichloroethylene
TCLP	toxicity characteristic leaching procedure
TCRA	Time-critical Removal Action
TM	Technical Memorandum
TNT	trinitrotoluene
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
UFP-SAP	Uniform Federal Policy for Sample Analysis Plan
USEPA	United States Environmental Protection Agency
UU/UE	unlimited use and unrestricted exposure
VDEQ	Virginia Department of Environmental Quality
VISL	vapor intrusion screening level
VOC	volatile organic compound

SECTION 1

Introduction

This document presents the fiscal years (FYs) 2023 through 2024 annual amendment to the Site Management Plan (SMP) for Naval Weapons Station (NWS) Yorktown Cheatham Annex (CAX), Williamsburg, Virginia. This SMP meets the requirements of the Federal Facilities Agreement (FFA) between the United States Environmental Protection Agency (USEPA) Region III, Commonwealth of Virginia Department of Environmental Quality (VDEQ), and Naval Facilities Systems Engineering Command (NAVFAC) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (USEPA et al., 2005). This annual amendment to the SMP is being submitted in accordance with the requirements of the FFA. **Figure 1-1** illustrates the location of CAX within the southeast portion of the Commonwealth of Virginia.

The purpose of the SMP is to provide a management tool for NAVFAC Mid-Atlantic, NWS Yorktown, CAX, VDEQ, USEPA, and their consultants to use in planning, reviewing, and setting priorities for all response activities at CAX. The SMP establishes schedules and conceptual approaches for continued CERCLA activities at CAX Environmental Restoration (ER) Program sites. The prioritization of activities, proposed schedules, and work descriptions were jointly developed by the Navy, USEPA, and VDEQ on the basis of goals agreed to by all parties.

The SMP establishes schedules and conceptual approaches for continued CERCLA activities at CAX ER Program sites. The schedules and work descriptions consist of the following:

- Site descriptions and proposed activities for the current FY
- Conceptual schedules and general work approaches for activities planned for the two-year period FY 2023 through FY 2024

The drafting of this SMP was completed in June 2022 with concurrence from the USEPA and VDEQ; however, in accordance with the FFA, this SMP will not be considered as a Final document until funds authorized and appropriated by Congress are received by the Environmental Restoration, Navy Account, so that the planned work for this fiscal year, as defined in this SMP, can be accomplished. The SMP is a working document that is updated yearly to maintain current documentation and summaries of environmental actions at CAX. This SMP updates and supersedes the FYs 2022-2023 SMP (CH2M HILL, 2021a).

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Legend
- Cheatham Annex
- NWS Yorktown
- City/County Boundaries

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Figure 1-1
Location of CAX
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

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SECTION 2

Background and Regulatory Framework

2.1 CAX Activity Description

CAX is located on the site of the former Penniman Shell Loading Plant, which was a large powder- and shell-loading facility operated during World War I. The Penniman facility closed in 1918 and between 1918 and 1923 was dismantled. Between 1923 and 1943, the property was used for farming or was left idle, until CAX was commissioned in 1943 as a satellite unit of the Naval Supply Depot to provide bulk storage facilities and serve as an assembly and overseas shipping point throughout World War II. CAX is bordered to the east by the York River, to the north by Queen Creek, to the west by the Queens Lake neighborhood, and to the south by King Creek and NWS Yorktown (**Figure 1-1**). At inception, CAX occupied approximately 3,349 acres; however, several portions of the original base were declared surplus and transferred to other government jurisdictions, including the Department of Interior (DOI) (i.e., National Park Service), the Commonwealth of Virginia, and York County. CAX is currently comprised of 2,634 acres and is divided into two separate parcels, with the larger parcel situated along the banks of the York River and the smaller parcel located south of the Colonial Parkway and encompassing Jones Pond (**Figure 1-1**). Almost all of the activities at CAX (administration, training, maintenance, support, and housing) take place in the larger portion of the Installation. The smaller parcel surrounding and including Jones Pond is used mainly as a watershed protection area. In July 1987, CAX was designated the Hampton Roads Navy Recreational Complex. Today, the mission of CAX includes supplying Atlantic Fleet ships and providing recreational opportunities to military and civilian personnel.

2.2 CAX Environmental History

2.2.1 Regulatory History

The first environmental investigation completed at CAX was conducted by the Navy prior to state and federal regulatory oversight of environmental activities at the installation. A Navy Initial Assessment Study (IAS) was conducted in 1984 and identified 12 potentially contaminated areas (C.C. Johnson & Associates and CH2M HILL, 1984). The IAS recommended additional investigation at Sites 1, 9, 10, and 11. In 1998, the Navy, USEPA, and VDEQ performed a site visit and identified five additional potential source areas and designated them as Areas of Concern (AOCs) 1 through 5. However, in 1999, based on a review of site history and available information, it was determined that AOC 4 was actually the same area as Site 4 and AOC 4 would no longer be addressed as a separate entity (Baker, 2000). Similarly, it was determined in 1999 that AOC 5 (a large pile of debris at the toe of the slope of the Site 1 landfill) should be managed as part of Site 1 and not as a separate unit (Baker, 2000). Also, in 1999, the USEPA identified potential contaminant sources associated with the former Penniman Facility (Weston, 1999), and this area was designated as AOC 6. CAX was included on the National Priorities List (NPL) in January 2001 with a Hazard Ranking System (HRS) score of 48.7. Additional investigations and activities were conducted in 2002.

In 2003, the Navy, USEPA, and VDEQ agreed that no further action (NFA) was necessary for some of the sites and a No Further Response Action Planned (NFRAP) Decision Document (DD) for Sites 2, 3, 5, 6, 8, and 10 was signed (Baker, 2003a). The response complete (RC) decision for Site 12 was documented in a 2004 NFRAP DD (Baker, 2004a).

In 2004, the Navy identified AOC 7 (Drum Disposal Area and Can Pit) as an area of concern for desktop audit. This AOC was included in Appendix B of the FFA, which was signed in March 2005 and identified the 12 sites initially identified in the IAS and seven AOCs (USEPA et al., 2005). Sites 1, 4, 7, and 11 are identified in the FFA Findings of Fact for CERCLA implementation with ultimate closure under a Record of Decision (ROD). During field investigations in 1999, it was determined that the area thought to be Site 7 (a World War I era disposal site) was actually a more recent disposal area. The actual location of Site 7 was later identified approximately 500 feet (ft)

to the north; therefore, the area previously thought to be Site 7 was re-designated as AOC 8 (Area South of Site 7).

The Navy initiated investigations of numerous Military Munitions Response Program (MMRP) sites in 2006, including the Other-than-Operational Marine Pistol and Rifle Range at CAX, which had an NFA determination (CH2M HILL, 2008a).

In 2009, the NFA ROD for Site 1 was signed (CH2M HILL, 2009a), and the Navy designated Penniman Lake as AOC 9. The NFA ROD for Site 11 was signed in 2010 (CH2M HILL, 2010). In 2011, the CAX Partnering Team agreed to combine Site 4 and AOC 3 into one site, designated as Site 4. In 2015, the CAX Partnering Team agreed that Youth Pond will be addressed as part of Site 4 and will no longer be tracked separately since Youth Pond has no site/AOC number and is the downgradient surface water receiving body at Site 4. In 2016, the CAX Partnering Team agreed to change the name of AOC 9 to "Penniman Lake Historical Industrial Areas" to better describe the site since the upgradient industrial areas are the suspected source of contamination; Penniman Lake will remain within the study area boundary. The NFA ROD for Site 7 soil and adjacent York River surface water and sediment (CH2M, 2017a), as well as the NFA Technical Memorandum (TM) for AOC 2 (CH2M, 2017b) were signed in 2017. The NFA ROD for Select Subareas and Environmental Media within AOC 6 was signed in 2018 (CH2M HILL, 2018a). Although AOC 8, AOC 9, Youth Pond, and the Other-than-Operational Marine Pistol and Rifle Range were not included in the FFA, investigations at these sites have been or will be conducted following CERCLA guidance, and these sites are included in this document.

Table 2-1 identifies both active sites and AOCs addressed under CERCLA at CAX and those sites for which it was determined that no action or NFA is required. **Figure 2-1** shows the location of each site/AOC at CAX. Active sites and AOCs are discussed in Section 3. Inactive sites (those with no action or NFA decisions) will be removed from Section 3 in the SMP update subsequent to their signed DD, with the exception of the one CAX MRP site, which will remain in the SMP's MRP section although it has had an NFA decision. The FY 2008 to 2009 SMP update (CH2M HILL, 2008b) was a complete revision of the CAX SMP and is considered a "baseline" SMP, as it includes descriptions for all CAX sites, even those that had NFA decisions prior to FY 2008 (i.e., Site 2, Site 3, Site 5, Site 6, Site 8, Site 10, Site 12, AOC 4, and AOC 5). Thus, it is a good reference document for those sites.

2.2.2 Partnering

The Navy works in partnership with USEPA and VDEQ and has established a formal CAX Partnering Team to implement CERCLA. CAX Partnering Team decisions are documented through consensus statements and/or through the meeting minutes; a summary of Team[1] consensus statements is presented in **Table 2-2**.

2.2.3 Hydrogeologic Setting

CAX is situated within the Virginia Coastal Plain Physiographic Province, which is underlain by unconsolidated sediment of the Quaternary, Tertiary, and Cretaceous ages. These sediments dip to the southeast, with a combined thickness of 1,900 feet (ft) in the vicinity of CAX. Deposition and erosion associated with fluctuating sea levels resulted in terraces that decrease in topographic elevation in a stair-step pattern with scarps, oriented north to south, that delineate the eroded shoreline along the toe of each terrace.

A total of ten geologic formations have been identified (Brockman et al., 1997) beneath CAX. The upper most geologic formations consist of alluvial, colluvial, and marsh deposits composed of silt, sand, and pebbles with some clay. The geologic units are grouped into hydrostratigraphic units based upon hydraulic characteristics. The aquifers separated by confining/semi-confining units relevant to CERCLA investigations at CAX are, from youngest to oldest (i.e., from shallow to deep); the Columbia aquifer, the Cornwallis Cave aquifer, and the Yorktown-Eastover aquifer. Localized shallow groundwater flow is locally influenced by topography and nearby surface water bodies with a regional flow and discharge direction toward the York River.

[1] NWS Yorktown and CAX conducted joint Partnering from 2000 through September 2008, when the bases split into separate Partnering Teams.

When present, the Columbia aquifer ranges in thickness from 5 to 10 ft thick, with horizontal hydraulic conductivity between about 0.4 to 8 feet per day (ft/day) and vertical hydraulic conductivity between 1.7×10^{-4} to 1.7×10^{-1} ft/day (Brockman et al., 1997). The hydraulic properties of the Cornwallis Cave aquifer are highly variable due to depositional effects and physical and geochemical weathering. In general, horizontal hydraulic conductivity ranges from 0.3 to 9 ft/day and vertical conductivity ranges from 6.2×10^{-4} to 2.4×10^{-1} ft/day (Speiran and Hughes, 2001).

The Yorktown-Eastover aquifer extends across all of CAX and ranges from 60 to 100 ft thick. Horizontal hydraulic conductivity ranges from 0.004 to 3 ft/day, and vertical hydraulic conductivity ranges from 1.7×10^{-5} to 4.8×10^{-1} ft/day. Transmissivity of the aquifer ranges from 0.5 to 40 square feet per day (ft^2/day), with groundwater flow from west-to-east.

2.3 CERCLA Process

The following sections provide an overview of the CERCLA process. The objectives of the CERCLA process are to evaluate the nature and extent of contamination at a site, and to identify, develop, and implement appropriate remedial actions (RAs) in order to protect human health and the environment. The major elements of the CERCLA process are identified below and described in greater detail in **Table 2-3**:

- Preliminary Assessment (PA)
- Site Investigation/Inspection (SI)
- Remedial Investigation/Feasibility Study (RI/FS)
- Treatability Study
- Engineering Evaluation/Cost Analysis (EE/CA) and Removal Action (may be implemented at any time in the CERCLA process)
- Proposed Plan (PP) and ROD
- Five-Year Review
- Remedial Design (RD) and RA
- Post-RA Monitoring and Reporting
- RC/Remedy In Place (RIP)

2.3.1 Military Munitions Response Program

The Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program (DERP) to address munitions and explosives of concern (MEC) and munitions constituents (MCs) at other than operational ranges. The DoD and the Navy are establishing policy and guidance for response actions under the MMRP; however, the key program drivers developed to date conclude that munitions response actions will be conducted under the process outlined in the National Contingency Plan (NCP) as authorized by CERCLA.

2.3.2 Community Participation

In conjunction with NWS Yorktown, CAX has a Community Involvement Plan (CIP) (CH2M HILL, 2014a) and established a Restoration Advisory Board (RAB) comprised of members of the community, local environmental

group members, and state and federal officials who meet annually (November) to keep the community informed on environmental issues at CAX[2].

The documents prepared for the program are maintained in the administrative record file for review by the public. The index of CAX Administrative Records is available at the information repository, the Yorktown Public Library at 8500 George Washington Memorial Highway, Yorktown, Virginia. Documents from the administrative record are available through the CAX public website: https://go.usa.gov/xSvFA.

Additional information regarding RAB meetings or the environmental cleanup program at CAX may also be obtained from the NWS Yorktown/CAX Public Affairs Officer:

Ms. Susanne Greene
Public Affairs Officer
160 Main Road
Yorktown, VA 23691-0160
Phone: (757) 887-4939

2 NWS Yorktown and CAX conducted joint RAB Meetings from 2000 through September 2019, when the bases split into separate teams for the purposes of these meetings.

Table 2-1. CAX Site Summary

FY 2023-2024 SMP

Site ID	Site Name	Site Description	EPA HRS (Source #)	FFA Status (2005)[1]	Current CERCLA Status	Comments/Notes
Site 1	Landfill Near Incinerator	1.3 acre landfill; 1999 removal action of river bank debris and bank stabilization; 2003 removal of surface debris; 2003 removal action of soil; 2005 removal action of soil & debris and breakwater construction; 2007 removal action of soil/SD	Source scored (1)	Findings of Fact CERCLA RI/FS/PP/ROD	Response Complete (all media)	NFA ROD for all media (signed September 2009)
Site 2	Contaminated Food Disposal Area	50 ft diameter food disposal pit; 12 to 15 feet deep No SW/SD associated with site	Not identified in HRS	Appendix C - NFA	Response Complete (all media)	NFRAP for all media (signed August 2003)
Site 3	Submarine Dye Disposal Area	55 gallon drum storage area; 1970 removal action of drums No SW/SD associated with site	Source not scored	Appendix C - NFA	Response Complete (all media)	NFRAP for all media (signed August 2003)
Site 4	Outdated Medical Supply Disposal Area	Ravine used as a disposal area for outdated IV packs and covered with soil; Surface metal banding pile and drums, plus buried construction debris (formerly AOC 3) 1998 removal action of surface debris Youth Pond included as a downgradient surface water body (2015)	Source not scored	Findings of Fact CERCLA RI/FS/PP/ROD	FS (all media)	The Site 4 RI Addendum Report and Preliminary Remediation Goals Development Technical Memorandum were finalized 2021.
Site 5	Photographic Chemicals Disposal Area	Borrow pit used as a disposal area No SW/SD associated with site	Source not scored	Appendix C - NFA	Response Complete (all media)	NFRAP for all media (signed August 2003)
Site 6	Spoiled Food Disposal Area	12 to 15 feet deep disposal pit No SW/SD associated with site	Source not scored	Appendix C - NFA	Response Complete (all media)	NFRAP for all media (signed August 2003)
Site 7	Old DuPont Disposal Area	Large disposal area; 2004-2006 removal action of surface debris and geotube installation; 2008 removal action of soil/waste	Source not scored	Findings of Fact CERCLA RI/FS/PP/ROD	Data gap investigation (groundwater) Response Complete (debris, soil, and York River surface water and sediment)	NFA ROD for all media except groundwater (signed August 2017). Vapor intrusion investigations have been completed (2021). Supplemental groundwater investigations are in progress (2021).
Site 8	Landfill Near Building CAD 14	0.25 acre landfill No SW/SD associated with site	Source not scored	Appendix C - NFA	Response Complete (all media)	NFRAP for all media (signed August 2003)
Site 9	Transformer Storage Area	7000 square foot storage area; 1980 area was graded and covered with gravel	Source scored (2)	Appendix A - CERCLA SI/SSP	ESI	Fieldwork for an ESI is complete, with data evaluation and reporting forthcoming.
Site 10	Decontaminated Agent Disposal Area Near First Street	75 to 100 gallon decontamination agent disposal area No SW/SD associated with site	Source not scored	Appendix C - NFA	Response Complete (all media)	NFRAP for all media (signed August 2003)
Site 11	Bone Yard	2.7 acre storage area; 1999 removal action of surface debris; 2009 a Non-Time-Critical Removal Action (NTCRA) was conducted to address soil hot spots	Source scored (3)	Findings of Fact CERCLA RI/FS/PP/ROD	ROD (all media)	NFA ROD for all media (signed August 2010)
Site 12	Disposal Site Near Water Tower	Scrap metal disposal area No SW/SD associated with site	Not identified in HRS	Appendix C - NFA	Response Complete (all media)	NFRAP for all media (signed April 2004)

Table 2-1. CAX Site Summary

FY 2023-2024 SMP

Site ID	Site Name	Site Description	EPA HRS (Source #)	FFA Status (2005)[1]	Current CERCLA Status	Comments/Notes
AOC 1	Scrap Metal Dump	North - 0.2 acre area with surface debris (some metal and railroad ties, mostly discarded concrete)	Source not scored	Appendix A - CERCLA SI/SSP	Response Complete (soil, debris, and groundwater)	Final ESI report, documenting NFA for groundwater, signed by CAX Partnering Team (2015). Following completion of the soil and debris removal action activities no further action is required for these media.
		South - 0.4 acre area with surface debris (some discarded concrete, utility poles, and a drum; large pile of metal)	Source not scored	Appendix A - CERCLA SI/SSP	RI (all media)	The RI Report is final (2022)
AOC 2	Dextrose Dump	1 acre disposal Area; 1998 housekeeping operation of surface debris No SW/SD associated with AOC	Source not scored	Appendix A - CERCLA SI/SSP	Response Complete (all media)	Technical Memorandum, documenting NFA, signed by CAX Partnering Team (2017).
AOC 3	CAD 11/12 Pond Bank	Pile of metal banding, empty drums, and subsurface construction debris 1999 FI; SW/SD associated with AOC investigated as Site 4	Not identified in HRS	Appendix A - CERCLA SI/SSP	Response Complete Incorporated into Site 4	Response Complete
AOC 4	Outdated Medical Supply Disposal Area	Determined to be the same area as Site 4	Not identified in HRS	Not Identified	Response Complete Incorporated into Site 4	Response Complete
AOC 5	Debris Area	A large pile of debris at the toe of the slope of the Site 1 landfill. It was determined it should be managed as part of Site 1 and not as a separate unit.	Not identified in HRS	Not Identified	Response Complete Incorporated into Site 1	Response Complete
AOC 6	Penniman AOC Penniman Shell Loading Plant operated by DuPont Corporation [TNT manufacturing plant in 1916 (Plant demolished in 1925)]	Earthen ammonia settling pits	Source scored (4)	Appendix A - CERCLA SSA/SSP	EE/CA (soil) PP/ROD (groundwater)	NFA ROD for groundwater (signed September 2018). Removal action for soil in progress.
		Concrete-lined TNT graining house sump	Source scored (5)		(both TNT areas investigated together) EE/CA (soil) PP/ROD (groundwater)	NFA ROD for groundwater (signed September 2018). Removal action for soil in progress.
		Earthen and brick-lined TNT catch box ruins	Source scored (6)			
		Metallic waste slag material	Source scored (7)		Response Complete (all media)	Technical Memorandum, documenting NFA, signed by CAX Partnering Team (2016). NFA ROD for all media (signed September 2018).
		1918 wooden drum storage	Source scored (8)		Response Complete (all media)	Consensus Letter to Document SI Recommendation for NFA for All Media (2013). NFA ROD for all media (signed September 2018).
AOC 7	Drum and Can Disposal Area	4800 ft^3 disposal area containing cans of PCE; 2006 removal action of surface debris	Not identified in HRS	Appendix B - Preliminary screening area	Response Complete (all media)	NFA following completion of the removal action documented in Final EE/CA (2014). Construction closeout documentation completed (2017).
AOC 8	Area South of Site 7	Debris disposal area; formerly referred to as Site 7	Not Scored	Not Identified	RI (all media)	RI Addendum to determine groundwater concentrations following the TCRA in progress. No Further Action Consensus Letter for Soil signed in 2021

Table 2-1. CAX Site Summary

FY 2023-2024 SMP

Site ID	Site Name	Site Description	EPA HRS (Source #)	FFA Status (2005)[1]	Current CERCLA Status	Comments/Notes
AOC 9	Penniman Lake Historical Industrial Areas	48-acre man made surface water body located in the southeastern portion of CAX 2000 Pond Study resulted in "catch and release" fishing restrictions because of bioaccumulative constituent detections (mainly Aroclor - 1260) in sediment (restriction is a conservative measure and not based on toxicity testing)	Not Scored	Not Identified	ESI (soil/sediment/animal tissue)	Fieldwork for an ESI for the non-explosives constituents is complete, with data evaluation and reporting forthcoming. Fieldwork for an ESI for the explosives constituents is complete, with data evaluation and reporting forthcoming.
Marine Pistol and Rifle Range	Marine Pistol and Rifle Range	7 acre small caliber munitions range	Not Scored	MRP	Response Complete (all media)	NFA Declaration (ESI, March 2008)

Notes:

[1] FFA Findings of Fact (pg 16) identified Sites 1, 4, 7, & 11 as RI/FS/PP/ROD for closure, but also identified these Sites in Appendix A as SSP

NA or NFA Sites

AOC - Area of Concern
CAX - Cheatham Annex
CERCLA - Comprehensive Environmental Response Compensation and Liability Act
EE/CA - Engineering Evaluation/Cost Analysis
ESI - Expanded Site Investigation
FFA - Federal Facilities Agreement
ft - feet
FS - Feasibility Study
FY - Fiscal Year
GW - Groundwater
HRS - Hazard Ranking Score
NA - No Action
NFA - No Further Action
NFRAP - No Further Response Action Planned
PCE - Tetrachloroethene
PP - Proposed Plan
RI - Remedial Investigation
ROD - Record of Decision
SAP - Sampling Analysis Plan
SD - Sediment
SI - Site Investigation
SW - Surface Water
TM - Technical Memorandum
TNT - Trinitrotoluene
UFP - Unified Federal Policy

Table 2-2. CAX Partnering Team Consensus Statement Summary

FY 2023-2024 SMP

NUMBER	CONSENSUS STATEMENT NUMBER	DATE	FACILITY	SITE	Area of Concern (AOC)	TOPIC	CONSENSUS STATEMENT
NA	NA	10/24/2001	CAX	2		Site 2 – Contaminated Food Disposal Area	The team thinks no further action (NFA) for site review at end of site visit.
NA	NA	10/24/2001	CAX	3		Site 3 – Submarine Dye Disposal Area	The team decided to review the site at the end of the site visit.
NA	NA	10/24/2001	CAX	4		Site 4 – Outdated Medical Supply Disposal Area	The team wants to use the site visit to determine the extent of the debris. S. Milhalko stated that the VDEQ would require that site would either have to have removal with backfill or cover such that it would not be uncovered again.
NA	NA	10/24/2001	CAX	6		Site 6 – Spoiled Food Disposal Area	The team agreed to drive by site to determine location at end of site visit.
NA	NA	10/24/2001	CAX	12		Site 12 – Disposal Site Near Water Tower	The team proposed that approach be a Site Screening Area (SSA) and during site visit evaluate need for this. For site visit, evaluate a proposed sampling plan to be evaluated during site visit, prepare site map for site visit.
NA	NA	10/24/2001	CAX		4	Area of Concern (AOC) 4 – IR Site 4 – Outdated Medical Supply Disposal Area	During the site visit, the approach will be evaluated and a decision is to be made.
NA	NA	10/24/2001	CAX		5	AOC 5 – Debris Area	Group decided to combine AOC 5 and Site 1, eliminate AOC 5.
NA	NA	10/24/2001	CAX			Site Update	Dave Martin, as topic leader, and other members wanted to focus on reviewing sites proposed for NFA, then review sites during site visit & what the team wants to do during the site visit (drive by versus walk the site).
NA	NA	10/24/2001	CAX			Site Update	For site visit, the team decided that a technical guide to the sites would be prepared that incorporates previous information on the site, the Partnering Team discussion, approach to the site, data gaps. This package is to include: site descriptions, maps, previous sampling locations, aerial photographs with site locations/approximate boundaries and for some sites a proposed sampling plan.
NA	NA	12/3/2001				Define Metrics in Partnering Deliverable	Keep as stated in deliverable.
NA	NA	12/4/2001	CAX	2		Site 2 – Contaminated Food Disposal Area	The team agreed that no further action is warranted at this site given that only spoiled food was disposed of at the site.
NA	NA	12/4/2001	CAX	4		Site 4 – Outdated Medical Supply Disposal Area	AOC-3 is part of AOC-4, AOC-4 is now Site 4- Outdated Medical Supply Disposal Area.
NA	NA	12/4/2001	CAX	5		Site 5 – Photographic Chemicals Disposal Area	Due to the small volume of photochemicals disposed in an area that can not be located using historical records and the disposal of these wastes in a "marl" pit consisting of clayey native soils that would prohibit transport of the photochemicals, no further action is warranted at this site.
NA	NA	12/4/2001	CAX	6		Site 6 – Spoiled Food Disposal Area	The team agreed that no further action is warranted at this site given that only spoiled food was disposed of at the site.
NA	NA	12/4/2001	CAX	8		Site 8 - Landfill Near Building CAD 14 Site Visit	On page 4-16 of handout, last paragraph, delete first sentence "The VDEQ….site."
NA	NA	12/4/2001	CAX	8		Site 8 - Landfill Near Building CAD 14 Site Visit	The team agreed that no further action is warranted at this site given that only non-hazardous materials such as spoiled meat, spoiled candy, and clothing were disposed at the site and all anecdotal records indicate that the clothing was not impregnated with any chemicals.
NA	NA	12/4/2001	CAX	11		Site 11 – Bone Yard	The team agreed to investigate Penniman Lake and Site 11 separately. Penniman Lake is already in the budget cycle as a separate site.
NA	NA	12/4/2001	CAX	12		Site 12 – Disposal Site Near Water Tower	The team agreed that further sampling is required at the site prior to making a NFA decision. The approach agreed to consist of a grid of five soil samples (1 center, 4 corner points). One sample will be analyzed for Target Analyte List (TAL)/Target Compound List (TCL) and the remaining 4 will be analyzed for TAL metals only. An additional three soil samples will be collected between the railroad tracks adjacent to the site. These analytical results will be compared to the grid analytical results to determine whether or not the railroad maybe a source area.
NA	NA	2/5/2002	CAX	9		Site 9 - Transformer Storage Area	Based upon review of polychlorinated biphenyl (PCB) confirmation data, proceed with NFA for Site 9.
NA	NA	2/5/2002	CAX	11		Site 11 – Bone Yard	The team agreed with the proposed sampling plan pending resolution of their comments.
NA		2/5/2002	CAX	12		Site 12 – Disposal Site Near Water Tower	The team agreed to analyze all soil samples for TCL organics in addition to the planned TAL Metals.
NA	NA	2/5/2002	CAX		1	AOC 1 - Scrap Metal Dump	AOC 1 will continue as an AOC, a Work Plan will be developed for the debris removal. If no significant contamination is found, based on confirmatory soil sampling, (i.e.: meet Eco/HH requirements), the AOC will be closed. The Work Plan will be flexible to allow for in-field adjustments.
NA	NA	2/5/2002	CAX			GIS Needs Assessment	The Draft Final CAX GIS Needs Assessment submitted in September 2001 will be considered final. Baker will proceed with the awarded CAX GIS Implementation.
NA		2/5/2002	NWS Yorktown /CAX	12		5-Year Review	The team agreed to form a subgroup to research and report out at the March meeting on this issue. The subgroup consists of Bob Stroud and Jennifer Davis.
NA	NA	2/5/2002	NWS Yorktown /CAX			2002 Goals Update	The team agreed to include the Goals as part of each meeting's minutes.

