Mid-Atlantic
Norfolk, Virginia

Final

Site Management Plan
Fiscal Years 2021 – 2025

Naval Auxiliary Landing Field Fentress
Chesapeake, Virginia

July 2020

Mid-Atlantic
Norfolk, Virginia

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Prepared for NAVFAC Mid-Atlantic
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Virginia Beach, Virginia
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Contents

Acronyms and Abbreviations

AFFF	aqueous film-forming foam
AOC	Area of Concern
BTEX	benzene, toluene, ethylbenzene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COPC	constituent of potential concern
DBT	Dive Bombing Target
DGM	digital geophysical mapping
EE/CA	Engineering Evaluation/Cost Analysis
ERP	Environmental Restoration Program
FY	Fiscal Year
GAC	granular activated carbon
HHRS	Human Health Risk Screening
IAS	Initial Assessment Study
IRP	Installation Restoration Program
MC	munitions constituents
MEC	munitions and explosives of concern
MGBR	Machine Gun Boresight Range
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
MRP	Munitions Response Program
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NFA	No Further Action
NTCRA	Non-Time-Critical Removal Action
PA	Preliminary Assessment
PAOI	Potential Area of Interest
PCB	polychlorinated biphenyl
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PHA	Provisional Health Advisory
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SI	Site Inspection
SMP	Site Management Plan
SSI	Supplemental Site Inspection
SVOC	semivolatile organic compound
SWMU	solid waste management unit

TPH	total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VDEQ	Virginia Department of Environmental Quality
VOC	volatile organic compound

SECTION 1

Introduction

This document presents the Fiscal Years (FYs) 2021 through 2025 Site Management Plan (SMP) for restoration sites at Naval Auxiliary Landing Field (NALF) Fentress, Chesapeake, Virginia, which is under the administrative cognizance of Naval Air Station (NAS) Oceana, Virginia Beach, Virginia. This SMP provides a management tool for Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic, Virginia Department of Environmental Quality (VDEQ) and activity personnel to be used for planning, scheduling, and determining the future of the NALF Fentress Environmental Restoration Program (ERP) sites, including Installation Restoration Program (IRP) sites, Munitions Response Program (MRP) sites, and potential new sites identified based on inadequate closeout documentation and/or the presence of emerging contaminants. The SMP provides long-term projections for these sites in accordance with the Department of the Navy (Navy) ERP and focuses on upcoming activities that are planned for FY 2020.

The SMP presents the rationale for all ongoing environmental investigations and the estimated schedule for completion of these activities for each active site. Detailed activity schedules for FY 2021 are provided at the end of **Section 4**.

Previous IRP site investigations at the main NAS Oceana installation have been conducted in accordance with the Resource Conservation and Recovery Act (RCRA) 3008(h) Administrative Order on Consent (the Consent Order) issued by the United States Environmental Protection Agency (USEPA) in 1991; however, NALF Fentress is not contiguous with the main NAS Oceana installation and is not subject to the Consent Order. As a result, cleanup activities at NALF Fentress have been accomplished in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) site management process.

All NALF Fentress ERP sites are managed with VDEQ oversight only. This document includes information on all ERP sites, regardless of regulatory program, for the purpose of completeness.

The SMP is intended to be a working document that is updated annually to maintain current documentation and summaries of ERP actions at NALF Fentress. This SMP updates and supersedes all previous SMPs. Detailed information is provided for active sites located at NALF Fentress. For sites that are not currently active, only summary information is included.

SECTION 2

Background and Regulatory Framework

2.1 NALF Fentress Description

NALF Fentress (**Figure 2-1**) is under the operational control of NAS Oceana and is located in Chesapeake, Virginia, approximately 7 miles southwest of NAS Oceana. Established in 1940, the installation encompasses just over 2,500 acres and approximately 8,700 acres in restrictive easements. The facility is primarily used by squadrons stationed at NAS Oceana or Naval Station Norfolk Chambers Field for field carrier landing practice operations (Malcolm Pirnie, 2008).

2.2 Environmental Restoration Program History

2.2.1 Installation Restoration Program Investigations

Initial activities in support of the IRP were combined for NAS Oceana and NALF Fentress. Prior to state and federal environmental regulatory involvement, the Navy identified possible environmental contamination caused by operations at the facilities. Three investigations were conducted: the Initial Assessment Study (IAS) (Rogers, Golden & Halpern, 1984), the Final Round 1 Verification Step (CH2M, 1986), and the Line Shack Inspection Study (CH2M, 1989). The IAS and Round 1 Verification Step investigations are discussed briefly in the following sections. The Line Shack Inspection Study is not discussed in this document as only NAS Oceana sites were included in that investigation. Detailed results of the investigations that specifically pertain to active sites at NALF Fentress are included in **Section 3** of this document.