Table 2-2. CAX Partnering Team Consensus Statement Summary

FY 2023-2024 SMP

NUMBER	CONSENSUS STATEMENT NUMBER	DATE	FACILITY	SITE	Area of Concern (AOC)	TOPIC	CONSENSUS STATEMENT
NA	NA	2/5/2002	NWS Yorktown /CAX			Consensus Statement Documentation	The team agreed to document Consensus Statements by site as an addendum to the Site Management Plan. Mary is to evaluate possible methods (by site, chronologically, etc.) and report back to the team during the March Meeting.
NA	NA	2/5/2002	NWS Yorktown /CAX			Draft Federal Facilities Agreement (FFA)	Scott Park/Jennifer Davis to prepare Draft FFA Addendum for counsel review and submittal to USEPA and VDEQ.
1	3/13/2002-1	3/13/2002	NWS Yorktown /CAX			Documentation of Consensus Statements	The team agreed to document Consensus Statements by site as an addendum to the Site Management Plan. A tracking number will be used to track the documents consisting of date and numerical sequence (i.e.: Month/Day/Year-Number – 3/13/02-1).
3	4/23/2002-3	4/23/2002	NWS Yorktown /CAX			Identification of new sites	The Team agrees that the FFA (Sections 9.3a and 9.3b) gives the team the authority to add newly identified sites to the Site Management Plan (SMP).
4	4/24/2002-4	4/24/2002	NWS Yorktown /CAX			Site Management Plan	The team agreed to go final with the Fiscal Year (FY) 2002/2003 Draft SMP and revise text for the FY 2003/2004 submittal. Baker will provide Final covers for the FY 2002/2003 SMP.
5	4/24/2002-5	4/24/2002	CAX	11		Approval of Proposed Field Investigation Sampling Locations presented in the Project Plans for CTO 236	The team agreed with the sampling location revisions made during the site visit and agreed that the field investigation can be performed. The field activities will be scheduled for May 2002.
5	4/24/2002-6	4/24/2002	CAX		6 - Penniman	Penniman AOC Sub-areas Investigation approach	The Team agrees to follow a general approach to the Penniman AOC sub-areas as follows: 1918 Drum Storage Area: Verify whether or not the kegs were used to store Ammonium Nitrate. Consider collecting surface soil samples between Buildings 225 and 113. Waste Slag Area: Based upon the understanding that the waste slag is most likely associated with maintenance activities along the rail line, a sampling approach will be developed.
7	4/24/2002-7	4/24/2002	NWS Yorktown /CAX			Community Relations Plan	The Team agrees to go final with the Community Relations Plan. If appropriate, final covers and spines will be submitted.
9	8/6/2002-9	8/6/2002	CAX	2, 3, 5, 8, 9, 10, 12		NFRAP Decision Document Format	The Team agreed to use the Quantico format for the NFRAP document. The team will review the No Further Response Action Plan (NFRAP) documents before finalizing them.
11	8/6/2002-11 (no record of this being signed)	8/6/2002	CAX	3		Fluorescein Dye	The Team agrees that since Fluorescence Dye is still in use and is very water soluble, hence dilutes infinitely.
12	9/18/2002-12	9/18/2002	NWS Yorktown /CAX			New technical team member	The Team agreed to add Marlene Ivester as a technical member to the team.
13	9/18/2002-13	9/18/2002	NWS Yorktown /CAX			Facilitator	The team agreed a facilitator is needed for a few meetings.
15	10/23/2002-15	10/23/2002	NWS Yorktown /CAX			N/A	The Team agreed to add a goal to the FY03 Team Goals to be self-facilitating by end of third Quarter 2003 (5 additional meetings).
17	10/23/2002-17	*12/4/2002 Revised*	NWS Yorktown /CAX			NWS Yorktown-SSAs 3-24; 23-26; 2, 8, 18 & SSA 14; GWOU I, 27-30 CAX-1, 4 & 9, 11, Background Study, NFRAP 2, 3, 5, 6, 9, 10 & 12	The NWS Yorktown/CAX Partnering Team empowers the ecological technical support team to address and resolve ecological issues for various sites at NWS Yorktown Yorktown/CAX (see table below) to meet the dates and priority specified by the NWS Yorktown/CAX Team, with Ed Corl to take the lead on meeting the schedule determined by the Team. NWS Yorktown: SSAs 3-24 Site Screening Process (SSP); 23-26 DF Remedial Investigation (RI); 2, 8, 18 & SSA 14 DF RI; Groundwater Operatable Unit (GWOU) I Draft WP; 27-30 Draft RI CAX: 1 DF RI; 4 & 9 Draft RI (Screening Ecological Risk Assessment (SERA)); 11 Draft RI, Draft Background Study; 2, 3, 5, 6, 9, 10 & 12 Draft NFRAP
18	12/5/2002-18	12/5/2002	NWS Yorktown /CAX	21, 22		NWS Yorktown Sites 21 & 22	Based upon EPA Region III comments, Sites 21 and 22 Record of Decisions (RODs) will be rewritten as RODs with no institutional controls (ICs) because they were remediated to residential levels.
19	12/5/2002-19	12/5/2002	NWS Yorktown /CAX			Site Action Status Report	The Team agrees to use the SASR as a tracking tool and add it to the standard meeting format.
20	12/5/2002-20	12/5/2002	NWS Yorktown /CAX			Action Item List	The Team agreed that the Action Item List will be addressed during the Agenda Building Call with respect to whether or not the Action Item has been completed. If completed, a “C” will be put in the Outcome column of the Action Item list and the item will not be addressed during the subsequent Partnering Team Meeting.
21	1/29/2003-21	1/29/2003	NWS Yorktown /CAX			CAX Site 1 Baseline Risk Assessment	The eco subgroup discussed the issues for the CAX Site 1 RI and determined that a baseline risk assessment was warranted for the wetland area based upon a conference call prior to the December Partnering Meeting. The Navy RPM determined that based upon the existing ROD schedule and funding execution for the site, it was determined that (revised per team concurrence by MM 3/12/03) the ROD and funding schedule could not be met. Therefore, the Navy recommended that an EECA for soils/debris removal at CAX Site 1 would be the best approach. The Team agrees upon this approach.
23	3/13/2003-23	3/13/2003	CAX	1		Site clean-up goals	The Team agrees that the Draft Final Engineering Evaluation/Cost Analysis (EE/CA) for CAX Site 1 can be distributed for public comment without specific site clean-up goals. Specific clean-up goals will be presented to the Team for review and approval, and final clean-up goals will be incorporated in the Final EE/CA.
25	4/29/2003-25	4/29/2003	CAX	1		Clean-up goals at CAX Site 1	The Team agrees to the clean-up goals for the planned removal action under the EE/CA for CAX Site 1 established during a conference call on April 14, 2003 (see the attached table).
27	6/11/2003-27	6/11/2003	CAX	1		Concurrence on CAX Site Removal	USEPA Region III, VDEQ, and Atlantic Division, Naval Facilities Engineering Division agree to the proposed removal action at Cheatham Annex Site 1 – Landfill Near the Incinerator as documented in the Draft Final April 2003 EE/CA and the Action Memorandum.

Table 2-2. CAX Partnering Team Consensus Statement Summary

FY 2023-2024 SMP

NUMBER	CONSENSUS STATEMENT NUMBER	DATE	FACILITY	SITE	Area of Concern (AOC)	TOPIC	CONSENSUS STATEMENT
28	6/17/2003-28	6/17/2003	CAX	1		CAX Site 1 RI Schedule	For CAX Site 1, the Team agrees: 1. Issue RI as a Final Round I RI with replacement pages and cover letter explaining the decision rationale. 2. Defer the Proposed Plan (PP) & ROD for the site until after completion of wetlands Baseline Ecological Risk Assessment (BERA) and Round II RI for sediments. 3. Issue a letter to file that the Feasibility Study (FS) will be deferred until completion of the Round II RI.
29	6/17/2003-29	6/17/2003	CAX	2, 3, 5, 6, 8, 10		CAX Sites 2, 3, 5, 6, 8 & 10, No further action decision	The Team agrees with the NFA remedy for CAX Sites 2, 3, 5, 6, 8 and 10 based upon the information presented for the Draft NFRAP Decision Document.
31	10-30-03-31	10/30/2003	CAX	7		CAX Site 7 TCRA	Based upon the landfill's proximity to the York River and the erosional damage associated with Hurricane Isabel, the team agrees that additional funding is necessary for a Time Critical Removal Action (TCRA) at CAX Site 7 in order to stabilize the shoreline. If additional FY 2004 funds can be obtained, the team agrees to delineate and characterize the landfill and determine the feasibility of landfill removal in the near term.
35	3-9-04-35	3/11/2004	CAX	12		Site 12 NFRAP	The team agrees with the NFA remedy for CAX Site 12 – Disposal Site Water Tower based upon the no further action remedy recommended in the Technical Memorandum submitted for review on January 12, 2004. NFRAP Decision Document with a Final Technical Memorandum as an appendix will be prepared for submittal by March 31, 2004 in accordance with the annual team 2004 goals.
36	3-22-04-36	3/22/2004	CAX	7		CAX Site 7	Based upon the field investigation conducted at CAX Site 7N, as summarized in the Draft Trenching Letter Report dated 19 March 2004, the team has agreed to move forward with a TCRA Action Memorandum as an interim action that will recommend appropriate erosion control and shoreline stabilization for the site. The team also agrees that removal of the CAX Site 7N landfill will be accomplished under an EE/CA when funding is available. While the team agreed that an esthetic clean up of the beach in the vicinity of the landfill does little to mitigate risk, the team agreed to move forward with a beach cleanup at the request of the Navy.
38	5-19-04-38	5/19/2004	NWS Yorktown /CAX			BTAG	The Yorktown/CAX Partnering Team agrees that the role of USEPA Biological Technical Assistance Group (BTAG) members will be changed from Adjunct Member to Technical Member.
48	4-28-08-48	4/28/2008	CAX	1		CAX Site 1 GW	The Partnering Team agrees potential groundwater risks at CAX Site 1 to be acceptable for unrestricted use/unrestricted exposure as presented in the Groundwater Risk Management Technical Memorandum.
NA	(Documented in a Tech Memo)	5/22/2008 (signed)	CAX	1		CAX Site 1 Waste, Soil and Sediment	The Partnering Team agrees that NFA is warranted for waste, soil, and sediment at CAX Site 1 as presented in the Documentation for No Further Action (NFA) Regarding Site Waste, Soil, and Sediment technical memorandum.
NA	(Documented in Meeting Minutes)	3/5/2009	CAX			Add'l EPA concerns regarding remnants of former Penniman Shell Loading Plant	Team agreed to the following paths forward: • In-ground batteries – Could not locate. Plan to conduct another site visit in May 2009. • Mixing Tanks – Based on the site visit and documentation, agreement that the "mixing tanks" were in fact latrines/privies and no further action is necessary. • Large Drums with side ports – Soil surrounding the one known drum was sampled and nothing was detected. If others are found, additional investigations should be conducted, however at this time, no further action is needed. • Detonation craters – Collect one DPT soil and groundwater sample for explosives and metals near where craters are concentrated. • Fuse Pit – The Navy plans on digging around the footer of the fuse pit to look for piping. The Navy also will excavate around the other side of the berm adjacent to the TNT Catch Box Ruins and around the Ammonia Settling Pit (AOC 6) to look for piping. The Navy will be researching Penniman archives at the Hagley Museum for blueprints related to the TNT Catch Box Ruins, Ammonia Settling Pits, and booster test pit building. The EPA concerns will be documented in either the AOC 6 SI report or a separate tech memo.
NA	(Documented in Meeting Minutes)	7/16/2009	CAX			Partnering Team Deliverable	The Partnering Team agrees the Partnering Deliverable is final.
NA	(Documented in Conference Call Minutes)	11/20/2009	CAX			PCB Study	The Partnering Team agrees to include the PCB Study in the upcoming Penniman Lake SI to have one comprehensive study.
NA	(Documented in a Tech Memo)	12/14/2009 [last signature (EPA)]	CAX	11		CAX Site 11 Soil and GW	The Partnering Team agrees that NFA is warranted for soil and groundwater at CAX Site 11, as presented in the *Consensus for No Further Action in Soil and Groundwater, Site 11 - Bone Yard* technical memorandum.
NA	(Documented in Meeting Minutes)	3/18/2010	CAX			Use of Preliminary BG 95% UTLs for Draft SI reporting	The Partnering Team agrees to use the preliminary background values (calculated using the method presented in the Background Technical Memorandum that was sent to EPA Las Vegas in February 2010) for draft SI reporting (multiple AOC SI and Sites 4/9 and AOC 3 SI).
NA	(Documented in Meeting Minutes)	5/12/2010	CAX		9	Penniman Lake SI	The Partnering Team agrees to a step-approach for conducting the Penniman Lake SI.
NA	(Documented in Meeting Minutes)	9/21/2010	CAX		6	Waste Slag Subarea	The Partnering Team agrees to: (1) conduct another site visit in the winter (January timeframe) to try and locate it; (2) collect a downgradient soil sample and analyze for metals if found; and (3) document the results, conclusions, and recommendations in a technical memorandum.
NA	(Documented in Meeting Minutes)	9/21/2010	CAX			Former Penniman Shell Loading Plant "Detonation Crater" Area	The Partnering Team agrees to collect one DPT GW sample from within a detonation crater on the former DOI property and analyze for explosives and metals only.
NA	(Documented in Meeting Minutes)	11/16/2010	CAX	7		SI Fieldwork	The Team agrees the groundwater and soil (pH only) investigation can go forward while the Team discusses the path forward for sediment.

Table 2-2. CAX Partnering Team Consensus Statement Summary

FY 2023-2024 SMP

NUMBER	CONSENSUS STATEMENT NUMBER	DATE	FACILITY	SITE	Area of Concern (AOC)	TOPIC	CONSENSUS STATEMENT
NA	(Documented in a Tech Memo)	12/30/2010	CAX			Background UTLs	The Team accepts the groundwater and soil Background UTL calculation methods.
NA	(Documented through correspondence)	1/18/2011 (VDEQ email) 1/5/2011 (EPA email)	CAX	7		SI UFP SAP	The Team agrees the UFP-SAP will focus on collecting groundwater samples (and soil for pH) and defer sediment discussions to a later date. As a result of deferring the sediment discussions, all information regarding the soil risk screening results will be removed from the UFP-SAP and included in the SI Report.
NA	(Documented in Meeting Minutes)	3/9/2011	CAX		6	Waste Slag Subarea	Waste slag pile found during January 2011 site visit. The Team agrees on an EE/CA to dig up and remove the slag pile, then collect floor and wall samples to be analyzed for inorganic constituents. If the samples indicate that there is no risk, NFA would be documented in a TM. However, how to document closure of the area has not been determined, but likely will be in the future AOC 6 ROD.
NA	(Documented in Meeting Minutes)	3/9/2011	CAX			UFP SAPs	The Team agrees to sign the SAP signature page over sending acceptance emails/letters in order to document concurrence within the SAP itself (better/easier for administrative record archive).
NA	(Documented in the Final report)	5/6/2011 (VDEQ letter) 5/3/2011 (EPA letter)	CAX			Background Values	The Team concurs with the background values and use of background data presented in the Background Study report.
NA	(Documented in Meeting Minutes)	5/20/2011	CAX		2	EE/CA	The Team agrees to remove the respirator cartridges only, as the dextrose bottles and military clothing are inert and not CERCLA-related.
NA	(Documented in Partnering Meeting Minutes)	7/27/2011	CAX	4	3	Preliminary Site 4 RI Discussion (ahead of the UFP-SAP scoping session)	The Team agreed to incorporate AOC 3 into Site 4.
NA	(Documented in Partnering Meeting Minutes)	9/14/2011	CAX	4		RI UFP SAP Scoping Session	The Team agreed to the new Site 4 study area boundary.
NA	(Documented in Conference Call Meeting Minutes)	10/19/2011	CAX		6	Waste Slag Material Subarea	Team agreed to: (1) remove the Waste Slag from the EE/CA; (2) collect surface (0-6") and subsurface (6-24") soil samples for inorganic constituent analysis only; (3) prepare a SAP Addendum, which will detail sample quantity and location and objectives; and (4) prepare a TM to present the data and path forward. In addition, the Team agreed that the results of the inorganic constituent analysis will be screened against the CAX background values, site-specific ecological screening values (ESVs) & Residential RSLs. The Team preferred to capture this agreement in the conference call meeting minutes instead of a formal consensus statement.
NA	(Documented in Partnering Meeting Minutes)	11/16/2011	CAX	Basewide		Risk Screening Constituents that Do Not Have Screening Values	The Team agreed to this process for constituents that do not have screening values: (1) Define surrogate value(s) used. (EPA has the right to refute surrogate value used.) (2) If surrogate value(s) are exceeded, include the constituent as a COPC. (3) However, on a case by case basis, certain constituents (e.g., acetone) may not need to be carried through into a future investigation after the SI phase. Don't write them off in the SI, but include text in the SI to set-up they are probably not a concern, and discuss eliminating them (and the reasons why) in the SAP.
NA	(Documented in Partnering Meeting Minutes)	11/16/2011	CAX	Basewide		Use of maximum background values in the SI phase	The Team discussed and agreed to not use maximum background values in the SI Phase; however, maximum background concentrations could be used to make risk management decisions in future investigations that include quantitative risk assessments.
NA	(Documented in Partnering Meeting Minutes)	11/16/2011	CAX	Basewide		Pesticide Detections	The Team agreed to use the threshold of 50 ppb when making risk management decisions on pesticides (i.e., pesticide detections of 50 ppb or below could be attributable to basewide pesticide use and not attributable to a CERCLA-related release).
NA	(Documented in Partnering Meeting Minutes)	11/16/2011	CAX	Basewide		NFA Decisions	The Team agreed that in order for a site and/or site medium to go NFA, a risk analysis needs to be completed prior to making a decision for site closure.
NA	(Documented in Partnering Meeting Minutes)	1/18/2012	CAX		2, 6 (Waste Slag Pile subarea), 7	EE/CA	The Team agreed to putting the EE/CA for AOC 2, AOC 6 (Waste Slag), and AOC 7 on-hold since additional soil sampling is needed at two of three sites before the removal area can be defined.
NA	(Documented in Partnering Meeting Minutes)	3/8/2012	CAX		2	Additional soil sample collection	The Team agreed that the data collected as part of the SAP addendum can be provided in a separate document (i.e., a technical memorandum) and will not hold up finalizing the Multiple AOC SI.
NA	(Documented in Partnering Meeting Minutes)	3/8/2012	CAX	Basewide		"AOC" versus "Site" Nomenclature	The Team agreed to leave all current site designations (either "Site" or "AOC") as they are (meaning none of the current AOCs will be redesignated as a "Site").
NA	(Documented in Partnering Meeting Minutes)	9/12/2012	CAX		2, 6 (Waste Slag Pile subarea), 7	EE/CA	The Team agreed to go ahead and prepare the AOC 7 EE/CA instead of keeping the site's removal action on-hold while additional samples are collected at AOCs 2 and 6.
NA	(Documented in Partnering Meeting Minutes)	11/14/2012	CAX	Partnering		SASR	The Team agreed since the new Goals format requested by Tier 2 is so comprehensive, there is no need to continue updating and using the SASR.

Table 2-2. CAX Partnering Team Consensus Statement Summary

FY 2023-2024 SMP

NUMBER	CONSENSUS STATEMENT NUMBER	DATE	FACILITY	SITE	Area of Concern (AOC)	TOPIC	CONSENSUS STATEMENT
NA	(Documented in Partnering Meeting Minutes)	11/14/2012	CAX	Partnering		Monthly Calls	The Team agreed to start holding one hour conference calls each month to help the team remain cohesive and up-to-date in between Partnering meetings. The calls will start in January (next Partnering meeting is March '13).
NA	(Documented in Partnering Meeting Minutes)	3/12/2013	CAX	4 and Youth Pond		RI Report	The Team agreed to work out the approach for the data evaluation and how to present in the RI. The approach will be discussed by the Team, and after agreement reached, the RI report will be prepared.
NA	(Documented in Partnering Meeting Minutes)	3/12/2013	CAX		6 (1918 Drum Storage Area)	Consensus Letter	The Team agreed to continue with the preparation and submission of the draft Consensus Letter for Team review.
NA	(Documented in Partnering Meeting Minutes)	4/25/2013	CAX	4 and Youth Pond		RI Report	The Team agreed on the proposed groupings and exposure scenarios.
NA	(Signed Consensus Letter)	9/18/2013	CAX		2	groundwater	The CAX Partnering Team agreed AOC 2 groundwater poses no potential unacceptable risk to human health and the environment and that no action is required for groundwater
NA	(Signed Consensus Letter)	9/18/2013	CAX		6 (1918 Drum Storage Area)	soil and groundwater	The Team agrees that no potential risks for surface and subsurface soil and groundwater exist at the 1918 DSA subarea and that no further action is required for soil and groundwater.
NA	(Signed Technical Memorandum)	9/18/2013	CAX		6 (Waste Slag Material subarea)	soil and groundwater	The Team agrees that the soil and groundwater at the Waste Slag Material subarea of AOC 6 poses no potential unacceptable risk to human health and the environment, and that no action following the removal of the waste slag pile is required.
NA	(Documented in Partnering Meeting Minutes)	9/19/2013	CAX		6 (Waste Slag Material subarea)	waste slag pile removal	The Team agreed that visual confirmation of the slag removal is fine and no post removal sampling for laboratory analysis will be required.
NA	(Discussed during June and September 2013 Partnering. VDEQ and EPA agreement via email, 10/23/2013 and 1/07/2014, respectively)	1/7/2014	CAX		2	EE/CA	The Team agreed to included the additional surface/subsurface soil results (being collected to determine if the upcoming Area 2 removal action should include hot spots outside of Area 2) in the AOC 2 EE/CA instead of preparing a separate Tech Memo for the soil sampling results. Not having to prepare and review a separate Tech Memo will significantly expedite progress at the site.
NA	(Signed Technical Memorandum)	1/14/2014	CAX		4	SI groundwater PCE result upgradient of site	The Team agreed that PCE is not present in the groundwater at or in the vicinity of 51 sample location CAS04-GW04,upgradient of Site 4, and that no further action is required.
NA	(Signed Consensus Letter)	1/28/2014 date of last signature)	CAX		6 (Waste Slag Material subarea)	waste slag pile removal	The Team agreed, as a conservative measure, a solid waste removal action at the Waste Slag Material subarea at AOC 6 will be conducted in order to eliminate any potential for future impacts from the waste slag material to site media.
NA	(Discussion and agreement via email)	9/5/2014	CAX		1	switch AOC 1 S from ESI to RI	Based on the results of the human health risk assessment (HHRA) prepared for the ESI, the Team decided that preparation of an RI report was the appropriate course for the site. Because sufficient data were collected during the ESI, the Team agreed the data could be incorporated into an RI report and that completion of the ESI report was unnecessary. The Team agreed to continue with the ESI for AOC 1 North.
NA	(Discussed during a Team conference call)	October 2014	CAX		6 (Ammonia Settling Pits subarea)	switch from ESI to RI	Based on the results of the human health risk assessment (HHRA) prepared for the ESI, the Team decided that preparation of an RI report was the appropriate course for the site. Because sufficient data were collected during the ESI, the Team agreed the data could be incorporated into an RI report and that completion of the ESI report was unnecessary.
NA	(Signed Declaration Page within Final ESI Report)	12/09/14 date of last signature)	CAX		7	groundwater	Based on the results of the Expanded Site Inspection, no potentially unacceptable human health or ecological risks were identified for groundwater at CAX AOC 7. As there are no hazardous substances, pollutants, or contaminants remaining onsite above levels that prevent unlimited use and unrestricted exposure of groundwater, no further action is necessary for site groundwater to ensure protectiveness for human health and the environment.
49	01-08-15-49	1/15/2015 (date of last signature)	CAX	Basewide		certifying clean fill material	This consensus statement has been prepared to ensure that fill material used as backfill at CAX ER sites is properly sampled to document that it is “clean” and appropriate for onsite placement at CAX. This consensus statement is applicable only to terrestrial areas. Aquatic and wetland backfill requirements will be handled on a site-specific basis. In addition, this consensus statement applies to all current and future CAX ER sites, but is not retroactive to CAX ER sites that have had previous remedial/removal actions and/or are closed.
NA	(Documented in Partnering Meeting Minutes)	1/28/2015	CAX	4		FS	The Team agreed to complete the RI Addendum for groundwater prior to preparation of the FS
NA	(Discussion and agreement via email)	4/2/15 (VDEQ) 4/7/15 (EPA)	CAX	9		site boundary	The Team agreed on the proposed revision to the Site 9 boundary that will include the area in between CAD buildings 6 and 16.