Initial Assessment Study (1984)

In order to identify and assess sites posing a potential threat to human health or the environment as a result of contamination from past operations, the Naval Energy and Environmental Support Activity conducted an IAS at NAS Oceana and NALF Fentress in 1984 (Rogers, Golden & Halpern, 1984). Information from historical records, aerial photographs, field inspections, and personnel interviews was collected and evaluated. A total of 16 potentially contaminated sites were identified at NAS Oceana and NALF Fentress; however, only one potentially contaminated site was identified at NALF Fentress, Site 14, Fentress Landfill. Site 14 was evaluated for contamination characteristics, migration pathways, and pollutant receptors. Following this evaluation, Site 14 was recommended for further investigation to evaluate the presence or absence of contaminants and extent of contamination at the site.

Round 1 Verification Step (1986)

Consistent with the recommendations included in the IAS, a Round 1 Verification Step was conducted in 1986 (CH2M, 1986) to further evaluate Site 14. Groundwater samples were collected from monitoring wells, along with two surface water samples and two sediment samples. Most concentrations of the constituents sampled for were below or near detection limits, and those that were elevated (zinc and silver) were not present at concentrations believed to pose unacceptable risks. Additional sampling of groundwater and surface water was recommended. The additional investigations for active sites are summarized in **Section 3** and **Table 2-1**.

2.2.2 RCRA Corrective Action Process

RCRA Facility Assessment and RCRA Corrective Action Order

Application of RCRA corrective action began in June 1988, when USEPA contractors conducted a RCRA Facility Assessment (RFA) of NAS Oceana and NALF Fentress (USEPA, 1989). The RFA redesignated existing sites as Solid Waste Management Units (SWMUs) and used a different numbering strategy than was used in previous investigations. In later documents, however, the original site designators were used; for example, “Site 14” from

the IAS was referred to as "Site 14" in the Environmental Investigation (CH2M, 1992), even though the RFA referred to this SWMU as "SWMU 23." The active IRP sites are identified in **Table 2-1**. Five SWMUs and two Areas of Concern (AOCs) were identified at NALF Fentress during the RFA:

- SWMU 10 – Hazardous Waste Storage Area, Fentress
- SWMU 23/Site 14 – Fentress Landfill
- SWMU 64/Site 17 – Fentress Burn Pit
- SWMU 76 – Waste Fuel Storage Tank A
- SWMU 77 – Waste Fuel Storage Tank B
- AOC D – Fuel Storage Tank (Building 20)
- AOC E – Material Storage Area (Building 20)

In 1991, following finalization of the RFA, the Consent Order was issued for NAS Oceana. NALF Fentress was excluded from the Final Consent Order because it was noncontiguous to the main NAS Oceana property.

2.2.3 Environmental Investigations Following the RFA under the Navy's IRP

Following the RFA, the Navy continued to investigate Sites 14 and 17 under the IRP with oversight from VDEQ. Investigations and actions completed under the IRP are included in **Table 2-2** and briefly described below.

Environmental Investigation of Site 14 and Site 17

An environmental investigation was performed in 1991, during which sampling was conducted at Site 14 in response to conclusions from the Round 1 Verification Step (CH2M, 1991). Groundwater and surface water samples were collected and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, total organic carbon, hexavalent chromium, chloride, sulfate, and alkalinity. In general, the groundwater and surface water concentrations were either 1) not detected, 2) below accurately quantifiable detection limits, or 3) detected at levels not significantly different than the laboratory blanks. Therefore, no further action (NFA) was recommended for Site 14.

Samples of soil and groundwater at Site 17 were analyzed for VOCs, SVOCs, total petroleum hydrocarbons (TPH), lead, and ignitibility (soils only). Petroleum-related compounds were found in both media. Additional action was recommended to monitor groundwater and remove the petroleum-impacted soil (CH2M, 1991).

Site Inspection

In 1992, a Site Inspection (SI) was performed at Site 17 and soil and groundwater samples were collected and analyzed for petroleum-related compounds. Petroleum contamination was found in both soil and groundwater north of the runway intersection and in soil west of the runway intersection. Further delineation of petroleum-related contamination at Site 17 was recommended to support a soil removal action (Baker, 1992).

Supplemental Site Investigation

In 1993, a supplemental site investigation (SSI) was completed for Site 14 and Site 17 (Baker, 1993). Even though NFA was recommended at Site 14, the SSI included Site 14 as a result of the Superfund Amendments and Reauthorization Act of 1986, after which the Navy modified its ERP to conform to the guidelines of the USEPA's Superfund Program.

Results of previous investigations for groundwater at Site 14 were confirmed, and no additional action was recommended.

Soil gas samples were analyzed in the field to determine sampling locations for soil collected at Site 17. All soil samples were analyzed for TPH and benzene, toluene, ethylbenzene, and xylene (BTEX). A select set of soil samples were analyzed for target compound list VOCs, SVOCs, and lead. A removal action of petroleum-contaminated soil, as well as installation of a downgradient well, was recommended.

Site Characterization Report for Underground Storage Tank (UST) 20B

A site characterization was conducted for UST 20B, a UST south of Building 20 that was used in refueling vehicles, to determine the extent of contamination after the report of a release of gasoline. After determining TPH existed within soil and groundwater and that there were potential risks to human receptors resulting from the release, further delineation of groundwater contamination followed by a groundwater remedial action was recommended. Limited remediation of soil was also recommended (Baker, 1994).