Table 2-2. CAX Partnering Team Consensus Statement Summary

FY 2023-2024 SMP

NUMBER	CONSENSUS STATEMENT NUMBER	DATE	FACILITY	SITE	Area of Concern (AOC)	TOPIC	CONSENSUS STATEMENT
NA	(Documented in Partnering Meeting Minutes)	9/2/2015	CAX		9	path forward	Instead of the interim removal action proposed at the May 2015 Partnering meeting, the Navy will conduct a desktop study evaluation of existing and newer information and then will propose an industrial area upgradient of Penniman Lake to become AOC 9, with Penniman Lake as the downgradient receiving body. The new AOC 9 CSM proposal will be presented in a tech memo for Team review and agreement. AOC 9 will remain in the SI phase for now. The "CERCLA vs. non-CERCLA" language in the AOC 9 SI Step 2 Tech Memo will be removed; the tech memo will be a summary of Step 2 field activities and data and will recommend the desktop study evaluation.
NA	(Documented in Partnering Meeting Minutes)	11/5/2015	CAX			Youth Pond	Since Youth Pond does not have a Navy site designation or an EPA OU number and will be included in the Site 4 FS, the Team agreed to stop tracking Youth Pond separately and include it as part of Site 4 in the Goals and the next SMP update.
NA	(Discussion and agreement via email)	11/23/2015	CAX		7	NFA Decision Document	The Team agreed the AOC 7 EE/CA is sufficient as the NFA Decision Document for soil and debris following the removal action and a tech memo is not necessary. Once the Construction Closeout Report is finished, the site will be closed.
NA	(Documented in Partnering Meeting Minutes)	1/20/2016	CAX	7		groundwater	The Team agreed to postpone the FS for groundwater to address a data gap with the deeper portion of the aquifer and conduct a groundwater treatability study (e.g., via oxygen releasing compound [ORC] sock).
NA	(Discussion and agreement via email)	3/9/2016 (VDEQ) 3/15/2016 (EPA)	CAX		6	RI Addendum	The Team agreed to conduct an RI Addendum for the Ammonia Settlings Pits and two TNT subareas of AOC 6 to address explosives detected in Penniman Lake, as AOC 6 is the only known source of explosives to the lake (non-explosive COPCs within Penniman Lake will be covered under AOC 9).
NA	(Documented in Partnering Meeting Minutes)	3/17/2016	CAX		6	RI Addendum	The Team agreed "current risk" will be the primary objective of the AOC 6 RI Addendum.
NA	(Documented in Partnering Meeting Minutes)	3/17/2016	CAX		8	groundwater	The Team agreed, while there is no unaccepted risk to groundwater exposure, since there is a Federal MCL (5 ug/L) exceedance for PCE, enhanced bioremediation socks (e.g., ORC-type socks) will be inserted into the monitoring wells, and after about 6 weeks, the wells will be resampled. A baseline round of samples will be collected before the socks are inserted.
NA	(Documented in Partnering Meeting Minutes)	3/17/2016	CAX	7		groundwater	The Team agreed the Site 7 treatability study will be the same as for AOC 8, that is, insert enhanced bioremediation socks (e.g., ORC-type socks) into the monitoring wells, and after about 6 weeks, resample the wells. A baseline round of samples will be collected before the socks are inserted.
NA	(Discussion and agreement via email)	5/11/2016 (EPA) 5/16/2016 (VDEQ)	CAX		2	removal action	The Team agreed that although arsenic concentrations in soil are greater than the PRG, they are within CAX background levels and no further soil excavation would be necessary.
NA	(Documented in Partnering Meeting Minutes)	8/17/2016	CAX			Youth Pond and Penniman Lake	The Team agreed to formalize catch and release restrictions on Youth Pond and Penniman Lake in the RODs for each site.
NA	(Documented in Partnering Meeting Minutes)	8/18/2016	CAX	4		groundwater	The Team agreed to continue the site FS and the RI addendum will include an evaluation of the groundwater to surface water pathway. The Team agreed that an NFA ROD for groundwater would be required if the remedial action removes the groundwater risk.
NA	(Documented in Partnering Meeting Minutes)	11/9/2016	CAX	7		groundwater	The Team noted, since enhanced biodegradation using ORC socks was not a feasible remedial option under the present aquifer conditions, an alternative remedial option is needed. The Team agreed to proceed with the preparation of a technical memorandum work plan for an alternative form of treatment/small scale treatability study prior to the preparation of a feasibility study. A baseline round of groundwater sample collection will be conducted prior to injections or treatments.
NA	(Documented in Partnering Meeting Minutes)	11/9/2016	CAX		8	groundwater	The Team agreed to a baseline round of groundwater sample collection for PCE, debris removal, and a reassessment of groundwater conditions. The Team will reevaluate the installation of new wells to replace the wells that will be destroyed by the removal action.
NA	(Documented in Partnering Meeting Minutes)	1/24/2017	CAX		8	debris	The Team agreed to conduct a Time-Critical Removal Action to address the potential for ongoing York River shoreline erosion to eventually expose and scatter the debris.
NA	(Documented in Partnering Meeting Minutes)	3/28/2017	CAX	7		groundwater	The Team agreed to collect additional groundwater samples prior to any proposed treatment of the groundwater; in addition, the team agreed additional delineation of the groundwater was necessary and that groundwater concentrations below screening criteria would determine whether or not the groundwater had been delineated.
NA	(Documented in Partnering Meeting Minutes)	6/7/2017	CAX		8	soil/debris	While no potential risk was identified for soil, the Team agreed to collect post-removal confirmation soil samples following removal action activities. The Team agreed that the soil samples would be analyzed for Benzo(a)anthracene, Benzo(a)pyrene, Benzo(a)fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Endrin Aldehyde, 4,4'-DDE, Aroclor-1260, Chromium, Hexavalent Chromium, Mercury, and Selenium as these were the constituents that were detected at concentrations above the screening values during the RI.
NA	(Documented in Partnering Meeting Minutes)	8/29/2017	CAX		6	groundwater	The team agreed to preparing an NFA ROD for groundwater at the AOC 6 TNT and ASP subareas while waiting for the sediment investigation to be completed for these subareas.

Table 2-2. CAX Partnering Team Consensus Statement Summary

FY 2023-2024 SMP

NUMBER	CONSENSUS STATEMENT NUMBER	DATE	FACILITY	SITE	Area of Concern (AOC)	TOPIC	CONSENSUS STATEMENT
NA	(Documented in Partnering Meeting Minutes)	11/25/2017	CAX		6	sediment	The team agreed to change the focus of the AOC sediment sampling from current risk to potential future risk by investigation the historic steam bed.
50	09-24-18-50	9/24/2018	CAX		6 and 9	sediment and surface water	The team agreed the investigation of and action for all Penniman Lake sediment and surface water will be conducted under AOC 9. This includes the explosives constituents in sediment resulting from upland AOC 6 (Ammonia Settling Pits subarea and TNT subareas) sources. As a result, the only media remaining to be addressed for the AOC 6 Ammonia Settling Pits subarea and TNT subareas is soil, as a No Further Action ROD for groundwater is anticipated to be signed by the end of FY2018. The proposed sampling plan outlined in the AOC 6 RI Addendum will be incorporated into future AOC 9 investigations. In accordance with the RIs prepared for the AOC 6 Ammonia Settling Pits subarea and TNT subareas, an EE/CA, will be initiated to address soil in these AOC 6 subareas
NA	(Documented in Site Screening Process Concurrence for Site Closeout Signature Page)	4/1/2019	CAX		2	soil and groundwater	The team agreed the No Action Consensus Letter for Groundwater at AOC 2 (CH2M, 2013), the removal action (TetraTech, 2016), the NFA Technical Memorandum for AOC 2 (CH2M, 2017), along with the Site Screening Process Concurrence for Site Closeout Signature page, fulfills the requirements of the SSP Report and site closeout decision document as defined in the CAX FFA Subsection 9.3 (C) (1) and (3), respectively.
NA	(Documented in Partnering Meeting Minutes)	2/11/2020	CAX		8	soil and groundwater	The team agreed to adjust the AOC 8 schedule so that the Pre-Treatability Study SAP (for groundwater) and the Post-TCRA Technical Memorandum (for soil) will be submitted around the same time to facilitate a joint review of the documents by the USEPA and VDEQ.
NA	(As documented in the SAP)	2/28/2021	CAX	9		soil and sediment	The team agreed to analyze the Phase 3 ESI soil and sediment samples for site-related COPCs (those constituents exceeding a screening criteria) as outlined in the ESI SAP.
NA	(Documented in email)	2/15/2021 (EPA) 2/26/2021 (DEQ)	CAX		9	groundwater	The team granted interim approval of the locations and installation of the proposed 20 monitoring well locations outlined in the draft *Results of the AOC 9 Phase 1 Expanded Site Inspection Technical Memorandum*
NA	(Documented in email)	7/27/2021 (EPA) 5/26/2021 (DEQ)	CAX	7		vapor intrusion	Based on the results of the February 2021 vapor intrusion (VI) sampling additional sampling for VI was not necessary since the crawlspaces of the recreational cabins are passively and permanently vented and the analyzed compounds were not detected in any of the samples indicating that crawlspace air is reflective of outdoor conditions.
NA	(Documented in a Tech Memo)	8/27/2021 date of last signature)	CAX		8	soil	The Partnering Team agrees that NFA is warranted for soil at CAX AOC 8, as presented in the *Consensus Letter for Soil at Area of Concern 8 T*echnical Memorandum.

Notes:

Decisions # 2,6,8,10,14,16,22,24,26,30,32-34,37,39-47 were strictly for NWS Yorktown

CAX and NWS Yorktown conducted joint Partnering from 2000 through September 2008, when the bases split into separate Partnering Teams.

BTAG - Biological Technical Assistance Group
CAX - Cheatham Annex
NA - Not Applicable
USEPA - United States Environmental Protection Agency
VDEQ - Virginia Department of Environmental Quality
NWS Yorktown - Naval Weapons Station Yorktown

Table 2-3. Major Elements of the CERCLA Process

FY 2023-2024 SMP

Preliminary Assessment (PA)	Initiation of concern about a site, area, or potential contaminant source. The PA is a limited-scope assessment designed to distinguish between sites that clearly pose little or no threat to human health or the environment and sites that may pose a threat and require further investigation. Environmental samples are rarely collected during a PA. The PA also identifies sites requiring assessment for possible response actions. If the PA results in a recommendation for further investigation, an SI is conducted.
Site Investigation (SI)	Some sites warrant preliminary or interim investigations, studies, or removal/remedial actions. If it is unclear as to whether a site should be included in the CERCLA RI/FS process, an SI is sometimes conducted to make a general determination if activities at the site have impacted environmental media. SIs typically include the collection of environmental and waste samples to determine which hazardous substances are present at a site and to determine if these substances have been released to the environment.
Remedial Investigation (RI)	During an RI, data is collected to characterize site conditions, determine the nature of the waste, assess risk to human health and the environment, and, if necessary, conduct treatability testing to evaluate the potential performance and cost of the treatment technologies being considered.
Treatability Study (TS)	Treatability studies may be conducted at any time during the CERCLA process. The need for a treatability study generally is identified during the FS. Treatability studies may be classified as either bench-scale (laboratory study) or pilot-scale (field studies). For technologies that are well-developed and tested, bench-scale studies are often sufficient to evaluate performance. For 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. Treatability studies are performed to assist in the evaluation of a potentially promising remedial technology. The primary objectives of treatability testing are to provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the FS and support the remedial design of a selected alternative.
Engineering Evaluation/Cost Analysis (EE/CA) and Interim Removal Action (IRA)	Removal actions are implemented to clean up or remove hazardous substances from the environment at a specific site in order to mitigate the spread of contamination. Removal actions may be implemented at any time during the CERCLA process. Removal actions are classified as either time-critical or non-time-critical actions. 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 (NTCRA). For a NTCRA, an EE/CA is prepared rather than the more extensive FS. The public has an opportunity to comment on the EE/CA during an announced formal public comment period. 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 in order to protect human health and the environment.
Feasibility Study (FS)	The FS is the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. The RI and FS can be conducted concurrently; data collected in the RI influences the development of remedial alternatives in the FS, which in turn affect the data needs and scope of treatability studies and additional field investigations. This phased approach encourages the continual scoping of the site characterization effort, which minimizes the collection of unnecessary data and maximizes data quality.
Proposed Plan (PP)	A PP presents the remedial alternatives developed in the FS and recommends a preferred remedial alternative. The public has an opportunity to comment on the PP during an announced formal public comment period. Site information is compiled in an administrative record and placed in the general IR program information repositories established at local libraries for public review. The public comments are reviewed and the responses are recorded in a document called a Responsiveness Summary. At the end of the public comment period, an appropriate remedial alternative is chosen to protect human health and the environment. All parties directly involved in the restoration program (Navy, EPA, and VDEQ) must agree on the selected alternative.
Record of Decision (ROD)	The ROD document is issued to explain the selected remedial action. Public comments received during the PP are addressed as part of the responsiveness summary in the ROD. A notice to the public is issued when the ROD is signed by Navy and EPA following State concurrence.
Remedial Design/Remedial Action (RD/RA)	The final stage in the process is the RD/RA. The technical specifications for cleanup remedies and technologies are designed in the RD phase. If land use controls are a component of the remedy, the Land Use Control Remedial Design is generated during this phase. The RA is the actual construction or implementation phase of the cleanup process.
Remedy In Place	For long-term remedies where it is anticipated that remedial action objectives will be achieved over a long period, the RIP milestone signifies the completion of the remedial action construction phase, and that the remedy has been implemented and has been demonstrated to be functioning as designed (i.e., all testing has been accomplished and the remedy will function properly). Once all RCs and RIPs have been documented for every site at the facility and the terms of the FFA have been met, site closeout and NPL deletion is completed.
Response Complete	Within the CERCLA process there are multiple points at which a decision can be made that no further response action is required; properly documented (necessary regulatory notification or application for concurrence has occurred) these decisions constitute response complete and/or site closeout. RC is the point at which the remedy has achieved the required reduction in risk to human health and the environment (cleanup goals have been met). Response complete is followed by site closeout.
Five-Year Review	Five-year reviews generally are required by CERCLA or program policy when hazardous substances remain on site above levels that permit unrestricted use and unlimited exposure. Five-year reviews provide an opportunity to evaluate the implementation and performance of a remedy to determine whether it remains protective of human health and the environment. Generally, reviews are performed five years after the initiation of a CERCLA response action, and are conducted every five years as long as future uses remain restricted. Five-year reviews for Cheatham Annex are performed by the Navy, the lead agency for the site, but EPA retains responsibility for determining the protectiveness of the remedy.

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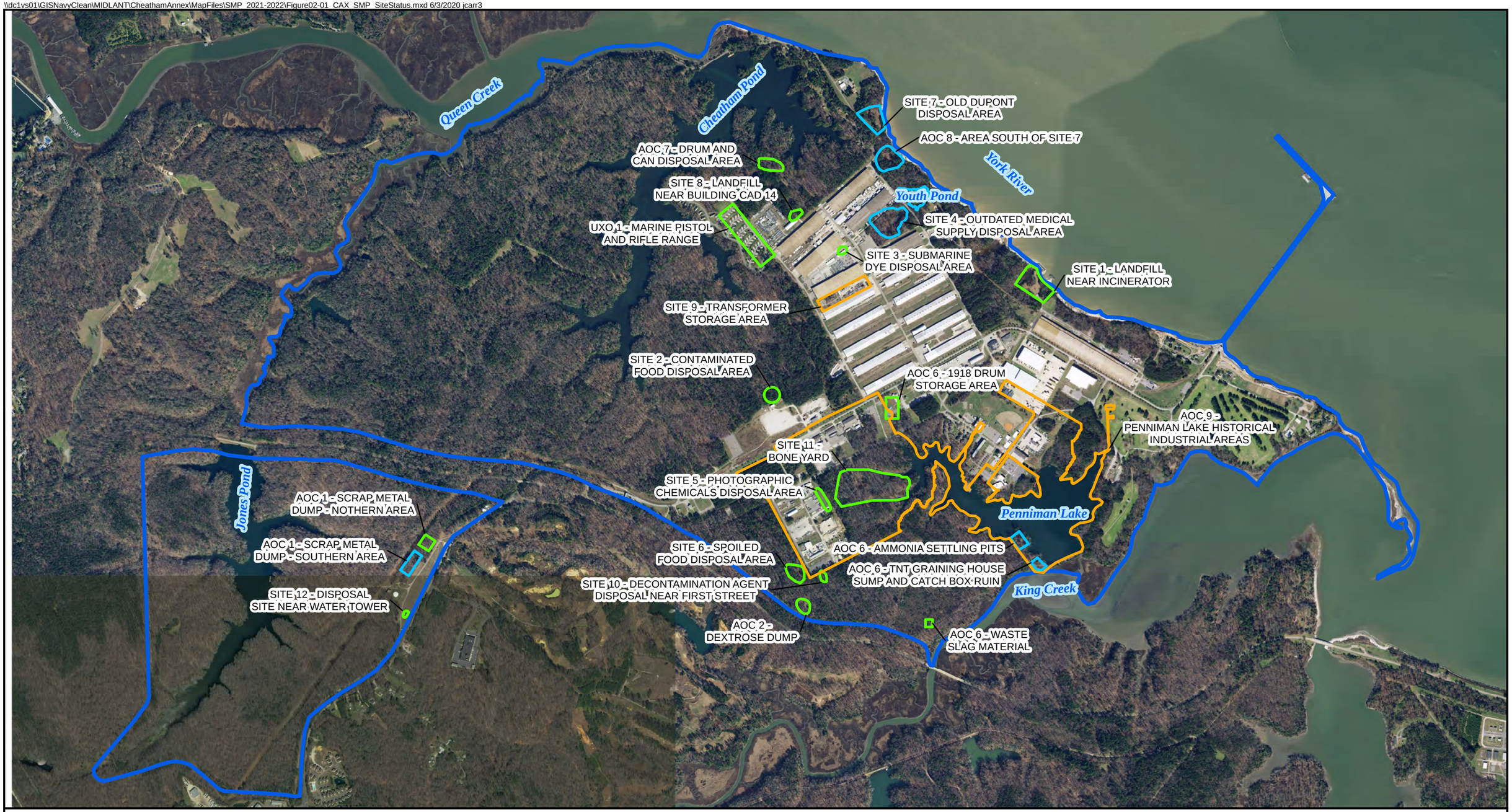

Legend

- Active RI/FS (one or more media) Site or AOC
- Active SI Site or AOC
- No Further Action Site or AOC
- CAX Boundary

Imagery:
Virginia Commonwealth, 2017

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Figure 2-1
Sites/AOC Locations and CERCLA Status
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

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SECTION 3

CAX Site and AOC Descriptions

This section provides a summary of base-wide investigations as well as a brief history of CERCLA activities (chronology of significant CERCLA documents and milestones), a summary of the nature and extent of potential contamination, a summary of potential unacceptable risks, and the CERCLA path forward for each of the active sites and AOCs at CAX. Active site and AOC figures and schedules follow the site descriptions. Schedules illustrate planned CERCLA implementation activities through 2024.

3.1 Base-Wide Studies

3.1.1 Initial Assessment Study

In the first phase of the Navy Assessment and Control of Installation Pollutants (NACIP) program (the precursor to the Environmental Restoration Program), a team of engineers and scientists conducted an IAS at CAX in 1984 to identify and assess sites posing a potential threat to human health and/or the environment due to contamination from past operations. Twelve potentially contaminated sites were identified (Sites 1 through 12), based on information from historical records, aerial photographs, field inspections, and personnel interviews. The IAS concluded that four of the twelve sites (Sites 1, 9, 10, and 11) may pose a sufficient threat to human health or to the environment to warrant Confirmation Studies (phase two of the NACIP). However, none of the sites posed an immediate threat to human health or the environment. The results of the Confirmation Studies, which would involve actual sampling to confirm or deny the existence of the suspected contamination and quantify the extent of any problems which may exist, would be used to evaluate the necessity to implement mitigative actions and/or clean-up operations (C. C. Johnson & Associates, Inc. and CH2M HILL, 1984).

3.1.2 Confirmation Studies

Two Confirmation Studies were conducted, one in 1986 and one in 1988. The 1986 study (Step 1A – Verification, Round 1) included the collection of groundwater samples at Site 1 (Landfill Near Incinerator), soil samples at Site 9 (Transformer Storage Area), and groundwater, soil, surface water/sediment, and drum content samples at Site 11 (the Bone Yard). No samples were collected at Site 10 (Decontamination Agent Disposal Area Near First Street), and the only reference to Site 10 in the report is in Table 1-1, which has the notation “Magnetometer Survey.” Site 10 is not cited again, and the referenced magnetometer survey was not documented in the report. Based on the results of the sampling that occurred at Sites 1, 9, and 11, a repeat of the first round of sampling and analysis was recommended for Sites 1 and 11 (minus drum samples), while for Site 9, the recommendation was to collect additional background information on the site before proceeding with a second round of sampling (Dames & Moore, 1986).

The second Confirmation Study (Step 1A – Verification, Round 2) sampling occurred in late 1987. Another round of groundwater samples were collected from Site 1 and another round of groundwater, surface water and sediment samples were collected from Site 11; all samples were collected at the same locations as with the round one sampling. A second round of soil samples were not collected at Site 11 (no explanation why was provided), even though it was recommended in the round one report. No sampling occurred at Site 9, and neither Site 9 nor Site 10 is mentioned in the report. At Site 1, two semi-volatile organic compounds (SVOCs), three metals, total phenols, and oil and grease were detected in groundwater; however, only zinc and total phenols exceeded the Virginia groundwater standards. At Site 11, two SVOCs and total phenols were detected in groundwater and surface water; however, only total phenols exceeded the Virginia groundwater standards and Virginia criterion for the protection of aquatic life (surface water). In addition, two volatile organic compounds (VOCs), total phenols, and oil and grease were detected in Site 11 sediment. No constituents in sediment exceeded their respective screening criteria at Site 11 (Dames & Moore, 1988).

In 1991, Dames and Moore finalized an RI Interim Report, which summarized the results of the two confirmation studies, including the magnetometer survey conducted at Site 10 during round one. The report recommended further RI activities for Sites 1, 10, and 11 and no further action for Site 9 (Dames and Moore, 1991).

3.1.3 Pond Study

In 2000, surface water and sediment samples were collected from 19 stations within four, man-made surface water bodies located within CAX - Jones Pond, Cheatham Pond, Youth Pond, and Penniman Lake (**Figure 2-1**). Based on the results, contaminants of potential concern (COPCs), including polychlorinated biphenyls (PCBs) and metals, were identified as having the potential to cause risk to human and environmental receptors and further investigation into the potential sources of these bioaccumulative chemicals and their potential effects on human health and the environment was also recommended (Baker, 2001a). In addition, based on the presence of bioaccumulative chemicals (particularly PCBs) in the sediment of Youth Pond and Penniman Lake, fishing restrictions were recommended as a conservative measure, and signs for catch-and-release were posted.

3.1.4 Background Study

Background concentrations for natural and anthropogenic constituents are used for comparison to site data to support the identification of a CERCLA release. The *Navy Policy on the Use of Background Chemical Levels* (CNO, 2004) and the United States Environmental Protection Agency's (USEPA's) *Role of Background in the CERCLA Cleanup Program* guidance (USEPA, 2002) acknowledge risk management and remedial actions for CERCLA sites should account for the influence of natural and anthropogenic background conditions, and that cleanup goals for natural and anthropogenic constituents of concern (COCs) from an identified CERCLA release should not be set below corresponding background concentrations.

Although a previous background investigation was conducted at CAX (Baker, 2003b), the Navy, USEPA, and VDEQ agreed that additional evaluation of background conditions (natural and anthropogenic) was warranted to more accurately identify site-related contamination and assess potential risks from exposure to site contaminants. Therefore, an additional background study was conducted, not to re-evaluate or re-visit past use of background data, but to supplement existing data for the establishment of a more comprehensive and representative background data set for future application to CERCLA investigations/actions (CH2M HILL, 2011a). The specific objectives of the new background study were to:

1) present soil and groundwater background data that can be used in future population (background) to population (site) statistical analyses;
2) establish the upper range of background concentrations of inorganics in surface and subsurface soil and groundwater through the calculation of upper tolerance limits (UTLs) [thus, replacing the outdated upper confidence limits (UCLs) from the original background study];
3) establish central tendency statistics, and
4) outline the use of updated background data during future CERCLA investigations (CH2M HILL, 2011a).

3.1.5 Community Involvement Plan Update

A Community Involvement Plan (CIP) assists the Navy in its community outreach efforts for disseminating information about, and public participation in, the ongoing investigation and remedial processes and identifies community concerns (if any). An update to the existing NWS Yorktown and CAX CIP (CH2M HILL, 2014a) was conducted in 2014 and included mailing a survey to residences within a one-mile radius of NWS Yorktown and CAX (~2,700 surveys were mailed and 118 responses were received) and conducting interviews with the Newport News City Manager and the National Park Service. In general, the public has a favorable attitude towards CAX and the Navy, and the majority of respondents (~70%) did not have any concerns regarding environmental cleanup at CAX (CH2M HILL, 2014a). An update to the CIP, including a new survey and new interviews, is in progress and will be available for public review upon its completion.

3.1.6 Watershed Contaminated Source Document for the Lower York River

If there is a potential for a water body to be impacted by contaminants originating from both Navy and non-Navy sources, Navy policy (CNO, 2002) requires preparation of a Watershed Contaminated Source Document (WCSD). A WCSD was prepared to summarize existing information and document the existence of both Navy and non-Navy sources that may have or continue to impact the sediments in the vicinity of NWS Yorktown and CAX, including the sediments found in the Lower York River and adjacent waterbodies such as Felgates Creek, King Creek, Penniman Lake, and Youth Pond.

The WCSD concluded that there are numerous historical and ongoing inputs of contaminants to the York River watershed, and that these contaminants may be transported into the York River watershed through a number of pathways, including air deposition, surface water runoff, and direct discharge, where they can settle into the sediments. The WCSD recommended that existing available analytical data, the Navy sediment policy, and the evaluation of contaminant pathways all be considered during the development of CERCLA-related work plans for investigation activities intended to evaluate the Navy's potential contaminant contribution to the York River watershed (NAVFAC LANT, 2013).

3.1.7 Basewide Per- and Polyfluoroalkyl Substances Investigations

In 2016, NAVFAC Headquarters released a directive to conduct a comprehensive compilation of existing information about known or potential releases and potential migration pathways for per- and polyfluoroalkyl substances (PFAS), an emerging chemical of environmental concern, at naval facilities (Navy, 2016). As part of the NAVFAC Headquarters directive, a Navy-wide review of records was conducted to establish an inventory of locations where PFAS may have been used, stored, released, or disposed of at Navy installations. In response to this direction, a draft final Basewide Preliminary Assessment (PA) report was submitted in March 2022. In addition, a draft Uniform Federal Policy Sampling Analysis Plan (UFP-SAP) was submitted in August 2022 to conduct a site inspection (SI) to determine if PFAS are present at the sites identified in the PA and is scheduled to be final in FY2023. Screening values for PFAS continue to evolve. The project action levels listed in the draft SAP are the May 2022, USEPA Regional Screening Levels (USEPA, 2022) for six PFAS which are approved for use by the DOD (DOD, 2022).

3.1.8 Base-wide Documents Available

Document Title /Milestone	Author/Date	AR Document Number
Initial Assessment Study	C.C. Johnson & Associates, Inc./ Hill, 1984	000132
Confirmation Study Step 1A (Verification), Round One	Dames & Moore, 1986	000135
Confirmation Study Step 1A (Verification), Round Two	Dames & Moore, 1988	000136
Remedial Investigation Interim Report	Dames & Moore, 1991	000139
Pond Study Report	Baker, 2001a	001212
Background Investigation Report	Baker, 2003b	001379
Background Study Report	CH2M HILL, 2011a	000227
Community Involvement Plan	CH2M HILL, 2014a	003247
Watershed Contaminated Source Document for the Lower York River	NAVFAC LANT, 2013	003114

3.2 Former Penniman Shell Loading Plant

As mentioned in Section 2.1, CAX is located on the site of the former Penniman Shell Loading Plant (PSLP) (**Figure 3-1)**. The PSLP was an explosives manufacturing facility operated by the E.I. DuPont de Nemours &

Company during World War I. This facility operated as a trinitrotoluene (TNT) manufacturing plant beginning in approximately 1916, and subsequently began loading artillery shells for the war effort in 1918; it was not in operation long before the November 1918 armistice ending the war was signed. Between 1918 and 1925, the facility was demolished, and the property reverted to farmland until the Navy established CAX in 1943.

In 1999, the USEPA led a site inspection (SI) of the former PSLP property to "assess the potential contamination sources present at this site and to determine the need for additional investigation under [CERCLA] or other authority and, if appropriate, support site evaluation using the Hazard Ranking System (HRS) for proposal to the National Priorities List (NPL)" (Weston, 1999). From this investigation, the CAX Partnering Team agreed to further investigate five of the former PSLP areas identified in the report (Ammonia Settling Pits, TNT Graining House Sump, TNT Catch Box Ruins, Waste Slag Material, and 1918 Drum Storage) and designated the study area as AOC 6 – Penniman AOC (USEPA, et al., 2005)[3].

3.3 Site Descriptions

The following sites and AOCs had a no action or NFA decision for all media prior to the submission of the FY2022-2023 SMP amendment:

- Site 1 – Landfill Near Incinerator
- Site 2 – Contaminated Food Disposal Area
- Site 3 – Submarine Dye Disposal Area
- Site 5 – Photographic Chemicals Disposal Area
- Site 6 – Spoiled Food Disposal Area
- Site 8 – Landfill Near Building CAD 14
- Site 10 – Decontaminated Agent Disposal Area Near First Street
- Site 11 – Bone Yard
- Site 12 – Disposal Site Near Water Tower
- AOC 2 – Dextrose Dump
- AOC 3 – CAD 11/12 Pond Bank (incorporated into Site 4)
- AOC 4 – Outdated Medical Supply Disposal Area (determined to be the same area as Site 4)
- AOC 5 – Debris Area (incorporated into Site 1)
- AOC 7 – Drum Disposal Area and Can Pit

As mentioned in Section 2.2.1, descriptions of Sites 2, 3, 5, 6, 8, 10, and 12 and AOCs 4 and 5 were included in the FY 2008-2009 SMP update but are not included herein and will not be included in future SMP updates. The Site 1 description was included through the FY 2010-2011 update, then removed after its NFA ROD was signed (September 2009). The Site 11 description was included through the FY 2011-2012 update, then removed after its NFA ROD was signed (August 2010). The AOC 3 description was included through the FY 2012-2013 update and removed starting with the FY 2013-2014 SMP update, now that it is part of Site 4. The AOC 7 description was included through the FY 2017-2018 update, then removed following CAX Partnering Team approval of the AOC 7 Construction Completion Report in June 2016. The AOC 2 description was included through the FY 2018-2019 update and has been removed beginning with the FY 2019-2020 update, following CAX Partnering Team approval of the NFA Technical Memorandum in May 2017. Information on the sites/ AOCs listed above is included in **Table 2-1.** Information regarding CAX sites that need further action or investigation also is included in **Table 2-1** and provided in more detail in the subsections that follow.

[3] In 2008, the USEPA expressed a concern with various PSLP remnants that were identified in the 1999 SI, but not included as part of AOC 6. The Navy looked into the issue further and, in partnership with the USEPA and VDEQ, agreed the USEPA's concerns regarding the PSLP remnants not included as part of AOC 6 have been adequately addressed and require no further action (CH2M HILL, 2013a).

3.3.1 Site 4—Outdated Medical Supply Disposal Area

Site Summary

Status:	Site characterization complete Site media: soil, groundwater, surface water, and sediment USEPA's Superfund Enterprise Management System (SEMS) Operable Unit (OU) 04: Open
Current ER Activities:	RI/FS
Media Investigated:	Soil, groundwater, surface water, sediment, and biota tissue
Removal/Remedial Action(s):	Approximately 200 pounds of debris and 13 pounds of sharps (metal and plastic) found on the surface were removed by Reactives Management, Inc. in May 1998 (Baker, 2001b, included as Appendix A).
Media Closed:	None
Waste and/or Debris Present Onsite:	Yes

Site Description

Site 4 is located at the headwaters of Upstream Pond (upstream of Youth Pond) and between buildings CAD 11 and CAD 12 (**Figure 3-2**). In the late 1960s, out-of-date, unused, medical supplies, including syringes and empty intravenous bottles, and one-inch metal banding, were unloaded down a bank in this area and covered with soil (**Figure 3-2**, Burial Area 2). Reportedly, much of the material was later removed from the site because stories were circulating about syringe needles getting stuck in deer hooves. After heavy rain events, syringes could sometimes be seen floating in Upstream Pond and in the downstream Youth Pond. In addition, railroad ties and concrete debris were dumped along the main drainage channel to Upstream Pond. Recent (2009) test pits revealed buried debris at the site (**Figure 3-2**, Burial Area 1, formerly known as AOC 3), including asphalt, bricks, concrete, metal, construction and wood debris, automotive parts, dark tar paper, shingles, and a 55-gallon drum. Site 4 receives stormwater runoff from the surrounding industrial area that discharges to Youth Pond (**Figure 3-2**). Youth Pond is an approximately two and a half acre freshwater, surface water body located between D Street and the York River, east (and downgradient) of Site 4. Following completion of the Pond Study, catch-and-release fishing restrictions were recommended for Youth Pond, as a conservative measure that was not based on a human health risk assessment, but based on detected bioaccumulative constituents in the sediment. Subsequently, fishing restriction signs (catch-and-release only) were posted in August 2000. In 2011, the CAX Partnering Team agreed to conduct an RI to include Youth Pond, because of the catch and release fishing restriction. A summary of relevant documents and action milestones is presented below.

Documents and Milestones

Document Title /Milestone	Author/Date	AR Document Number
Site Inspection Report, Site 4 and AOC 1	Baker, 2001b	001291
Trenching Letter Report, Site 1, Site 4, and AOC 2	Baker, 2002	001234
Screening Level Ecological Risk Assessment Report for Sites 4 and 9	Baker, 2005	001565
Site Inspection Report, Sites 4, Site 9, and Area of Concern 3	CH2M HILL, 2011b	002425
No Further Action Technical Memorandum for PCE Detected in Groundwater Upgradient of Site 4	CH2M HILL, 2014b	003150
Remedial Investigation Report, Site 4 and Youth Pond	CH2M HILL, 2014c	003254
Site 4 Pre-Feasibility Study Technical Memorandum	CH2M HILL, 2015a	003291
Wetland Delineation Report	CH2M HILL, 2017d	N/A (See References)
Site 4 RI Addendum Report	CH2M HILL, 2021b	003758
Preliminary Remediation Goals Development Technical Memorandum for Site 4	CH2M HILL, 2021c	003744

Nature and Extent of Potential Contamination

An RI field investigation was completed at Site 4 and Youth Pond to further evaluate the site media and determine the nature and extent of potential contamination. The results of this investigation were presented in an RI report (CH2M HILL, 2014c) and included a human health risk assessment (HHRA) and a baseline ecological risk assessment (ERA). Following the RI, a Pre-Feasibility Study TM (CH2M HILL, 2015a) was prepared to detail the steps needed to move Site 4 from the RI to the FS stage; it included revised (post-RI) human health and ecological risk assessments for soil to determine if risks outside of the debris areas are acceptable or if these areas also need to be considered for remediation. In addition, the results of additional groundwater investigations were presented in an RI Addendum Report (CH2M, 2021b) and included an HHRA and ERA for groundwater to determine if risks are acceptable or if groundwater also needed to be considered for remediation. The RI, TM, and RI Addendum conclusions are summarized in the table below.

Site 4 Potential Contamination and Risks Summary

Site 4			
Debris	Test-pitting activities conducted at Site 4 indicate that the extent of buried debris has been delineated and is contained within two separate burial areas totaling approximately 4 acres in size (Burial Investigation Area 1 and Burial Investigation Area 2). At Burial Investigation Area 1, buried debris includes asphalt, bricks, concrete, metal, construction and wood debris, automotive parts, tarpaper, shingles, and a 55-gallon drum. At Burial Investigation Area 2, buried debris consists of medical supplies, metal, and construction/fill debris. In some areas, the buried debris is in direct contact with either the groundwater or surface water/sediment within Upstream Pond.		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	Human Health Ecological	Arsenic and hexavalent chromium Arsenic, mercury, and zinc	These COCs are associated with the debris area soil and are considered site-related. An FS will be prepared to evaluate remedial alternatives to address these COCs and the debris (CH2M HILL, 2014c). Based on the revised soil risk assessments, no additional investigation or evaluation of soil outside the fenced area is necessary (CH2M HILL, 2015a). There is significant potential for contaminants found in soil and sediment within drainages and surface water and sediment in both Upstream and Youth Ponds to have originated from non-CERCLA-regulated sources rather than from sources specific to Site 4. Therefore, with the exception of one voluntary surface soil PAH hotspot removal near Cheatham Annex Detachment (CAD) Warehouse 12, no action will be taken to address PAHs and pesticides in any site media at Site 4, Upstream Pond, or Youth Pond (CH2M HILL, 2015a).
Groundwater	Human Health	Benzo(a)anthracene, benzo(a)pyrene, naphthalene, and arsenic	Potentially unacceptable risks were identified for groundwater for hypothetical future residential exposure scenarios (there were no potentially unacceptable risks under current exposure scenarios (CH2M, 2021b).
Sediment (Upstream Pond)	Ecological	Cadmium, copper, lead, silver, and zinc	An evaluation of the hyporheic zone of Upstream and Youth Ponds was conducted for the site; however, the results of the sediment toxicity testing in the baseline ecological risk assessment (BERA) did not indicate any consistent impacts from COCs to organism survival, growth, or reproduction at any of the Upstream Pond or Youth Pond locations. There also do not appear to be any widespread impacts from COCs to the benthic invertebrate community in Upstream Pond based on the semi-quantitative biological survey that was conducted as part of this BERA. Any intrusive remedial action to address the potential ecological risk would have detrimental physical effects on the habitats and biota that are currently present. In addition, there is the potential for later recontamination from urban runoff. Therefore, these COCs in this medium will not be carried forward to the FS (CH2M HILL, 2015a). However, since PCBs were detected in the Site 4 soil, Upstream Pond sediment, and in Upstream and Youth Ponds fish tissue samples, these media will be included in the Site 4 FS (CH2M HILL, 2015a).

Site 4 Potential Contamination and Risks Summary

Surface Water (Upstream Pond)	None identified	None identified	No potential unacceptable risks or COCs associated with surface water were identified based on the results of the RI (CH2M HILL, 2014c).
Fish Tissue (Upstream Pond)	None identified	None identified	No site-related potential unacceptable risks or COCs associated with fish tissue were identified based on the results of the RI (CH2M HILL, 2014c). However, since PCBs were detected in the Site 4 soil, Upstream Pond sediment, and in Upstream and Youth Ponds fish tissue samples, these media will be included in the Site 4 FS (CH2M HILL, 2015a).
Youth Pond			
Debris	None		
Medium	**Potential Risk**	**COC(s)**	**Status**
Surface Soil	None identified	---	No potential unacceptable risks or COCs associated with surface soil within the Youth Pond surface drainage feature were identified based on the results of the RI (CH2M HILL, 2014c).
Surface Water	None identified	---	No potential unacceptable risks or COCs associated with surface water were identified based on the results of the RI (CH2M HILL, 2014c).
Sediment	None identified	---	No potential unacceptable risks or COCs associated with sediment were identified based on the results of the RI (CH2M HILL, 2014c).
Animal Tissue	None identified	---	No potential unacceptable risks or COCs associated with fish or frog tissue were identified based on the results of the RI (CH2M HILL, 2014c). However, the Navy will voluntarily keep the fishing restrictions in place to protect against human exposure to PCBs in fish tissue (CH2M HILL, 2015a). In addition, since PCBs were also detected in Site 4 soil, Upstream Pond sediment, and in Upstream Pond fish tissue, these media, as well as the Youth Pond fish tissue, will be addressed in the Site 4 FS (CH2M HILL, 2015a).

Activities Completed in FY 2022 (October 2021-September 2022)

The draft FS is scheduled to be submitted in FY 2023.

CERCLA Path Forward

- FS
- PP/ROD (all media)

Schedule 3-1 presents the FY 2023-2024 schedule for Site 4.

3.3.2 Site 7—Old DuPont Disposal Area

Site Summary

Status:	Site characterization ongoing Site Media: Soil and groundwater, plus York River sediment SEMS OU 03 – Soil and York River Sediment: Closed SEMS OU 16 – Groundwater: Open
Current ER Activities:	Data gap investigation for groundwater prior to an FS
Media Investigated:	Soil, groundwater, and York River sediment
Removal/Remedial Action(s):	2004: Beach surface debris cleanup. An apparently unfired, unfused, three-inch projectile was discovered and removed from the site for proper disposal. Due to this discovery, a planned TCRA to remove waste and prevent further erosion of disposal area waste into the York River was put on hold while the Navy obtained an Explosives Safety Submission (ESS) Waiver. The Final ESS (Bhate, 2005) was submitted to the CAX Partnering Team on January 4, 2006. According to the "UXO Remediation After Action Report" (Bhate, 2007b), approximately 86 pounds of munitions scrap (i.e., lifting lugs and fuse adapters) were recovered, certified safe (i.e., free from explosive hazards) and shipped to a recycling facility and smelted for reuse. No live ordnance was found and the action was completed by August 9, 2006.
	2006: Geotubes™ were installed to stabilize the shoreline and protect it from further erosion.
	Late 2007 into 2008: A removal action was initiated in December 2007 to remove visible and buried debris from the previously identified disposal area and the former cabin site areas. Approximately 4,482 tons of debris and soil were removed (Shaw, 2009). Following the removal action, the slope of the site was graded back to be less steep and seeded.
Media Closed:	Soil and York River Sediment
Waste and/or Debris Present Onsite:	No

Site Description

Site 7 is located along the York River, northeast of Chase Road (**Figure 3-3**); Davis Road transects the site. During the early 1900s, it was reported that non-hazardous and/or inert wastes from the City of Penniman and the DuPont Company Penniman facility were disposed along the York River. Site 7 was identified as a potential area of concern in the IAS (C. C. Johnson & Associates, Inc. and CH2M HILL, 1984).

Information on the types and quantities of wastes received is not available; however, as the shoreline eroded, site waste (e.g., dinner ware and incinerated bottles and metal) littered the beach. In 2003, Hurricane Isabel eroded approximately 15 to 20 ft of shoreline, causing a large of amount of debris to cover the beach and action was taken to minimize the impact. In February 2004, trenching with limited soil sampling adjacent to former Cabin 169 was conducted to delineate the extent of buried debris. Additional soil sampling was conducted in April 2004 to further delineate the extent of debris near former Cabin 170. The trenching report identified potential soil contamination adjacent to and encompassing former Cabins 169 and 170 (Baker, 2004b). In addition, a volume of ash and debris was identified in the southwestern portion of the site where erosion of the slope had occurred. This area was highly vulnerable to further erosion into the York River by surface water runoff and intense wave action. Therefore, an Action Memorandum (AM) was signed for a Time-critical Removal Action (TCRA) to prevent further erosion of the disposal area contents into the York River (Baker, 2004c). A debris removal action was started in 2007 and completed in 2008 (Shaw, 2009). A summary of relevant documents and action milestones is presented below.

Documents and Milestones

Document Title /Milestone	Author/Date	AR Document Number
Trenching and Limited Investigation Report, Site 7N	Baker, 2004b	001479
Action Memorandum for the Time Critical Removal Action, Site 7N – Old DuPont Disposal Area	Baker, 2004c	001592
Explosive Safety Submission – Site 7	Bhate, 2005	N/A (see References)
Project Completion Report Site 1 – Landfill Near Incinerator and Site 7 – Old DuPont Disposal Area	Bhate, 2007a	N/A (see References)
Unexploded Ordnance (UXO) Remediation After Action Report, Site 7	Bhate, 2007b	000041
Construction Completion Report: Soil Debris Removal at Site 7	Shaw, 2009	N/A (see References)
Site Inspection Report, Site 7 – Old DuPont Disposal Area	CH2M HILL, 2012a	003015
Remedial Investigation Report, Site 7 – Old DuPont Disposal Area	CH2M HILL, 2015b	003307
Proposed Plan, Site 7 – Old DuPont Disposal Area Soil, Sediment and Surface Water	CH2M HILL, 2016a	003411
Record of Decision, Site 7 – Old DuPont Disposal Area	CH2M HILL, 2017a	003423
Remedial Investigation Vapor Intrusion Technical Memorandum, Site 7	CH2M HILL, 2021d	Pending

Nature and Extent of Potential Contamination

An RI field investigation was completed at Site 7 to further evaluate the site media and determine the nature and extent of potential contamination. The results of this investigation were presented in an RI report (CH2M HILL, 2015b) that included a human health risk assessment and an ecological risk assessment. The RI conclusions are summarized in the table below.

Site 7 Potential Contamination and Risks Summary

Debris	None - all debris (surface and buried) at Site 7 was removed with the 2007/2008 removal action.		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	None identified	None identified	No potential unacceptable risks or COCs associated with soil were identified, based on the results of the RI (CH2M HILL, 2015b), and an NFA ROD was signed in 2017 (CH2M, 2017a).
Sediment (York River)	None identified	None identified	No potential unacceptable risks or COCs associated with sediment were identified, based on the results of the RI (CH2M HILL, 2015b), and an NFA ROD was signed in 2017 (CH2M, 2017a).
Groundwater	Human Health	2,4-DNT, 2,6-DNT, TCE, and chloroform	Potentially unacceptable risks were identified for groundwater for hypothetical future industrial and residential exposure scenarios (there were no potentially unacceptable risks under current exposure scenarios). Supplemental groundwater investigations are being conducted to further define the extent of the TCE plume and identify a potential source area.
Vapor Intrusion	None identified	None	No potential unacceptable risks or COCs associated with vapor intrusion (VI) were identified, based on the results of the VI sampling (CH2M, 2021d).

Supplemental groundwater investigations were conducted at the site in November 2016, May 2017, September 2017, May 2019, and November 2020. These investigations have confirmed that TCE is the primary COC in groundwater, but have not been able to fully determine the extent of the TCE contamination or determine with certainty the location of a potential source.

Activities Completed in FY 2022 (October 2021-September 2022)

A final UFP-SAP to determine the extent of the TCE contamination was submitted in January 2022. Fieldwork to determine the nature and extent of the TCE contamination in groundwater is on-going.

CERCLA Path Forward

- Groundwater Investigation
- FS/PP/ROD (Groundwater)

Schedule 3-2 presents the FY 2023-2024 schedule for Site 7.

3.3.3 Site 9—Transformer Storage Area

Site Summary

Status:	Site characterization ongoing Site Media: Soil and groundwater, plus investigating sediment within the CADs 6 & 16 storm water drainage system, Outfall #2, and the drainage channel downstream of the outfall SEMS OU 06: Open
Current ER Activities:	Expanded SI (ESI) for soil, groundwater, and sediment
Media Investigated:	Soil, groundwater, and sediment
Removal/Remedial Action(s):	None (however, a housekeeping effort was conducted to remove surface debris to facilitate ESI sampling activities)
Media Closed:	None
Waste and/or Debris Present Onsite:	Transformers no longer stored on-site. Surface debris (possibly more present-day than historic) present between CADs 6 and 16. No known subsurface debris.

Site Description

Site 9 is a former transformer storage area. Between 1973 and 1980, electrical transformers, some of which contained PCBs, were reportedly stored at the site for repair or disposal. The storage area was not paved; however, it was enclosed by an earthen wall. Transformers were not stored at the site after 1980, and the area was graded and covered with gravel. The IAS described Site 9 as approximately 7,000 square feet (ft^2) in size and located adjacent to the northwest corner of CAD 16. However, a closer look at soil waste characterization sample results for an intended, but canceled, MILCON project between CADs 6 and 16, and a subsequent interview with a long-term CAX employee, revealed that the transformer storage area was located adjacent to the northwest corner of CAD 6. Apparently, transformers and electronic components were brought on-site, crushed, and loaded onto rail cars for disposal. The activities the employee described are consistent with apparent objects and activities in between CADs 6 and 16 shown in historic aerial photos, such as heavy equipment, components/debris scattered about, ground scarring, and nearby railroad tracks. Based on this new information, the Site 9 Study Area Boundary was updated to include the area between CADs 6 and 16 (**Figure 3-4**). The original Site 9 Study Area Boundary (adjacent to the northwest corner of CAD 16) is also shown on **Figure 3-4**, since a number of studies have been conducted there, and the best approach to close that area needs to be determined. A summary of the relevant document and action milestones is below.

Documents and Milestones

Original Site 9 Study Area Boundary (Northwest Corner of CAD 16)		
Document Title /Milestone	**Author/Date**	**AR Document Number**
No Further Response Action Planned Decision Document, Site 9 – Transformer Storage Area	Baker, 1999a	001223[4]
Screening Level Ecological Risk Assessment Report for Sites 4 and 9	Baker, 2005	001565
Site Inspection Report, Sites 4, Site 9, and Area of Concern 3	CH2M HILL, 2011b	002425
Revised Site 9 Study Area Boundary (area between CADs 6 and 16)		
None to date (investigation in progress)		

[4] Due to EPA concerns related to the human health risk assessment (HHRA) presented in the report, including the unknown depths of the soil samples, this document never went final. The document is in the AR as an "FYI," along with a letter explaining why it did not go final.

Nature and Extent of Potential Contamination

Based on the results of the SI (CH2M HILL, 2011b), an Expanded Site Inspection (ESI) field investigation was conducted in 2014 to further evaluate surface soil within the original Site 9 study area boundary and the ditch along B Street across from Site 9. Evaluation of the PCB detections in the B Street ditch sample results led to the aforementioned closer look at soil waste characterization sample results for an intended, but canceled, MILCON project between CADs 6 and 16, which eventually led to a revision of the Site 9 study area boundary. With this new discovery, evaluation of the 2014 ESI sample results has been put on hold. A UFP-SAP has been prepared to conduct a new ESI field investigation to evaluate the soil and groundwater within and/or near the new Site 9 study area boundary, plus evaluate sediment within the CADs 6 and 16 stormwater drainage system, Outfall #2, and the drainage channel downstream of the outfall. The summary table below will be updated with the ESI results once they are available.

Site 9 Potential Contamination and Risks Summary

Original Site 9 Study Area Boundary (Northwest Corner of CAD 16)			
Debris	None		
Medium	**Potential Risk**	**COPC(s)**	**Status**
Soil	Human Health and Ecological	PAHs, Aroclor-1260, metals	An evaluation of the SI data indicated a localized surface soil PAH, Aroclor-1260, and metals "hot spot" area in the northern corner of the site (CAS09-SS02); therefore, additional surface soil data were needed, and the samples were collected in 2014 for an ESI. Further evaluation of these results is on-hold, pending the collection of additional data related to the revised Site 9 study area boundary.
Groundwater	None identified	None identified	No potential unacceptable risk or COCs associated with groundwater were identified based on the results of the SI (CH2M HILL, 2011b).
Soil/Sediment (B Street ditch)	(see "Status" notes in far right column)	(see "Status" notes in far right column)	In early 2010, the drainage ditch was reworked during utility installation activities. Therefore, new data from the drainage ditch were needed, and samples were collected in 2014 for an ESI. Further evaluation of these results is on-hold, pending the collection of additional data related to the revised Site 9 study area boundary.
Revised Site 9 Study Area Boundary (area between CADs 6 and 16)			
Debris	Transformers no longer stored on-site. Surface debris present between CADs 6 and 16. No known subsurface debris.		
Medium	**Potential Risk**	**COPC(s)**	**Status**
Soil	---	---	Investigation ongoing
Groundwater	---	---	Investigation ongoing
Sediment	---	---	Investigation ongoing

Activities Completed in FY 2022 (October 2021-September 2022)

A draft ESI Report is scheduled to be submitted in FY 2023.

CERCLA Path Forward

- ESI
- RI/FS/PP/ROD

Schedule 3-3 presents the FY 2023-2024 schedule for Site 9.

3.3.4 AOC 1—Scrap Metal Dump

Site Summary

AOC 1 North	
Status:	Site characterization complete Site Media: Soil and groundwater SEMS OU 17: Closed
Current ER Activities:	None
Media Investigated:	Soil and groundwater
Removal/Remedial Action(s):	The recommended alternative in the final EE/CA was the excavation of surface and limited subsurface debris and impacted soil to 1 ft bgs, offsite disposal of the excavated material, post-excavation confirmation sampling, and backfilling the excavation areas with clean fill material. The removal action was completed in December 2017.
Media Closed:	Groundwater and soil
Waste and/or Debris Present Onsite:	No
AOC 1 South	
Status:	Site characterization ongoing Site Media: Soil, groundwater, surface water, and sediment SEMS OU 09: Open
Current ER Activities:	RI for debris, soil, groundwater, surface water, and sediment
Media Investigated:	Soil, groundwater, surface water, and sediment
Removal/Remedial Action(s):	None
Media Closed:	None
Waste and/or Debris Present Onsite:	Yes

Site Description

AOC 1 was identified as an AOC in 1998, following site visits by the Navy, USEPA, and VDEQ. AOC 1 is a former debris disposal area located just west of Chapman Road within two ravines, known as “AOC 1 North” and “AOC 1 South” (**Figures 3-5 and 3-6,** respectively). The AOC 1 North ravine is normally dry and only receives water from overland flow during storm events, and when it does have water, it flows towards and converges with the drainage from AOC 1 South. The AOC 1 South drainage is generally wet year round (i.e., saturated soil and/or standing water), but does not always have a water flow; the amount of water (and flow velocity) is dependent on storm events. When there is flow, it enters an unnamed tributary of Jones Pond; however, there isn’t a continual, year-round flow of surface water toward Jones Pond. Based on site observations of generally dry conditions in the unnamed tributary between storm events, it is anticipated that only substantial storm events would produce sufficient surface flow to reach Jones Pond from the site.

Wood and metal debris outcrop from the banks of the southern ravine. Orange staining in the unnamed tributary that receives runoff from the southern ravine has been identified. Based on an average thickness of debris of three feet, the total volume of debris at both AOC 1 North and AOC 1 South was estimated to be 3,000 cubic yards (cy). Two cylinders were present along the top of bank along the northern ravine. Markings were distinguishable on both of the cylinders, and included raised lettering around the neck “The Liquid Carbonic Co.” These were later determined to be empty and were removed from the site.

In the fall of 2017, a debris and soil removal action was conducted at AOC 1 North. All site debris and soil identified as posing a potentially unacceptable risk to ecological risk due to exposure to zinc were removed. A

construction completion report was completed to document the removal activities. With the completion of the removal action, no further action is needed at AOC 1 North, as documented in the EE/CA (CH2M HILL, 2016b). Investigation continues at AOC 1 South. A summary of relevant documents and action milestones is presented below.

Documents and Milestones

Document Title /Milestone	Author/Date	AR Document Number
Site Inspection Report, Site 4 and AOC 1	Baker, 2001b	001291
Site Inspection Report, AOCs 1, 2, 6, 7, and 8	CH2M HILL, 2012b	002463
Expanded Site Inspection Report, AOC 1 North	CH2M HILL, 2015c	003270
Action Memo (includes EE/CA), AOC 1 North	CH2M HILL, 2016b	003333
Construction Completion Report	APTIM, 2018	N/A (see References)
Remedial Investigation Report, AOC 1 South	CH2M HILL, 2022	Pending

Nature and Extent of Potential Contamination

Based on the results of the SI (CH2M HILL, 2012b), an ESI field investigation was conducted at AOC 1 in 2014 to further evaluate surface soil and groundwater at AOC 1 North and to further evaluate surface and subsurface soil, groundwater, surface water, and sediment at AOC 1 South. Based on the results of the human health risk assessment (HHRA) prepared for AOC 1 South as part of the ESI (which indicated that there would be risk to human health that would likely require remedial action), the CAX Partnering Team decided that preparation of an RI report was the appropriate course for AOC 1 South and that preparation of an ESI report for AOC 1 North would continue. The results of the AOC 1 North ESI report and 2012 Site Inspection report are presented in the summary table below.

AOC 1 Potential Contamination and Risks Summary

AOC 1 North			
Debris	None - all debris (surface and buried) at AOC 1 North was removed with the 2017 removal action.		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	Human Health	None	The COCs identified in the ESI were addressed by the 2017 removal action, and no further action for soil is required at AOC 1 North.
	Ecological	None	
Groundwater	Human Health	Arsenic, chromium, and cobalt	These constituents are only present for the hypothetical and extremely unlikely scenario of future residential site use of the surficial aquifer as a potable water supply. Moreover, the detected concentrations of all three of these inorganic constituents in groundwater at AOC 1 North were determined to be consistent with naturally occurring, background conditions and not the result of a site-related release. Therefore, with completion of the ESI (CH2M HILL, 2015c), the Partnering Team agreed no further action for groundwater was necessary.

AOC 1 Potential Contamination and Risks Summary

AOC 1 South			
Debris	Debris observed at AOC 1 South consisted primarily of piles of concrete, empty 55-gallon, rusted drums, and a large surface pile of metal debris.		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	Human Health	lead	Potentially unacceptable human health and ecological risks were identified associated with the listed COCs in surface and/or subsurface soil (CH2M HILL, 2022). In addition, since arsenic, chromium, iron, and manganese are considered constituents contributing to human health risk that do not require further action they will be retained in the FS and will be considered in the technical assessment as part of the five-year review process.
	Ecological	aluminum, antimony, copper, iron, lead, mercury, and zinc within the surface debris boundary and lead outside the surface debris boundary	
Groundwater	Human Health	arsenic, manganese, and thallium	Potentially unacceptable human health risks were identified for groundwater for hypothetical future residential exposure scenarios (there were no potentially unacceptable risks under current exposure scenarios) (CH2M HILL, 2022).
	Ecological	Arsenic and manganese	Potentially unacceptable ecological risks were identified for groundwater if constituent concentrations were ultimately discharged to nearby surface water bodies (CH2M HILL, 2022).
Surface Water	Human Health	None	Manganese was identified as a COPC to aquatic communities (aquatic plants and invertebrates, fish, and amphibians) exposed to surface water in the unnamed tributary (Drainage Channel #1) (CH2M HILL, 2022).
	Ecological	manganese	
Sediment	None Identified	None	No potentially unacceptable human health or ecological risks were identified due to exposure to sediment (CH2M HILL, 2022).

Activities Completed in FY 2022 (October 2021-September 2022)

The final RI Report was submitted in May 2022.

CERCLA Path Forward

- AOC 1 North – NFA
- AOC 1 South –FS/PP/ROD

Schedule 3-4 presents the FY 2023-2024 schedule for AOC 1 South.

3.3.5 AOC 6—Penniman AOC

Site Summary

1918 Drum Storage Subarea	
Status:	Site characterization complete Site Media: Soil and groundwater SEMS OU 02: Open
Current ER Activities:	N/A (no further action required)
Media Investigated:	Soil and groundwater
Removal/Remedial Action(s):	N/A (not needed)
Media Closed:	All site media
Waste and/or Debris Present Onsite:	No
Waste Slag Material Subarea	
Status:	Site characterization complete Site Media: Soil and groundwater SEMS OU 02: Open
Current ER Activities:	N/A (no further action required)
Media Investigated:	Soil
Removal/Remedial Action(s):	2015: The pile of slag material was removed, along with metal door hasps discovered under the slag pile. Approximately 39 tons of soil and debris were disposed of as non-hazardous waste.
Media Closed:	All site media
Waste and/or Debris Present Onsite:	No
Ammonia Settling Pits Subarea	
Status:	Site characterization ongoing Site Media: Soil and groundwater SEMS OU 15: Open
Current ER Activities:	Removal Action for soil
Media Investigated:	Soil and groundwater (surface water and sediment within Penniman Lake will be addressed as part of AOC 9 investigations)
Removal/Remedial Action(s):	None
Media Closed:	Groundwater
Waste and/or Debris Present Onsite:	No
TNT Graining House Sump and TNT Catch Box Ruins Subareas	
Status:	Site characterization ongoing Site Media: Soil and groundwater SEMS OU 02: Open
Current ER Activities:	Removal Action for soil
Media Investigated:	Soil and groundwater (surface water and sediment within Penniman Lake will be addressed as part of AOC 9 investigations)
Removal/Remedial Action(s):	None
Media Closed:	Groundwater
Waste and/or Debris Present Onsite:	Yes (concrete foundation for Graining House Sump)

Site Description

AOC 6 consists of five sub-areas related to the former Penniman Shell Loading Plant, as identified in a 1999 SI report (Weston, 1999) and defined in the CAX FFA (USEPA et al, 2005).

The five AOC 6 sub-areas (**Figure 3-7**) were identified through aerial photographic analysis and the 1999 SI (Weston, 1999), and are as follows:

- **1918 Drum Storage -** This area was used for the storage of wooden kegs when the shell loading area was active. It was identified in historical photographs. The contents of the kegs are unknown.
- **Waste Slag Material -** The Waste Slag Material subarea of AOC 6 consisted of a pile of metallic slag material that was identified and sampled during the 1999 SI (Weston, 1999). The waste source pile was defined as approximately 25 feet long by 10 feet wide, although it was more circular than rectangular in shape. It was located in the southern portion of the base.
- **Ammonia Settling Pits -** This area consists of earthen ammonia settling pits that were part of a former shell loading area located on CAX. Wastewater from an ammonia finishing building was discharged through these settling pits.
- **TNT Graining House Sump -** This area consists of a concrete-lined, open top pit believed to be the sump pit for the TNT graining house in the former shell loading area.
- **TNT Catch Box Ruins -** This area consists of an earthen, brick-lined depression located immediately adjacent to the TNT graining house in the former shell loading area. This area was used to separate TNT particles from wastewater.

A summary of relevant documents and action milestones is presented below.

Documents and Milestones

Document Title /Milestone	Author/Date	AR Document Number
Data Acquisition/Summary Report, Penniman Shell Loading Plant	Weston, 1999a	000162C
Site Inspection Narrative Report, Penniman Shell Loading Plant	Weston, 1999b	000161C
Site Inspection Report, AOCs 1, 2, 6, 7, and 8	CH2M HILL, 2012b	002463
Consensus Letter for Soil and Groundwater at the Area of Concern 6 1918 Drum Storage Area Subarea	CH2M HILL, 2013c	003177
No Action Technical Memorandum for Soil and Groundwater at the Waste Slag Subarea of AOC 6	CH2M HILL, 2013d	003128
Consensus Letter for Removal of the Waste Slag Pile at the Area of Concern 6 Waste Slag Material Subarea	CH2M HILL, 2014d	003147
Remedial Investigation Report, AOC 6 TNT Subareas	CH2M HILL, 2015d	003282
No Further Action Technical Memorandum for the Waste Slag Material Subarea of AOC 6	CH2M HILL, 2016c	003353
Remedial Investigation Report, AOC 6 Ammonia Settling Pits Subarea	CH2M HILL, 2016d	003354
Proposed Plan for Select Subareas and Environmental Media within AOC 6	CH2M HILL, 2018b	003452
Record of Decision for Select Subareas and Environmental Media within AOC 6	CH2M HILL, 2018a	003506
Action Memorandum (includes EE/CA), Area of Concern 6 – TNT Subareas and ASP Subarea	CH2M HILL, 2020b	003657

Nature and Extent of Potential Contamination

Based on the results of the SI (CH2M HILL, 2012b), an RI field investigation was conducted in 2013 to further evaluate soil and groundwater at the AOC 6 TNT Subareas (**Figure 3-8**) and an ESI field investigation was conducted in 2014 to further evaluate soil and groundwater at the AOC 6 Ammonia Settling Pits Subarea (**Figure 3-9**). However, based on the results of the HHRA prepared for the ESI, the CAX Partnering Team decided that preparation of an RI report was the appropriate course for the Ammonia Settling Pits Subarea. The results of both RI reports are presented in the summary table that follows.

AOC 6 Potential Contamination and Risks Summary

1918 Drum Storage Subarea			
Debris	None		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	None identified	None identified	The SI report (CH2M HILL, 2012b) concluded that no further action for soil was warranted. The CAX Partnering Team agreed that no potential risks for surface and subsurface soil exist at the 1918 Drum Storage Subarea and that no further action is required for soil (CH2M HILL, 2013c).
Groundwater	Human Health	Thallium (dissolved phase only)	Although ingestion of dissolved thallium could potentially pose an unacceptable hazard for a hypothetical future adult and child resident, dissolved thallium was detected in only one of three groundwater samples at a maximum concentration of 2 µg/L, which does not exceed the maximum contaminated level (MCL) (2 µg/L). Therefore, the CAX Partnering Team agreed that no further action is required for groundwater at the 1918 Drum Storage Subarea (CH2M HILL, 2013c).
All	---	---	An NFA ROD for all media (soil and groundwater) was signed in 2018 (CH2M, 2018a).
Waste Slag Material Subarea			
Debris	None - all debris (surface and buried) at this subarea was removed in 2015.		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	None identified	None identified	The CAX Partnering Team agreed that no further action is required for soil at the Waste Slag Material Subarea of AOC 6.
Groundwater	None identified	None identified	The pile of waste slag material at AOC 6 was removed in order to eliminate any potential for future impacts from the slag pile to site media. Following the removal action, the CAX Partnering Team agreed that no further action is required for groundwater at the Waste Slag Material Subarea of AOC 6.
All	---	---	An NFA ROD for all media (soil and groundwater) was signed in 2018 (CH2M, 2018a).
Ammonia Settling Pits Subarea			
Debris	None		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	Ecological	Lead	Potential unacceptable ecological risks were identified associated with lead in surface soil, based on the conclusions of the RI report (CH2M HILL, 2016d). The RI report recommended an FS to evaluate remedial alternatives to address a small hot spot of lead contamination in surface soil; however, the team agreed later that an EE/CA was more appropriate to address the limited contamination at the site.

AOC 6 Potential Contamination and Risks Summary

Groundwater	Human Health	Arsenic, chromium, cobalt, iron, and manganese	There was sufficient uncertainty to question whether the detected concentrations of the COCs are representative of a site-related release or indicative of naturally occurring conditions. Therefore, the RI report (CH2M HILL, 2016d) recommended a risk-management decision of no further action for groundwater. An NFA ROD for groundwater was signed in 2018 (CH2M, 2018a).
TNT Graining House Sump and TNT Catch Box Ruins Subareas			
Debris	Concrete foundation for Graining House Sump (Catch Box Ruins is a ground depression with no debris.)		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	Human Health	2,4,6-trinitrotoluene (TNT), 2-nitrotoluene, arsenic, lead, and hexavalent chromium	Potential unacceptable human health and ecological risks were identified associated with the listed COCs in both surface and subsurface soil, based on the conclusions of the RI report (CH2M HILL, 2015d). The RI report recommended an FS to evaluate remedial alternatives to address potentially unacceptable human health or ecological risks associated with TNT and lead in soil. Lead is only present within soil at the TNT Catch Box Ruin subarea. The RI report also recommended no further action for 2-nitrotoluene, arsenic, and hexavalent chromium; however, the CAX Partnering Team agreed later that an EE/CA was more appropriate to address the limited contamination at the site.
	Ecological	TNT and lead	
Groundwater	Human Health	Arsenic and iron	Arsenic and iron were identified as COCs in groundwater in the HHRA prepared for the RI report (CH2M HILL, 2015d). However, the RI concluded elevated arsenic and iron concentrations are attributable to naturally occurring background conditions reflective of the natural reductive dissolution processes rather than the result of historical leakage or discharge from the former TNT Graining House Sump and/or TNT Catch Box Ruins. Therefore, the RI report recommended no further action for groundwater. An NFA ROD for groundwater was signed in 2018 (CH2M, 2018a).

Activities Completed in FY 2022 (October 2021-September 2022)

Preparation for removal action field activities is on-going. Removal action activities are scheduled to be completed in early FY 2023.

CERCLA Path Forward

- 1918 Drum Storage Area – N/A (CERCLA activities are complete)
- Waste Slag Material subarea – N/A (CERCLA activities are complete)
- Ammonia Settling Pits subarea – N/A for groundwater (CERCLA activities are complete) and PP/ROD[5] for soil
- TNT Graining House and TNT Catch Box Ruins subareas – N/A for groundwater (CERCLA activities are complete) and PP/ROD[6] for soil

Schedule 3-5 presents the FY 2023-2024 schedule for the active subareas of AOC 6.

5 While the Ammonia Settling Pits and two TNT subareas had separate RI reports, they were addressed together in one EE/CA and will be addressed together in one PP, and one ROD.

3.3.6 AOC 8—Area South of Site 7

Site Summary

Status:	Site characterization ongoing Site Media: Soil and groundwater SEMS OU 13: Open
Current ER Activities:	Remedial Investigation
Media Investigated:	Soil and groundwater
Removal/Remedial Action(s):	Complete
Media Closed:	None
Waste and/or Debris Present Onsite:	No (following removal action)

Site Description

AOC 8 is located along the York River and was previously on a flat, sparsely vegetated depression, with a berm along the northern perimeter. Gravel and ballast rock could be seen on the ground surface. To the east of the flat area, the land dropped off slightly, and in a very small area along the perimeter, buried debris (pipe, metal, and wood) could be seen cropping out from the edge of the slope and along the beach. A TCRA was completed in 2019. The site was graded to promote slope stability and recreate an emergent wetland area (**Figure 3-10**) and vegetation was planted to provide habitat and food sources for wildlife. Based on the IAS description of Site 7, this area was thought to be Site 7 (a disposal area associated with the former World War I era Penniman Shell Loading Plant). However, test pits conducted in 1999 indicate that the waste post-dates World War I and does not appear to be associated with Penniman facility waste disposal (Baker, 2001c). Therefore, this area was determined to not be Site 7 and it was re-designated as AOC 8. A summary of relevant documents and action milestones is presented below.

Documents and Milestones

Document Title /Milestone	Author/Date	AR Document Number
Field Investigation Report, Site 7[6] and AOC 2	Baker, 2001c	001348
Site Inspection Report, AOCs 1, 2, 6, 7, and 8	CH2M HILL, 2012b	002463
AOC 8 – Area South of Site 7, Remedial Investigation Report	CH2M HILL, 2018c	003402
Action Memorandum, Area of Concern 8 – Area South of Site 7	CH2M HILL, 2017e	003496
Construction Completion Report	APTIM, 2020	N/A (see References)
AOC 8 No Further Action Consensus Letter for Soil	CH2M HILL, 2021e	003726

Nature and Extent of Potential Contamination

Based on the results of the RI (CH2M HILL, 2018c), no COCs were identified for soil or groundwater at AOC 8. However, concentrations of tetrachloroethene (PCE) detected in groundwater within the shallow surficial aquifer exceeded the MCL (5 µg/L) in samples from four locations. In addition, although not specifically evaluated in the RI, the potential for future unacceptable human health and ecological risks to all receptors was assumed, due to the potential for further leaching of contaminants from the surface and subsurface debris. An Action Memorandum was prepared to perform a Time-Critical Removal Action (TRCA) of surface and subsurface debris to

6 In this instance, Site 7 refers to AOC 8.

prevent current exposures of human health and ecological receptors to the debris and to prevent or minimize future transport of contamination from debris to other media, other portions of the site, as well as to off-site areas. The TCRA was completed in January 2019. An RI Addendum is in progress to determine concentrations of PCE and PCE degradation products in groundwater following completion of the TCRA, and No Further Action Consensus Letter for Soil was signed by the Navy, USEPA, and VDEQ to document agreement that no further action is required for soil following completion of the TCRA.

AOC 8 Potential Contamination and Risks Summary

Debris	None - all debris (surface and buried) at AOC 8 was removed with the 2017/2018 removal action.		
Medium	**Potential Risk**	**COC(s)**	**Status**
Soil	None Identified	None Identified	No potential unacceptable risks or COCs associated with soil were identified based on the results of the RI (CH2M HILL, 2018c). A Consensus Letter was signed by the Navy, USEPA, and VDEQ to document agreement that no further action is required for soil (CH2M, 2021f).
Groundwater	None Identified	None Identified	No potential unacceptable risks or COCs associated with groundwater were identified based on the results of the RI (CH2M HILL, 2018c). However, a groundwater investigation to confirm that no potential human health or ecological risk exists following completion of the TCRA is being conducted.

Activities Completed in FY 2022 (October 2021-September 2022)

RI addendum field activities are on-going.

CERCLA Path Forward

- RI Addendum (groundwater)
- Pilot Study for groundwater (if needed based on the results of the RI Addendum)
- FS/PP/ROD

Schedule 3-6 presents the FY 2023-2024 schedule for AOC 8.

3.3.7 AOC 9—Penniman Lake Historical Industrial Areas

Site Summary

Status:	Site characterization ongoing Site Media: Groundwater, soil, surface water, sediment, and animal tissue SEMS OU 14: Open
Current ER Activities:	ESI
Media Investigated:	Soil, sediment, surface water, and animal tissue (fish and frog)
Removal/Remedial Action(s):	None
Media Closed:	None
Waste and/or Debris Present Onsite:	No

Site Description

AOC 9 was originally defined as Penniman Lake, a 48-acre surface water body located in the southeastern portion of CAX that was created in 1943 when a portion of King Creek was dammed (**Figure 3-11**). Following completion of the Pond Study, catch-and-release fishing restrictions were recommended for Penniman Lake, as a conservative measure that was not based on a human health risk assessment. Subsequently, fishing restriction signs (catch-and-release only) were posted in August 2000. However, Penniman Lake is a downgradient receiving body and not the source of contamination. Therefore, a desktop evaluation of the historic building uses and activities upgradient of Penniman Lake was conducted in an effort to identify a potential source (or sources) of contamination. The Desktop Study identified 44 areas of interest within the watershed with the potential to serve as source areas of contamination and established the 171-acre AOC 9 study area boundary, which encompasses the structures, areas, and drainages currently under investigation as part of the ESI. In addition, since the PSLP was an explosives manufacturing facility during WWI, AOC 6 was identified as an area of interest for explosive compound contamination within the Penniman Lake watershed. The CAX Partnering team agreed that the explosive compound contamination would be investigated as part of AOC 9. A summary of relevant documents and action milestones is presented below.

Documents and Milestones

Document Title /Milestone	Author/Date	AR Document Number
Pond Study Report	Baker, 2001a	001212
Remedial Investigation Report, Site 11 – Bone Yard	Baker, 2007	002171
Site Inspection Report, AOCs 1, 2, 6, 7, and 8	CH2M HILL, 2012b	002463
Results of the Step 1 Polychlorinated Biphenyls SI at Penniman Lake Technical Memorandum	CH2M HILL, 2012c	003080
Summary of Step 2 Field Investigations and Recommendations on Analytical Suites for Tissue Analyses, Penniman Lake, Step 2 SI Technical Memorandum	CH2M HILL, 2013e	003129
SI Step 2 Results and Proposed Path Forward for Penniman Lake Technical Memorandum	CH2M HILL, 2016e	003320
Technical Memorandum, Source Identification Desktop Evaluation, Area of Concern 9, Penniman Lake Historical Industrial Areas	CH2M HILL, 2017f	003335
Technical Memorandum, Results of the Area of Concern Phase I Expanded Site Inspection Penniman Like Historical Industrial Areas	CH2M HILL, 2021f	003715

Nature and Extent of Potential Contamination

During the 2000 Pond Study, a total of eight co-located surface water and surface sediment samples from Penniman Lake were analyzed for target compound list (TCL) organic compounds, target analyte list (TAL) inorganic constituents, and explosive compounds. Average concentrations of PCBs detected in Penniman Lake sediments were 0.5 mg/kg with a maximum concentration of 4.7 mg/kg. PCBs were not detected in surface water within Penniman Lake.

During the CAX Site 11 RI, surface water and sediment samples were collected in the drainages north and south of the site and within Penniman Lake and analyzed for TCL organic compounds, TAL inorganic constituents, and explosive compounds. These samples were collected to determine what, if any, impact Site 11 had on these areas. During upgradient/background sediment sampling associated with the RI, elevated levels of PCBs were detected immediately downgradient of Outfall 29, in the grassy area of the north drainage channel (total PCB concentration of 7.5 mg/kg) and within the northwest finger of Penniman Lake (total PCB concentration of 15 mg/kg). In addition, Aroclor-1260 was detected in one surface water sample at a concentration of 0.47 J µg/L. Site 11 was determined not to be the source of PCB contamination within the drainage channels. No other surface water samples contained PCBs.

During the CAX SI for the TNT Graining House, TNT Catch Box Ruins, and Ammonia Settling Pits subareas surface water and sediment samples were collected from within Penniman Lake and analyzed for SVOCs and explosive compounds. In addition, surface water and sediment samples collected during the SI Step 2 field investigations for Penniman Lake were analyzed for explosive compounds. These samples were collected to determine what, if any, impact AOC 6 had on Penniman Lake. Four explosive constituents (4-amino-2,6-Dinitrotoluene, 1,3-Dinitrobenzene, 2,4,6-Trinitrotoluene, and HMX) were detected in surface sediment at concentrations exceeding their respective ecological screening values, while one SVOC (2,6-dinitrotoluene) and one explosive constituent (1,3-Dinitrobenzene) were detected in subsurface sediment at concentrations exceeding their respective ecological screening values. No surface water samples contained SVOCs or explosive compounds.

In 2011, a multi-step SI investigation was conducted at AOC 9 to further evaluate the drainages into Penniman Lake to look for a PCB source and to determine if a CERCLA-related release occurred. This investigation included the following:

- 2011 – Step 1 SI field investigation conducted to identify or eliminate potential PCB contamination pathways into Penniman Lake.
- 2012 – Step 1 SI Technical Memorandum completed to evaluate the Step 1 field data. Additional sampling of upland areas to locate potential PCB source areas was recommended.
- 2012 – Step 2 SI field investigation conducted in the upland areas to locate potential PCB source areas. A biological survey of fish, frogs, and benthic invertebrates was also conducted.
- 2013 – Step 2, Part 1 Technical Memorandum completed to present the Step 2 SI field data and recommend analytical suites for fish and frog tissue collected during the Step 2 SI field investigation.
- 2016 – Step 2, Part 2 Technical Memorandum completed to evaluate all Step 2 SI field data (including tissue). Based on the results of this Technical Memorandum, a Source Identification Desktop Evaluation was recommended.

The historical and current SI analytical data collected to date did not provide any evidence of the existence of an isolated or spatially-discrete upland source area of contamination to Penniman Lake. Since the Step 2 evaluation was initiated, information regarding historic land use (historic maps and as-built drawings) in the industrial area upgradient of the northwest finger of Penniman Lake (where the highest PCB concentrations were detected) were recently discovered. Therefore, the CAX Partnering Team agreed to the preparation of a comprehensive desktop evaluation, bringing together the historic, SI, and recently discovered information, to determine if additional

investigation of the industrial area upgradient of Penniman Lake is warranted to identify potential sources of contamination to Penniman Lake sediment. A records search was performed and additional evaluation to characterize potential historical sources of the SI-identified COPCs was recommended for 44 areas. The need for a more comprehensive reference data set reflecting non-CERCLA inputs to the lake also was documented.

The human health and ecological risk screenings completed as part of the Step 2 SI identified COPCs in surface and subsurface soil samples collected from upland areas draining to Penniman Lake, in surface and subsurface sediment samples collected from the drainage channels leading into Penniman Lake, and in surface and subsurface sediment and fish tissue samples collected from within Penniman Lake. Aroclor-1260 was identified as the primary risk contributor for human and ecological exposures. It was detected in most soil and sediment samples (detected in 197 of 297 total samples), with concentrations ranging from 6.18 µg/kg to 63,000 µg/kg. Concentrations in surface and subsurface sediment in the northwest finger of Penniman Lake and the associated upland drainage ditches of the western subwatersheds are substantially elevated and are of greatest concern. PAHs, pesticides, and metals were also detected above screening criteria in similar spatial patterns and were identified as COPCs. The Step 2 SI (CH2M, 2016f) and the Desktop Evaluation (CH2M, 2017f) identified several data gaps relating to the identification of historic source areas and the nature and extent of Aroclor-1260 and metals contamination, which will be addressed as part of the ongoing ESI.

AOC 9 Potential Contamination and Risks Summary

Debris	None		
Medium	**Potential Risk**	**COPC(s)**	**Status**
Groundwater	---	---	Groundwater has not yet been evaluated. ESI ongoing
Soil	Human health	Aroclor-1260, PAHs, 4,4'-DDE, dieldrin, metals	ESI ongoing
	Ecological	Aroclor-1260, High Molecular Weight (HWM) PAHs	
Surface Water	None	None	N/A
Sediment	Human Health	Aroclor-1260, PAHs, dieldrin, chromium	ESI ongoing
	Ecological	2,6-dinitrotoluene, Aroclor-1260, HWM and Low Molecular Weight (LMW) PAHs, dieldrin, 4-amino-2,6-Dinitrotoluene, 1,3-Dinitrobenzene, 2,4,6-Trinitrotoluene, and HMX, metals	
Animal Tissue	Human Health	Aroclor-1260, total PCBs, 4,4'-DDE, arsenic	ESI ongoing
	Ecological	Aroclor-1260, total PCBs	

Activities Completed in FY 2022 (October 2021-September 2022)

ESI field work was completed in October 2021.

CERCLA Path Forward

- ESI
- RI/FS/PP/ROD

Schedule 3-7 presents the FY 2023-2024 schedule for AOC 9.

3.4 MRP Site Descriptions

Because funding for both the Installation Restoration Program and the MRP (collectively known as the ERP) is managed by NAVFAC, sites classified as MRP also are included in this SMP. The only MRP site identified at CAX is the Other-than-Operational Marine Pistol and Rifle Range (**Figure 3-12**), and its CERCLA documentation is complete with signature of the NFA Declaration Signature page included in the ESI (CH2M HILL, 2008a).

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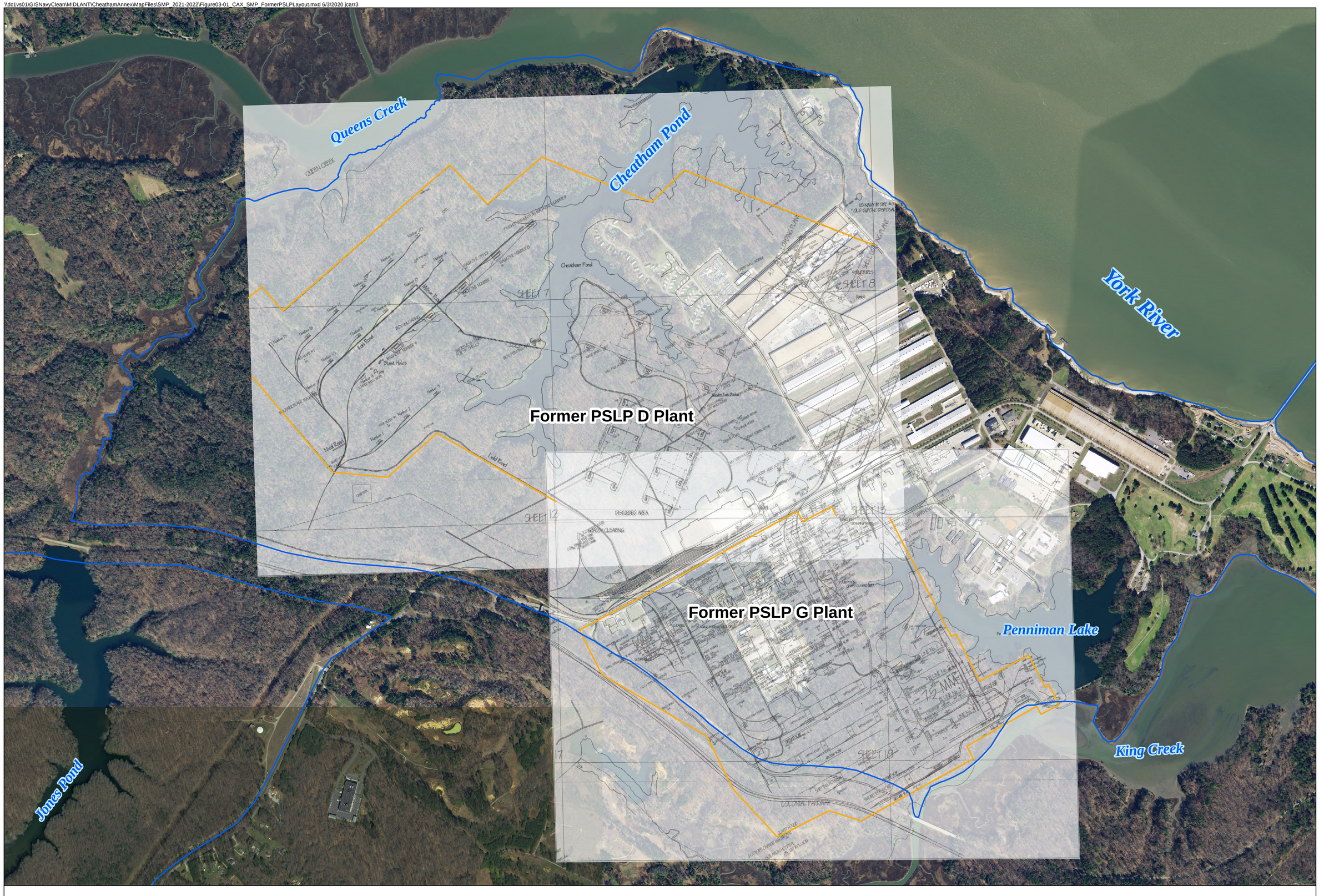

Legend

- PSLP Boundaries
- CAX Boundary

Notes:
1. Plant D and Plant G overlays from Figures 2 and 3, respectively, of the Weston SI Report (Weston, 1999b)
2. Imagery: Virginia Commonwealth, 2017

N
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0 800 1,600
Feet

Figure 3-1
Former Penniman Shell Loading Plant (PSLP) Layout
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m

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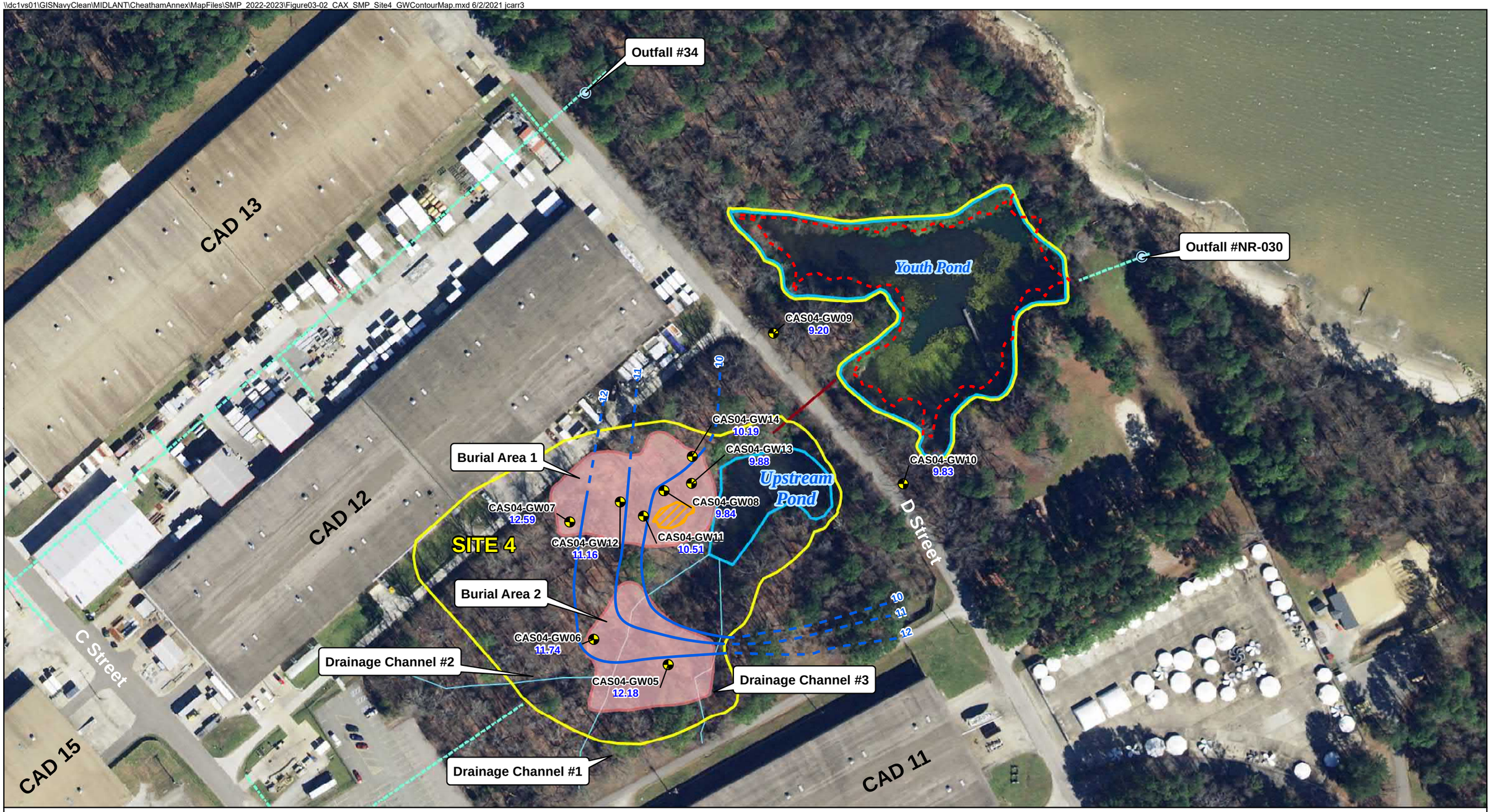

Legend

- Monitoring Well Location
- Outfall
- Culvert
- Drainage Channels
- Storm Water Line
- Shallow Groundwater Contours (dashed where inferred)
- Approximate Direction of Groundwater Flow
- Surface Debris Pile
- Extent of Buried Debris
- Water Body
- Approximate Study Area (Active RI)(6.7 acres)
- Catch and Release Fishing Restriction

11.66 - Groundwater Elevation (ft amsl)
Imagery: Virginia Commonwealth, 2017

N W E S

0 65 130 Feet

Figure 3-2
Site 4 – Outdated Medical Supply Disposal Area
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m

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Legend

- Site Boundary
- Cheatham Annex Boundary
- Buildings
- Former Buildings
- Monitoring Well Location
- Surface Water Elevation
- Roads
- Potentiometric Surface Contour (dashed where inferred)
- Approximate Direction of Groundwater Flow
- Excavation Boundary Site 7

Notes:
Water levels taken on November 2, 2020 between 9:30 am and 11:30 am, during high tide.
NR - Not Recorded
2.53 - Groundwater Elevation (ft amsl)
Imagery: Virginia Commonwealth, 2017

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Feet

Figure 3-3
Site 7 - Old DuPont Disposal Area
Site Management Plan
Cheatham Annex
Williamsburg, VA

ch2m:

\\dc1vs01\GISNavyClean\MIDLANT\CheathamAnnex\MapFiles\SMP_2022-2023\Figure03-04_CAX_SMP_Site9_TransformerStorageArea.mxd 5/21/2021 jcarr3

Legend

- Monitoring Well Location
- Piezometer Location
- Drop Inlet
- Outfall
- Storm Water Line
- Original Site 9 Study Area Boundary (0.1 acres)
- Site 9 Study Area Boundary (Active SI site)(3.5 acres)

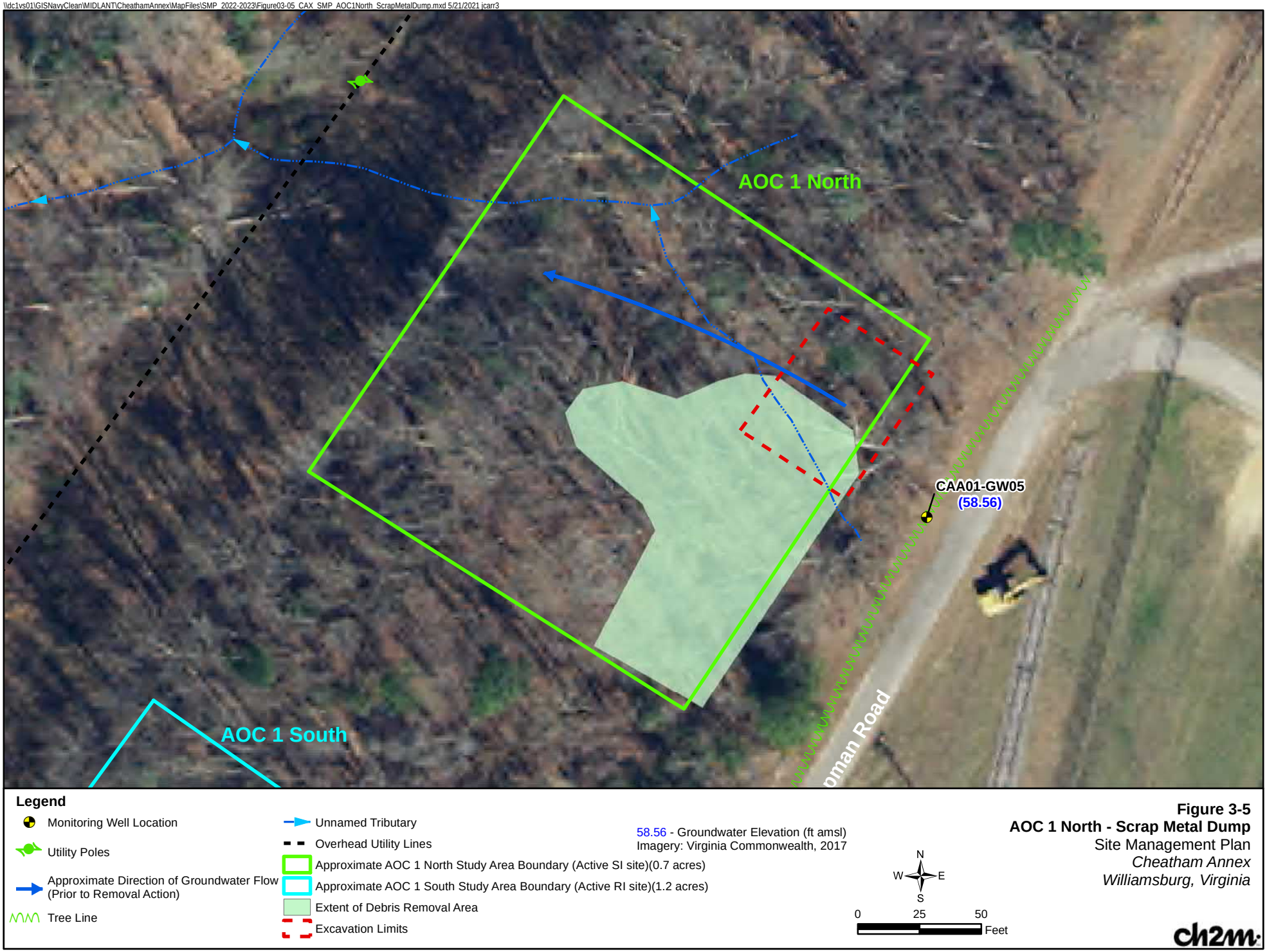
Imagery: Virginia Commonwealth, 2017

N
W E
S

0 250 500
Feet

Figure 3-4
Site 9 - Transformer Storage Area
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m:


\\dc1vs01\GISNavyClean\MIDLANT\CheathamAnnex\MapFiles\SMP_2022-2023\Figure03-05_CAX_SMP_AOC1North_ScrapMetalDump.mxd 5/21/2021 jcarr3
AOC 1 North
AOC 1 South
CAA01-GW05
(58.56)
oman Road
Legend
Monitoring Well Location
Utility Poles
Approximate Direction of Groundwater Flow (Prior to Removal Action)
Tree Line
Unnamed Tributary
Overhead Utility Lines
Approximate AOC 1 North Study Area Boundary (Active SI site)(0.7 acres)
Approximate AOC 1 South Study Area Boundary (Active RI site)(1.2 acres)
Extent of Debris Removal Area
Excavation Limits
58.56 - Groundwater Elevation (ft amsl)
Imagery: Virginia Commonwealth, 2017
N
W
E
S
0
25
50
Feet
Figure 3-5
AOC 1 North - Scrap Metal Dump
Site Management Plan
Cheatham Annex
Williamsburg, Virginia
ch2m

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Legend

- Monitoring Well Location
- Utility Poles
- Surficial Aquifer Potentiometric Surface Contour
- Approximate Direction of Groundwater Flow
- Overhead Utility Lines
- Tree Line
- Drainage Channel
- Approximate Study Area Boundary (Active RI site)(1.2 acres)
- Approximate Boundary of Scrap Metal Debris Pile (~20'H x ~52'W)
- Approximate Extent of Surface Debris (2019)

N
W E
S

0 50 100 Feet

53.96 - Groundwater Elevation (ft amsl)

Imagery: Virginia Commonwealth, 2017

Figure 3-6
AOC 1 South - Scrap Metal Dump
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m

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Legend

- Approximate Study Area Boundary (No Further Action)(1.7 acres)
- Approximate Study Area Boundaries (Active RI)(1.4 acres)

Imagery: Virginia Commonwealth, 2017

N
W E
S

0 300 600
Feet

Figure 3-7
AOC 6 - Penniman AOC
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m.

\\dc1vs01\GISNavyClean\MIDLANT\CheathamAnnex\MapFiles\SMP_2022-2023\Figure03-08_CAX_SMP_AOC6_TNTSubareas.mxd 5/21/2021 jcarr3

Legend

- Staff Gauge
- Monitoring Well Locations
- Topographic High Point (dashed where approximated)
- Surficial Aquifer Potentiometric Surface Contour (dashed where inferred)
- Approximate Direction of Groundwater Flow
- Approximate Location of 36-inch Overflow Discharge Pipe
- Approximate AOC 6 TNT Subareas Study Boundary (Active RI)(0.5 acres)
- Berm Boundary
- Former TNT Graining House Sump/Former Catch Boxes boundary

N W E S

0 50 100 Feet

Figure 3-8
AOC 6 - TNT Subareas
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

6.15 - Groundwater Elevation (ft amsl)
8.06 = Surface Water Elevation (ft amsl)
Imagery: Virginia Commonwealth, 2017

ch2m

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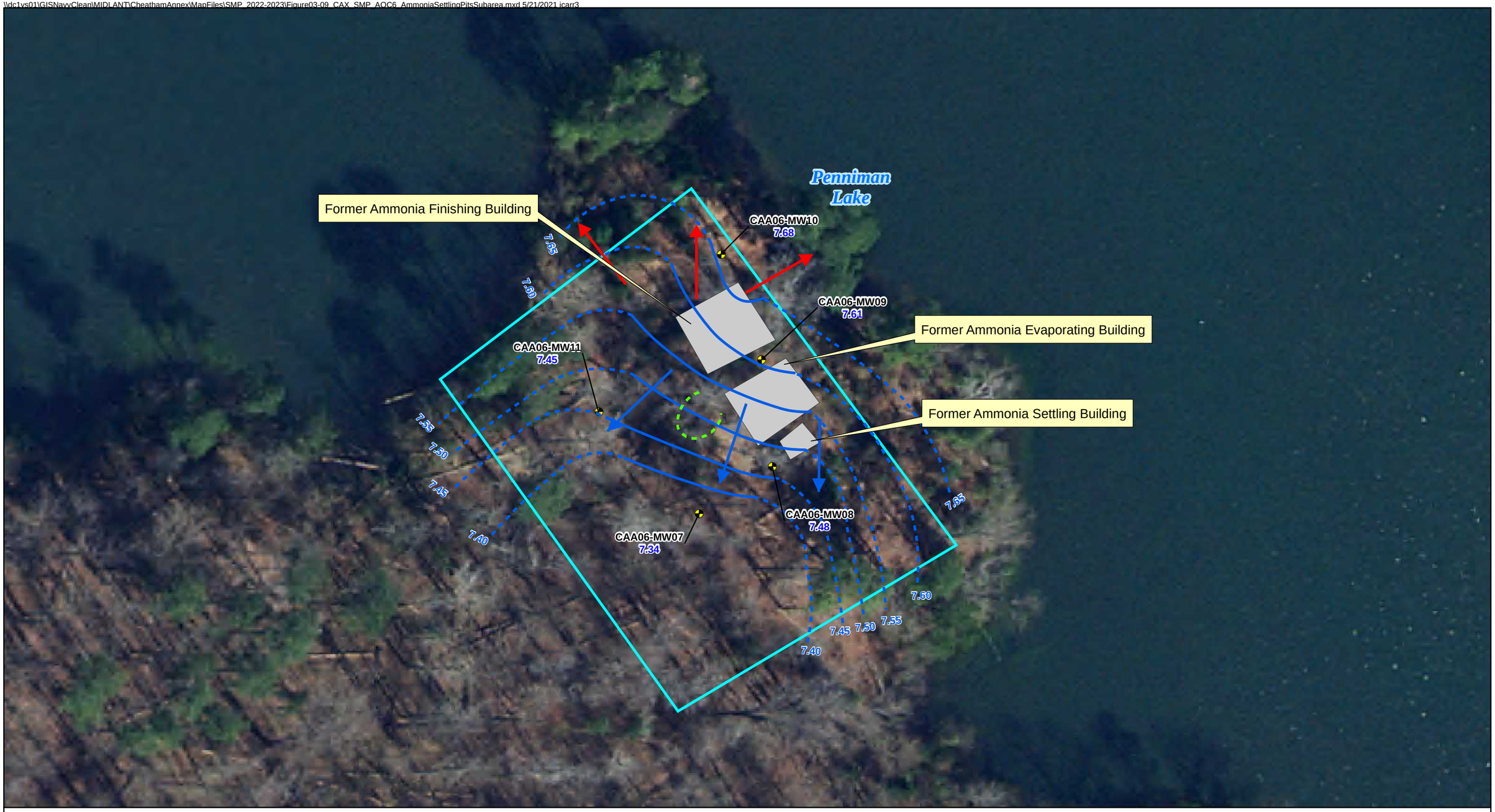

Legend

- Monitoring Well Location
- Groundwater Contour (dashed where inferred)
- Approximate Direction of Groundwater Flow
- Surface Water Flow Direction
- Approximate Location of Berm
- Former Buildings
- Approximate Study Area (Active RI)(0.9 acres)

7.34 - Groundwater Elevation (ft amsl)
Imagery: Virginia Commonwealth, 2017

N
W E
S
0 25 50
Feet

Figure 3-9
AOC 6 - Amonia Settling Pits Subarea
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m.

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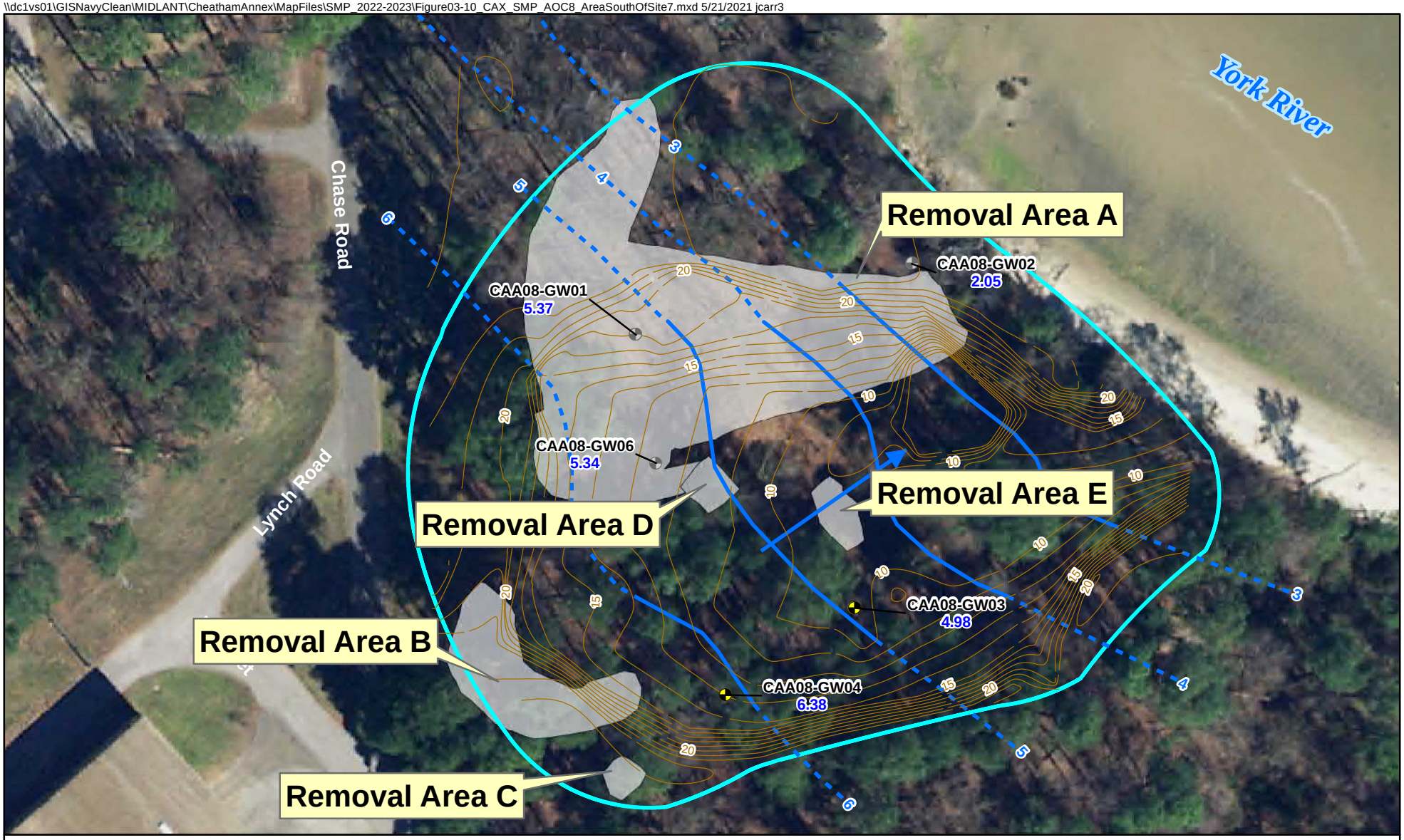

Legend

- Monitoring Well Location
- Removed/Abandoned Monitoring Well
- Elevation Contour prior to Removal Action (feet)
- Inferred Groundwater Contour (feet)
- Groundwater Contour (feet)
- Approximate Direction of Groundwater Flow
- Approximate Study Area (Active RI)(2.5 acres)
- Final Excavation Limits

5.34 - Groundwater Elevation (Prior to Removal Action)
Imagery: Virginia Commonwealth, 2017

N W E S

0 35 70
Feet

Figure 3-10
AOC 8 - Area South of Site 7
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m

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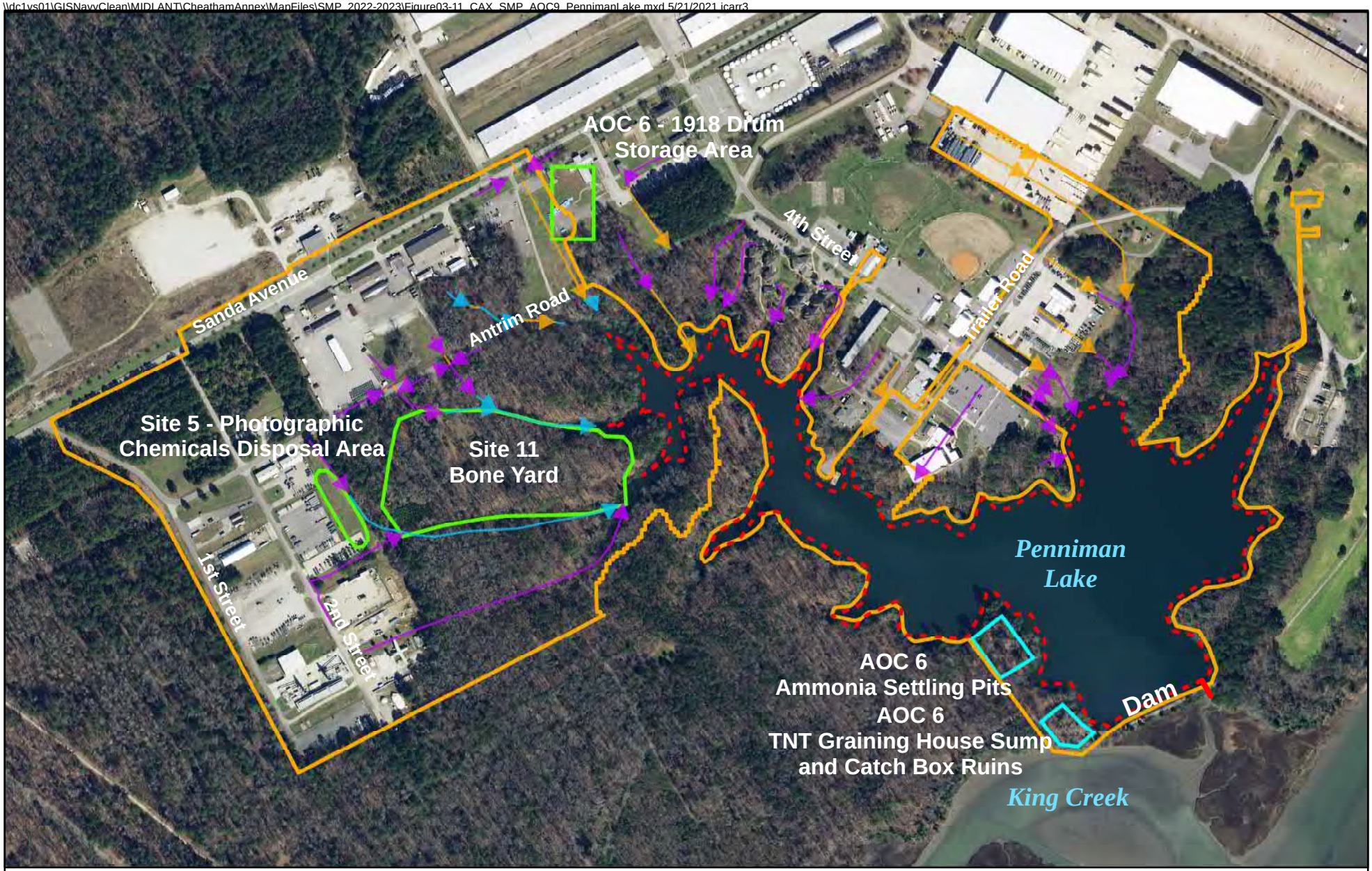

Legend

- Grassy Stormwater Drainage Channels
- Intermittent Creek
- Underground Stormwater Pipe
- Overflow Pipe
- Catch and Release Fishing Restriction
- No Further Action Site Adjacent to AOC 9(13.1 acres)
- Active SI Historic Study Area (approximate)(170.9 acres)
- Active RI Sites Adjacent to AOC 9(1.4 acres)

N W E S

0 225 450 675 Feet

Imagery: Virginia Commonwealth, 2017

Figure 3-11
AOC 9 - Penniman Lake Historical Industrial Areas
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

ch2m

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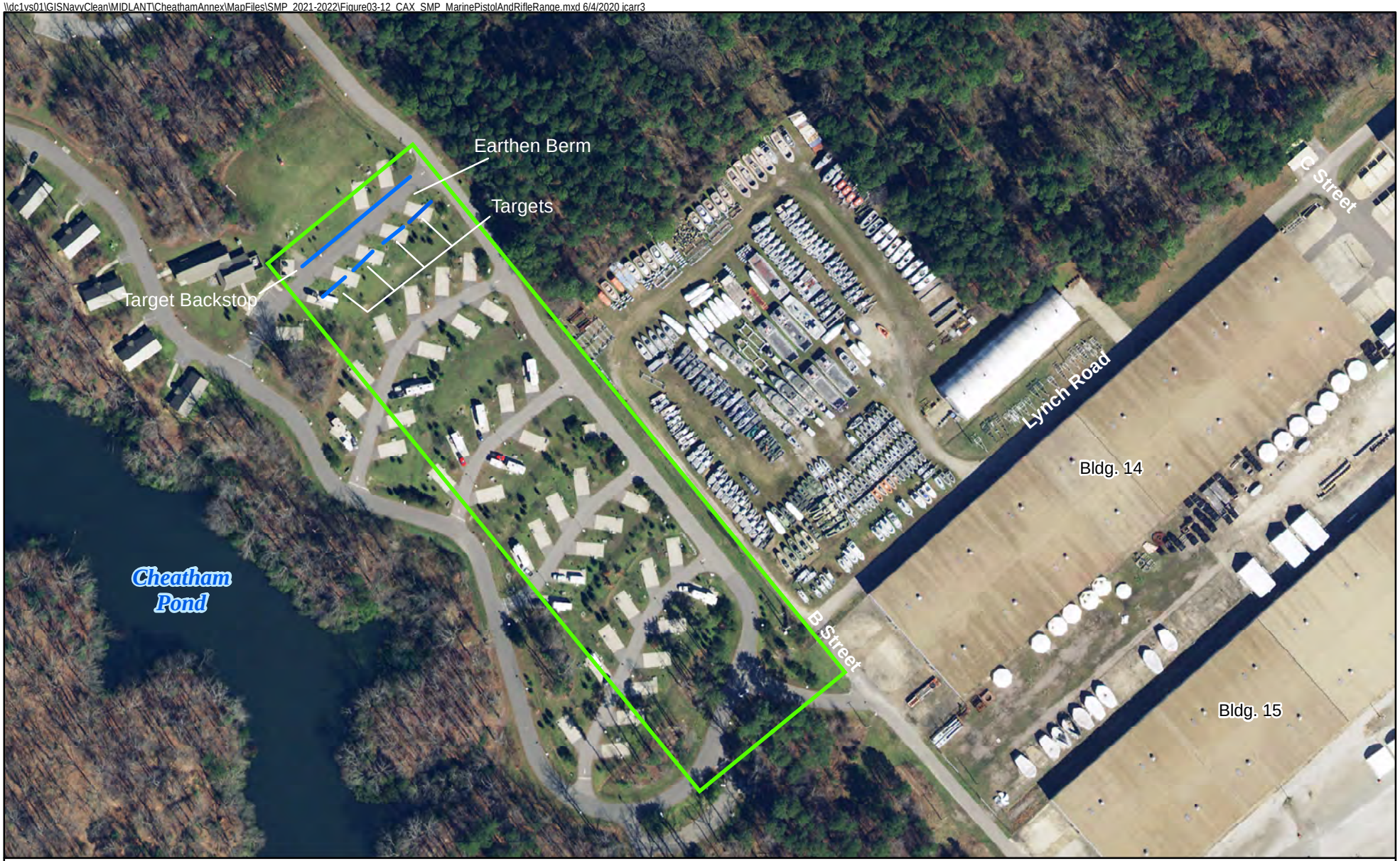

Legend

Marine Pistol and Rifle Range

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Figure 3-12
Marine Pistol and Rifle Range
Site Management Plan
Cheatham Annex
Williamsburg, Virginia

Imagery: Virginia Commonwealth, 2017

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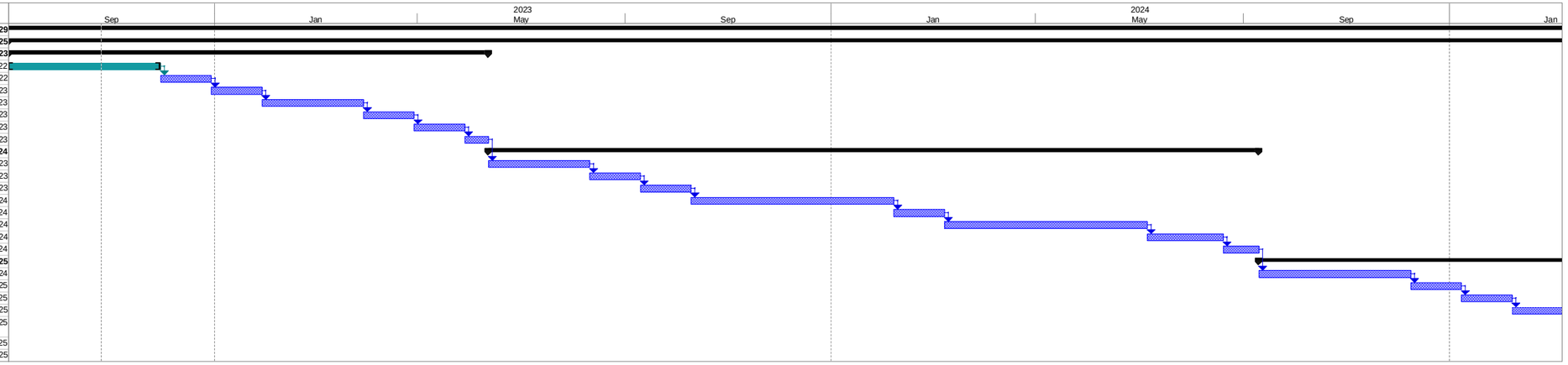
Schedule 3-1
Site 4 FYs 2023-2024 Schedule

ID	Site Name	Task Name	Duration	Start	Finish
1		**CAX**	**3512 days**	**Mon 3/16/20**	**Fri 10/26/29**
2	**Site 4**	**Site 4**	**1204 days**	**Thu 9/1/22**	**Wed 12/17/25**
3	**Site 4**	**Feasibility Study**	**284 days**	**Thu 9/1/22**	**Sun 6/11/23**
4	Site 4	Preliminary FS Report	90 days	Thu 9/1/22	Tue 11/29/22
5	Site 4	Gov't Review and Comments	30 days	Wed 11/30/22	Thu 12/29/22
6	Site 4	Address Gov't Comments and Issue Draft FS	30 days	Fri 12/30/22	Sat 1/28/23
7	Site 4	Regulatory Review	60 days	Sun 1/29/23	Wed 3/29/23
8	Site 4	Address Regulatory Comments and Issue Draft Final F	30 days	Thu 3/30/23	Fri 4/28/23
9	Site 4	Regulatory Review	30 days	Sat 4/29/23	Sun 5/28/23
10	Site 4	Issue Final FS	14 days	Mon 5/29/23	Sun 6/11/23
11	**Site 4**	**Proposed Plan**	**456 days**	**Mon 6/12/23**	**Mon 9/9/24**
12	Site 4	Preliminary PP	60 days	Mon 6/12/23	Thu 8/10/23
13	Site 4	Gov't Review and Comments	30 days	Fri 8/11/23	Sat 9/9/23
14	Site 4	Address Gov't Comments and Issue Draft PP	30 days	Sun 9/10/23	Mon 10/9/23
15	Site 4	Regulatory/Legal Review	120 days	Tue 10/10/23	Tue 2/6/24
16	Site 4	Address Regulatory/Legal Comments and Issue Draft F	30 days	Wed 2/7/24	Thu 3/7/24
17	Site 4	Regulatory Review	120 days	Fri 3/8/24	Fri 7/5/24
18	Site 4	Public Comment Period	45 days	Sat 7/6/24	Mon 8/19/24
19	Site 4	Issue Final PP	21 days	Tue 8/20/24	Mon 9/9/24
20	**Site 4**	**Record of Decision**	**464 days**	**Tue 9/10/24**	**Wed 12/17/25**
21	Site 4	Preliminary ROD	90 days	Tue 9/10/24	Sun 12/8/24
22	Site 4	Gov't Review and Comments	30 days	Mon 12/9/24	Tue 1/7/25
23	Site 4	Address Gov't Comments and Issue Draft ROD	30 days	Wed 1/8/25	Thu 2/6/25
24	Site 4	Regulatory/Legal Review	150 days	Fri 2/7/25	Sun 7/6/25
25	Site 4	Address Regulatory/Legal Comments and Issue Draft Final ROD	30 days	Mon 7/7/25	Tue 8/5/25
26	Site 4	Regulatory Review	120 days	Wed 8/6/25	Wed 12/3/25
27	Site 4	Issue ROD for Signature	14 days	Thu 12/4/25	Wed 12/17/25



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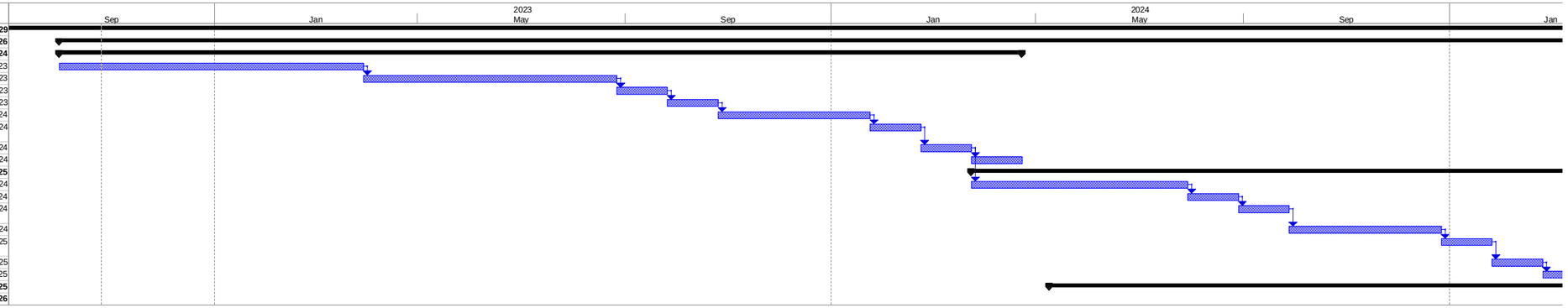
Schedule 3-2
Site 7 FYs 2023-2024 Schedule

ID	Site Name	Task Name	Duration	Start	Finish
1		**CAX**	**3512 days**	**Mon 3/16/20**	**Fri 10/26/29**
28	**Site 7**	**Site 7**	**1541 days**	**Sat 10/1/22**	**Sat 12/19/26**
29	**Site 7**	**Remedial Investigation Addendum**	**570 days**	**Sat 10/1/22**	**Mon 4/22/24**
30	Site 7	Groundwater Sampling Fieldwork (including laboratory)	180 days	Sat 10/1/22	Wed 3/29/23
31	Site 7	Pre-draft RI Addendum	150 days	Thu 3/30/23	Sat 8/26/23
32	Site 7	Gov't Review and Comments	30 days	Sun 8/27/23	Mon 9/25/23
33	Site 7	Address Gov't Comments and Issue Draft RI Addendu	30 days	Tue 9/26/23	Wed 10/25/23
34	Site 7	Regulatory Review	90 days	Thu 10/26/23	Tue 1/23/24
35	Site 7	Address Regulatory Comments and Issue Draft Final RI Addendum	30 days	Wed 1/24/24	Thu 2/22/24
36	Site 7	Regulatory Review	30 days	Fri 2/23/24	Sat 3/23/24
37	Site 7	Final RI Addendum	30 days	Sun 3/24/24	Mon 4/22/24
38	**Site 7**	**Feasibility Study for Groundwater**	**368 days**	**Sun 3/24/24**	**Wed 3/26/25**
39	Site 7	Preliminary FS Report	128 days	Sun 3/24/24	Mon 7/29/24
40	Site 7	Gov't Review and Comments	30 days	Tue 7/30/24	Wed 8/28/24
41	Site 7	Address Gov't Comments and Issue Draft FS	30 days	Thu 8/29/24	Fri 9/27/24
42	Site 7	Regulatory Review	90 days	Sat 9/28/24	Thu 12/26/24
43	Site 7	Address Regulatory Comments and Issue Draft Final FS	30 days	Fri 12/27/24	Sat 1/25/25
44	Site 7	Regulatory Review	30 days	Sun 1/26/25	Mon 2/24/25
45	Site 7	Issue Final FS	30 days	Tue 2/25/25	Wed 3/26/25
46	**Site 7**	**Proposed Plan for Groundwater**	**504 days**	**Thu 5/9/24**	**Wed 9/24/25**
55	**Site 7**	**Record of Decision for Groundwater**	**465 days**	**Thu 9/11/25**	**Sat 12/19/26**



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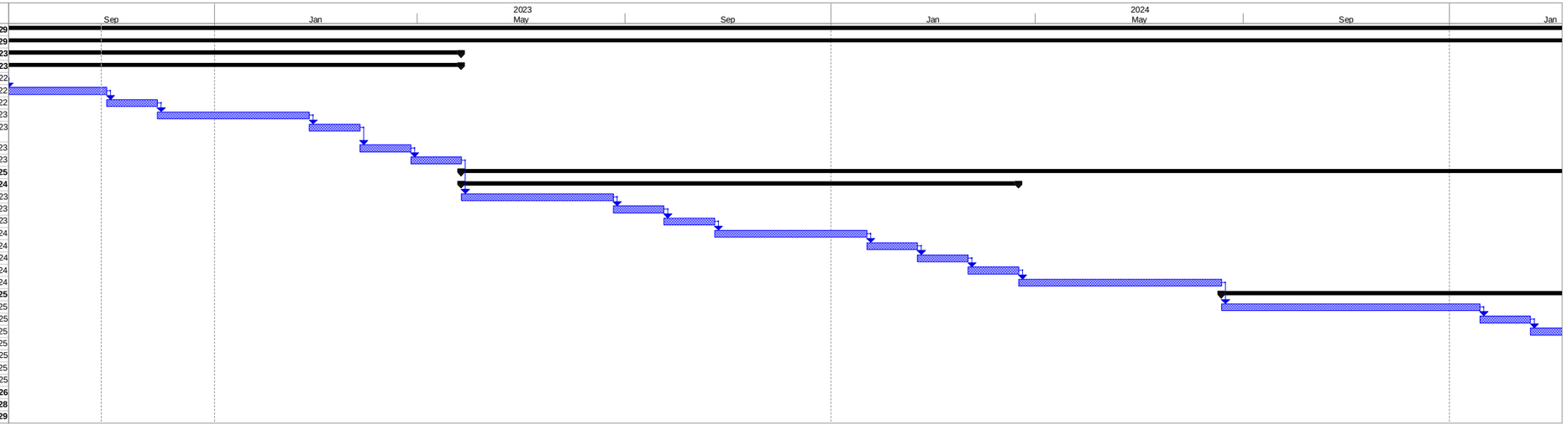
Deadline

Schedule 3-3
Site 9 FYs 2023-2024 Schedule

ID	Site Name	Task Name	Duration	Start	Finish
1		**CAX**	**3512 days**	**Mon 3/16/20**	**Fri 10/26/29**
63	**Site 9**	**Site 9**	**2589 days**	**Fri 4/1/22**	**Wed 5/2/29**
64	**Site 9**	**Expanded SI**	**421 days**	**Fri 4/1/22**	**Fri 5/26/23**
65	**Site 9**	**ESI Report**	**421 days**	**Fri 4/1/22**	**Fri 5/26/23**
66	Site 9	Preliminary ESI	151 days	Fri 4/1/22	Mon 8/29/22
67	Site 9	Gov't Review and Comments	60 days	Tue 8/30/22	Fri 10/28/22
68	Site 9	Address Gov't Comments and Issue Draft ESI Repo	30 days	Sat 10/29/22	Sun 11/27/22
69	Site 9	Regulatory Review	90 days	Mon 11/28/22	Sat 2/25/23
70	Site 9	Address Regulatory Comments and Issue Draft Final ESI Report	30 days	Sun 2/26/23	Mon 3/27/23
71	Site 9	Regulatory Review	30 days	Tue 3/28/23	Wed 4/26/23
72	Site 9	Issue Final ESI Report	30 days	Thu 4/27/23	Fri 5/26/23
73	**Site 9**	**Remedial Investigation**	**843 days**	**Sat 5/27/23**	**Mon 9/15/25**
74	**Site 9**	**RI UFP-SAP**	**330 days**	**Sat 5/27/23**	**Sat 4/20/24**
75	Site 9	Preliminary RI UFP-SAP	90 days	Sat 5/27/23	Thu 8/24/23
76	Site 9	Gov't Review and Comments	30 days	Fri 8/25/23	Sat 9/23/23
77	Site 9	Address Gov't Comments and Issue Draft RI UFP-S	30 days	Sun 9/24/23	Mon 10/23/23
78	Site 9	Regulatory Review	90 days	Tue 10/24/23	Sun 1/21/24
79	Site 9	Address Regulatory Comments and Issue Draft Fina	30 days	Mon 1/22/24	Tue 2/20/24
80	Site 9	Regulatory Review	30 days	Wed 2/21/24	Thu 3/21/24
81	Site 9	Issue Final RI UFP-SAP	30 days	Fri 3/22/24	Sat 4/20/24
82	Site 9	Field Investigation (and Laboratory)	120 days	Sun 4/21/24	Sun 8/18/24
83	**Site 9**	**RI Report**	**393 days**	**Mon 8/19/24**	**Mon 9/15/25**
84	Site 9	Preliminary RI	153 days	Mon 8/19/24	Sat 1/18/25
85	Site 9	Gov't Review and Comments	30 days	Sun 1/19/25	Mon 2/17/25
86	Site 9	Address Gov't Comments and Issue Draft RI Report	30 days	Tue 2/18/25	Wed 3/19/25
87	Site 9	Regulatory Review	90 days	Thu 3/20/25	Tue 6/17/25
88	Site 9	Address Regulatory Comments and Issue Draft Fina	30 days	Wed 6/18/25	Thu 7/17/25
89	Site 9	Regulatory Review	30 days	Fri 7/18/25	Sat 8/16/25
90	Site 9	Issue Final RI Report	30 days	Sun 8/17/25	Mon 9/15/25
91	**Site 9**	**Feasibility Study**	**368 days**	**Tue 9/16/25**	**Fri 9/18/26**
99	**Site 9**	**Proposed Plan**	**542 days**	**Sat 9/19/26**	**Mon 3/13/28**
108	**Site 9**	**Record of Decision**	**445 days**	**Sun 2/13/28**	**Wed 5/2/29**



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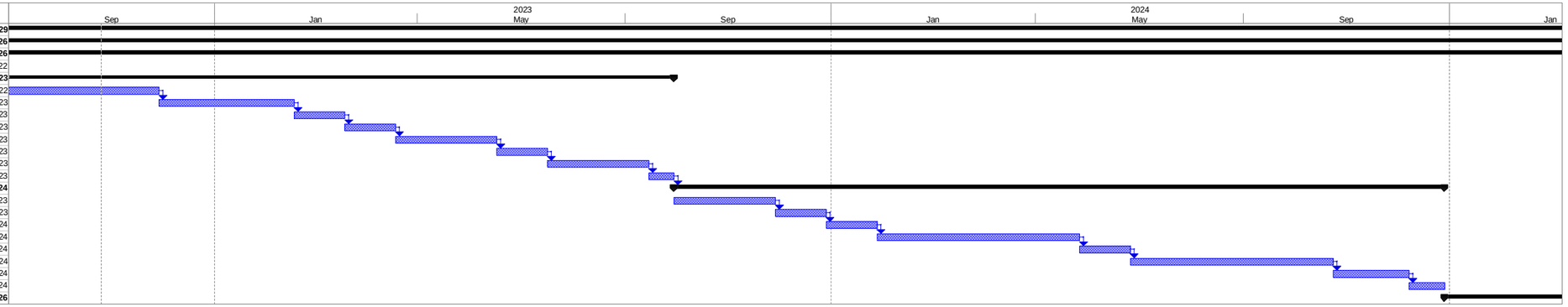
Schedule 3-4
AOC 1 FYs 2023-2024 Schedule

ID	Site Name	Task Name	Duration	Start	Finish
1		**CAX**	**3512 days**	**Mon 3/16/20**	**Fri 10/26/29**
116	**AOC 1**	**AOC 1**	**2213 days**	**Mon 3/16/20**	**Mon 4/6/26**
117	**AOC 1**	**AOC 1 South**	**2213 days**	**Mon 3/16/20**	**Mon 4/6/26**
118	AOC 1	Remedial Investigation	807 days	Mon 3/16/20	Tue 5/31/22
119	**AOC 1**	**Feasibility Study**	**425 days**	**Mon 8/1/22**	**Fri 9/29/23**
120	AOC 1	RAA Development	120 days	Mon 8/1/22	Mon 11/28/22
121	AOC 1	Preliminary Draft FS Report	80 days	Tue 11/29/22	Thu 2/16/23
122	AOC 1	Gov't Review and Comments	30 days	Fri 2/17/23	Sat 3/18/23
123	AOC 1	Address Gov't Comments and Issue Draft FS	30 days	Sun 3/19/23	Mon 4/17/23
124	AOC 1	Regulatory Review	60 days	Tue 4/18/23	Fri 6/16/23
125	AOC 1	Address Regulatory Comments and Issue Draft Fina	30 days	Sat 6/17/23	Sun 7/16/23
126	AOC 1	Regulatory Review	60 days	Mon 7/17/23	Thu 9/14/23
127	AOC 1	Issue Final FS	15 days	Fri 9/15/23	Fri 9/29/23
128	**AOC 1**	**Proposed Plan**	**456 days**	**Sat 9/30/23**	**Sat 12/28/24**
129	AOC 1	Preliminary PP	60 days	Sat 9/30/23	Tue 11/28/23
130	**AOC 1**	Gov't Review and Comments	30 days	Wed 11/29/23	Thu 12/28/23
131	**AOC 1**	Address Gov't Comments and Issue Draft PP	30 days	Fri 12/29/23	Sat 1/27/24
132	**AOC 1**	Regulatory/Legal Review	120 days	Sun 1/28/24	Sun 5/26/24
133	**AOC 1**	Address Regulatory/Legal Comments and Issue Dra	30 days	Mon 5/27/24	Tue 6/25/24
134	**AOC 1**	Regulatory Review	120 days	Wed 6/26/24	Wed 10/23/24
135	**AOC 1**	Public Comment Period	45 days	Thu 10/24/24	Sat 12/7/24
136	**AOC 1**	Issue Final PP	21 days	Sun 12/8/24	Sat 12/28/24
137	**AOC 1**	**Record of Decision**	**464 days**	**Sun 12/29/24**	**Mon 4/6/26**



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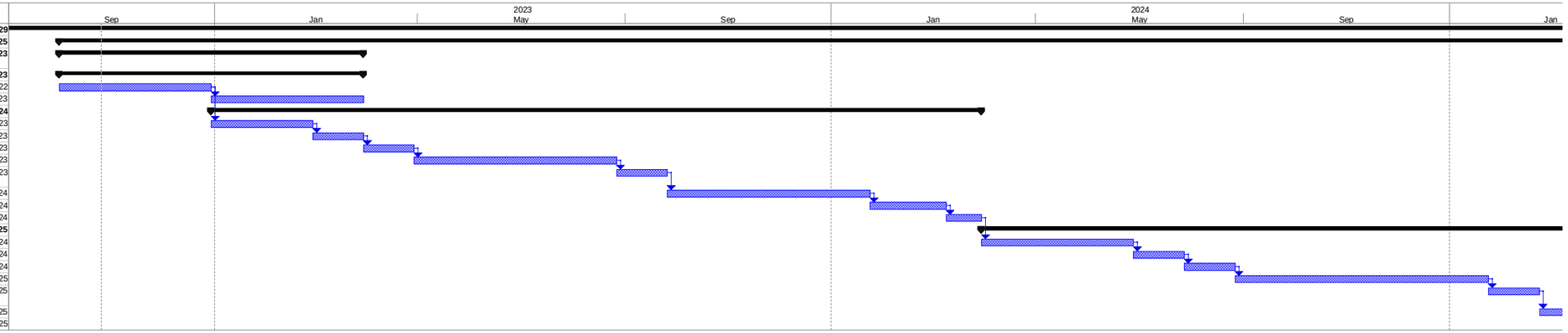
Progress
Deadline

Schedule 3-5
AOC 6 FYs 2023-2024 Schedule

ID	Site Name	Task Name	Duration	Start	Finish
1		**CAX**	**3512 days**	**Mon 3/16/20**	**Fri 10/26/29**
145	**AOC 6**	**AOC 6**	**1010 days**	**Sat 10/1/22**	**Sun 7/6/25**
146	**AOC 6**	**Ammonia Settling Pits and TNT Graining House & TNT Catch Box Ruins subareas**	**180 days**	**Sat 10/1/22**	**Wed 3/29/23**
147	**AOC 6**	**Complete Removal Action**	**180 days**	**Sat 10/1/22**	**Wed 3/29/23**
148	AOC 6	Field Activities (soil removal action)	90 days	Sat 10/1/22	Thu 12/29/22
149	AOC 6	Construction Completion Report	90 days	Fri 12/30/22	Wed 3/29/23
150	**AOC 6**	**Proposed Plan**	**456 days**	**Fri 12/30/22**	**Fri 3/29/24**
151	AOC 6	Preliminary PP	60 days	Fri 12/30/22	Mon 2/27/23
152	AOC 6	Gov't Review and Comments	30 days	Tue 2/28/23	Wed 3/29/23
153	AOC 6	Address Gov't Comments and Issue Draft PP	30 days	Thu 3/30/23	Fri 4/28/23
154	AOC 6	Regulatory/Legal Review	120 days	Sat 4/29/23	Sat 8/26/23
155	AOC 6	Address Regulatory/Legal Comments and Issue Draft Final PP	30 days	Sun 8/27/23	Mon 9/25/23
156	AOC 6	Regulatory Review	120 days	Tue 9/26/23	Tue 1/23/24
157	AOC 6	Public Comment Period	45 days	Wed 1/24/24	Fri 3/8/24
158	AOC 6	Issue Final PP	21 days	Sat 3/9/24	Fri 3/29/24
159	**AOC 6**	**Record of Decision**	**464 days**	**Sat 3/30/24**	**Sun 7/6/25**
160	AOC 6	Preliminary ROD	90 days	Sat 3/30/24	Thu 6/27/24
161	**AOC 6**	Gov't Review and Comments	30 days	Fri 6/28/24	Sat 7/27/24
162	**AOC 6**	Address Gov't Comments and Issue Draft ROD	30 days	Sun 7/28/24	Mon 8/26/24
163	**AOC 6**	Regulatory/Legal Review	150 days	Tue 8/27/24	Thu 1/23/25
164	**AOC 6**	Address Regulatory/Legal Comments and Issue Draft Final ROD	30 days	Fri 1/24/25	Sat 2/22/25
165	**AOC 6**	Regulatory Review	120 days	Sun 2/23/25	Sun 6/22/25
166	**AOC 6**	Issue ROD for Signature	14 days	Mon 6/23/25	Sun 7/6/25



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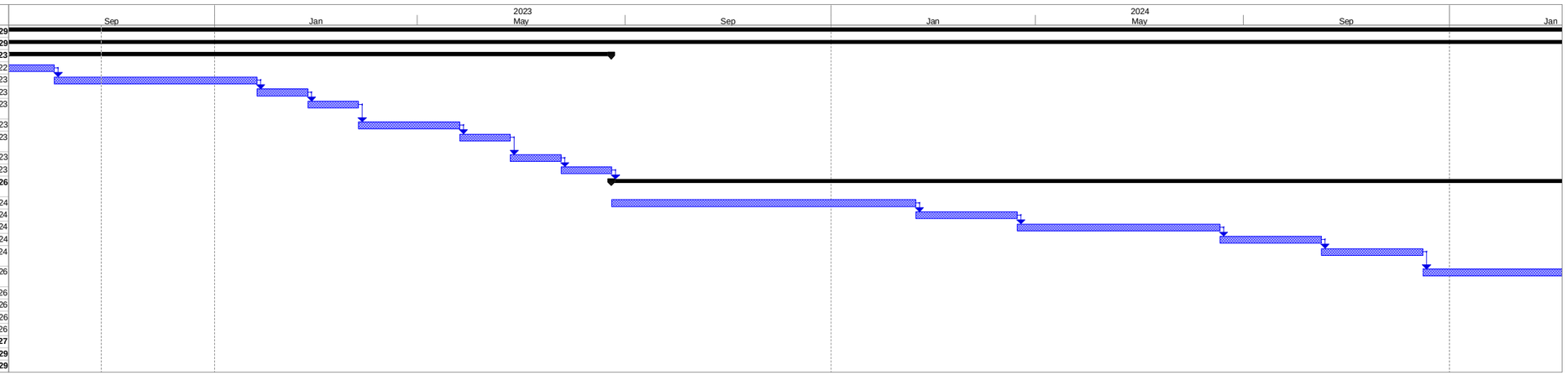
Schedule 3-6
AOC 8 FYs 2023-2024 Schedule

ID	Site Name	Task Name	Duration	Start	Finish
1		**CAX**	**3512 days**	**Mon 3/16/20**	**Fri 10/26/29**
167	**AOC 8**	**AOC 8**	**2736 days**	**Sun 5/1/22**	**Fri 10/26/29**
168	**AOC 8**	**RI Addendum (Groundwater)**	**480 days**	**Sun 5/1/22**	**Wed 8/23/23**
169	AOC 8	Field Work	150 days	Sun 5/1/22	Tue 9/27/22
170	**AOC 8**	Preparation of RI Addendum Report	120 days	Wed 9/28/22	Wed 1/25/23
171	AOC 8	Gov't Review and Comments	30 days	Thu 1/26/23	Fri 2/24/23
172	AOC 8	Address Gov't Comments and Issue Draft RI Addendum Report	30 days	Sat 2/25/23	Sun 3/26/23
173	AOC 8	Regulatory Review	60 days	Mon 3/27/23	Thu 5/25/23
174	AOC 8	Address Regulatory Comments and Issue Draft Final RI Addendum Report	30 days	Fri 5/26/23	Sat 6/24/23
175	AOC 8	Regulatory Review	30 days	Sun 6/25/23	Mon 7/24/23
176	AOC 8	Issue Final RI Addendum Report	30 days	Tue 7/25/23	Wed 8/23/23
177	**AOC 8**	**Groundwater Pilot Study (if needed following Post TCRA Sampling)**	**1220 days**	**Thu 8/24/23**	**Fri 12/25/26**
178	AOC 8	Complete Pre-Draft Pilot Study Work Plan	180 days	Thu 8/24/23	Mon 2/19/24
179	AOC 8	Complete Draft Pilot Study Work Plan	60 days	Tue 2/20/24	Fri 4/19/24
180	AOC 8	Complete Draft Final Pilot Study Work Plan	120 days	Sat 4/20/24	Sat 8/17/24
181	AOC 8	Complete Final Pilot Study Work Plan	60 days	Sun 8/18/24	Wed 10/16/24
182	AOC 8	Collect a "baseline" round of groundwater samples from select existing wells prior to treatment	60 days	Thu 10/17/24	Sun 12/15/24
183	AOC 8	Complete Pilot Study Field Work (includes performance groundwater sampling)	425 days	Mon 12/16/24	Fri 2/13/26
184	AOC 8	Complete Pre-Draft Pilot Study Tech Memo	75 days	Sat 2/14/26	Wed 4/29/26
185	AOC 8	Complete Draft Pilot Study Tech Memo	60 days	Thu 4/30/26	Sun 6/28/26
186	AOC 8	Complete Draft Final Pilot Study Tech Memo	120 days	Mon 6/29/26	Mon 10/26/26
187	AOC 8	Complete Final Pilot Study Tech Memo	60 days	Tue 10/27/26	Fri 12/25/26
188	**AOC 8**	**Feasibility Study**	**300 days**	**Sat 12/26/26**	**Thu 10/21/27**
196	**AOC 8**	**Proposed Plan**	**456 days**	**Fri 10/22/27**	**Fri 1/19/29**
205	**AOC 8**	**Record of Decision**	**464 days**	**Thu 7/20/28**	**Fri 10/26/29**



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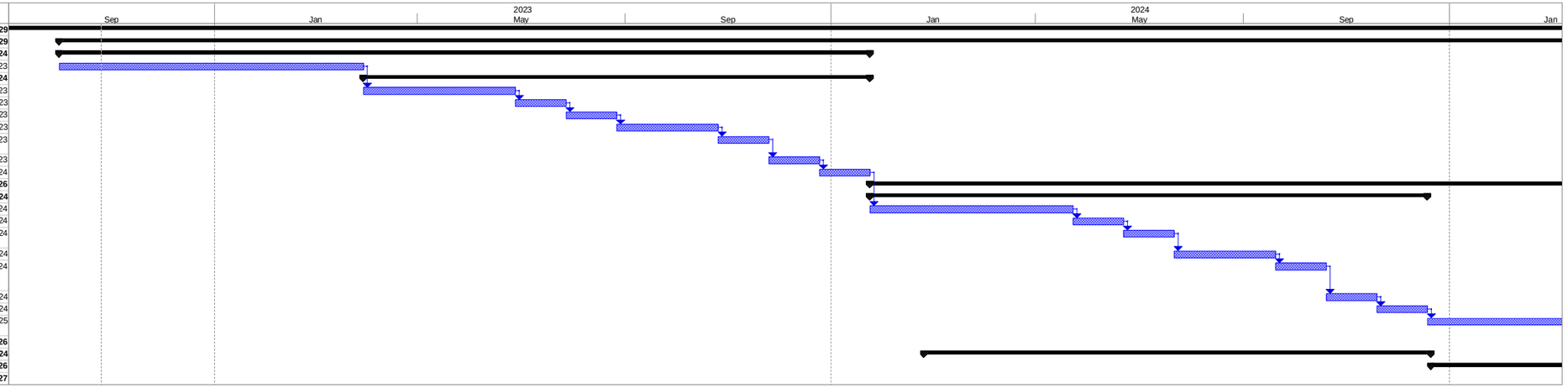
Schedule 3-7
AOC 9 FYs 2023-2024 Schedule

ID	Site Name	Task Name	Duration	Start	Finish
1		**CAX**	**3512 days**	**Mon 3/16/20**	**Fri 10/26/29**
213	**AOC 9**	**AOC 9**	**2541 days**	**Sat 10/1/22**	**Fri 9/14/29**
214	**AOC 9**	**Expanded Site Inspection**	**480 days**	**Sat 10/1/22**	**Tue 1/23/24**
215	AOC 9	Phase 2 Field Investigation (Including Team Discussion	180 days	Sat 10/1/22	Wed 3/29/23
216	**AOC 9**	**ESI Report**	**300 days**	**Thu 3/30/23**	**Tue 1/23/24**
217	AOC 9	Preliminary ESI	90 days	Thu 3/30/23	Tue 6/27/23
218	AOC 9	Gov't Review and Comments	30 days	Wed 6/28/23	Thu 7/27/23
219	AOC 9	Address Gov't Comments and Issue Draft ESI Repo	30 days	Fri 7/28/23	Sat 8/26/23
220	AOC 9	Regulatory Review	60 days	Sun 8/27/23	Wed 10/25/23
221	AOC 9	Address Regulatory Comments and Issue Draft Final ESI Report	30 days	Thu 10/26/23	Fri 11/24/23
222	AOC 9	Regulatory Review	30 days	Sat 11/25/23	Sun 12/24/23
223	AOC 9	Issue Final ESI report	30 days	Mon 12/25/23	Tue 1/23/24
224	**AOC 9**	**Remedial Investigation**	**841 days**	**Wed 1/24/24**	**Wed 5/13/26**
225	**AOC 9**	**RI UFP-SAP**	**330 days**	**Wed 1/24/24**	**Wed 12/18/24**
226	AOC 9	Preliminary RI UFP-SAP	120 days	Wed 1/24/24	Wed 5/22/24
227	AOC 9	Gov't Review and Comments	30 days	Thu 5/23/24	Fri 6/21/24
228	AOC 9	Address Gov't Comments and Issue Draft RI UFP-SAP	30 days	Sat 6/22/24	Sun 7/21/24
229	AOC 9	Regulatory Review	60 days	Mon 7/22/24	Thu 9/19/24
230	AOC 9	Address Regulatory Comments and Issue Draft Final RI UFP-SAP	30 days	Fri 9/20/24	Sat 10/19/24
231	AOC 9	Regulatory Review	30 days	Sun 10/20/24	Mon 11/18/24
232	AOC 9	Issue Final RI UFP-SAP	30 days	Tue 11/19/24	Wed 12/18/24
233	AOC 9	Field Investigation (and Laboratory)	120 days	Thu 12/19/24	Thu 4/17/25
234	**AOC 9**	**RI Report**	**391 days**	**Fri 4/18/25**	**Wed 5/13/26**
242	**AOC 9**	**Feasibility Study**	**300 days**	**Sun 2/25/24**	**Fri 12/20/24**
250	**AOC 9**	**Proposed Plan**	**456 days**	**Sat 12/21/24**	**Sat 3/21/26**
259	**AOC 9**	**Record of Decision**	**464 days**	**Sun 3/22/26**	**Mon 6/28/27**



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SECTION 4

Land Use Planning

Currently, CAX does not have any sites with Land Use Controls (LUCs) in place. Should LUCs be part of the remedy identified in a future ROD, the site will be listed within this section of the SMP, and the boundaries of potential environmental impact areas shown on a figure.

This information will be available to Base Planning personnel for environmental considerations during Base operational planning and decision making to ensure that LUCs are maintained at ER sites where the ROD identifies LUCs as part of the remedy. In the event DoD activities will influence LUC areas, the Navy Remedial Project Manager should be consulted. Contact information is listed below:

Mr. Bryan Peed
Naval Facilities Engineering Systems Command, Mid-Atlantic
9742 Maryland Ave. Bldg N-26, Rm 3208
Norfolk, VA 23511-3095
(757) 341-0480
Email: bryan.peed@navy.mil

SECTION 5

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