Engineering Evaluation/Cost Analysis (EE/CA) and Associated Decision Document – Site 17

Removal Action Alternatives for Site 17 were evaluated and excavation and onsite treatment using bioremediation was identified as the recommended treatment alternative (FWI, 1994a). The excavation and backfill with bioremediated material were documented in the Decision Document (FWI, 1994b).

Drinking Water Supply Investigation

Because of the UST leak at UST 20B, VDEQ recommended monitoring the drinking water supply wells for BTEX and trichloroethene monthly for 3 consecutive months beginning in April 1995, and once every 3 months beginning in July 1995 until the current drinking water supply wells were replaced as part of a planned renovation of the drinking water treatment system. Additionally, the samples were analyzed for 1,2-dibromoethane and dibromochloropropane during some of the sampling events and 1,2-dibromoethane was detected above the current maximum contaminant level in one sample in February 1996. Toluene, ethylbenzene, and xylene were detected below their current maximum contaminant levels in both samples collected in September 1996. In 1998, the old, Surficial aquifer water supply wells were closed, and new, deeper, Yorktown aquifer supply wells were put into use (Navy, 1995, 1996a, 1996b, 1999).

Aerial Photographic Analysis Report

Due to uncertainty regarding the background and exact location of sites, an aerial photograph analysis report was submitted to the Navy in April 2018. The purpose of the report was to:

- Document site changes observed in the aerial photographs covering the time period from 1938 through 2016
- Compare reported years of site use against observations in the aerial photographs
- Review the aerial photographs to identify sites not previously reported
- Compare aerial photographs to historical archival maps
- Document other environmentally significant activity

As a result of the report, Potential Area of Interest (PAOI) 1 was identified and is located in the vicinity of Site 17. The PAOI is suspected to be an additional firefighting training area and is now identified as Site 17c.

2.2.4 Munitions Response Program Investigations

Ranges associated with NALF Fentress were first evaluated as part of a Preliminary Assessment (PA) conducted by Malcolm Pirnie in 2008. The PA evaluated the history of munitions use at the sites listed below and recommended additional investigation (Malcolm Pirnie, 2008):

- UXO 09 – Machine Gun Boresight Range (MGBR)
- UXO 10 – Dive Bombing Targets (DBTs)

The Magazine Storage Area was evaluated as part of the Aerial Photographic Analysis of NALF Fentress (CH2M, 2019) and the 1986 Master Plan for NAS Oceana (NAVFAC, 1986). An SI is planned to determine if and where a release of munitions from historical activities associated with the Magazine Storage Area may have occurred. The MRP investigations are summarized in **Section 3.2**.

Table 2-1. Current Status Summary of Active Installation Restoration Program Sites
Naval Auxiliary Landing Field Fentress, Site Management Plan for FY 2021

Site Number	IRP Site Name	Former Site/ SWMU ID	IAS (AR #000014)	RFA (AR #000375)	DD	Closure Status	Path Forward
14	Fentress Landfill	SWMU 23	1984	1989	--	NFA/reopened	Removed from the Oceana Final RCRA 3008h Consent Order because it is noncontiguous, as per USEPA Letter dated August 23, 1990. Reopened in 2016 to address emerging contaminant (PFAS) releases to the environment, and subsequently to reassess other contaminants.
17	Fire Fighting Training Area (Fentress Burn Pit)	SWMU 64	--	1989	Jul-94	--	Removed from the Oceana Final 3008h Consent Order because it is noncontiguous, as per USEPA Letter dated August 23, 1990. The 1991 EI reported that soils and groundwater were contaminated with petroleum related compounds. The 1993 SSI supported soil removal action and no groundwater remediation. Reopened in 2016 to address emerging contaminant (PFAS) releases to the environment, and subsequently to reassess other contaminants. The is currently comprised of three fire fighting training areas (Site 17a, 17b, and 17c).
--	Fuel Storage Tank, Fentress, Bldg 20 (UST 20B)	--	--	--	--	--	Originally investigated under the POL program, this site was reopened in 2016 to address emerging contaminant (PFAS) releases to the environment, and subsequently to reassess other contaminants.
--	Other PFAS Sites	--	--	--	--	--	Aviation crash sites and other areas where AFFF may have been released.

Notes
1998 = Year Activity Completed (fiscal year)
AFFF = aqueous film-forming foam
CMS = Corrective Measures Study
DD = Decision Document
EI = Environmental Investigation
IAS = Initial Assessment Study
NFA = No Further Action
PFAS = per- and polyfluoroalkyl substance
PFOA = perflouroctanoic acid
PFOS = perfluorooctane sulfonate
POL = petrolium, oil, and lubicant
RCRA = Resource Conservation and Recovery Act
RFA = RCRA Facility Assessment
SSI = Supplemental Site Investigation
SWMU = Solid Waste Management Unit
USEPA = United States Environmental Protection Agency
UST = underground storage tank

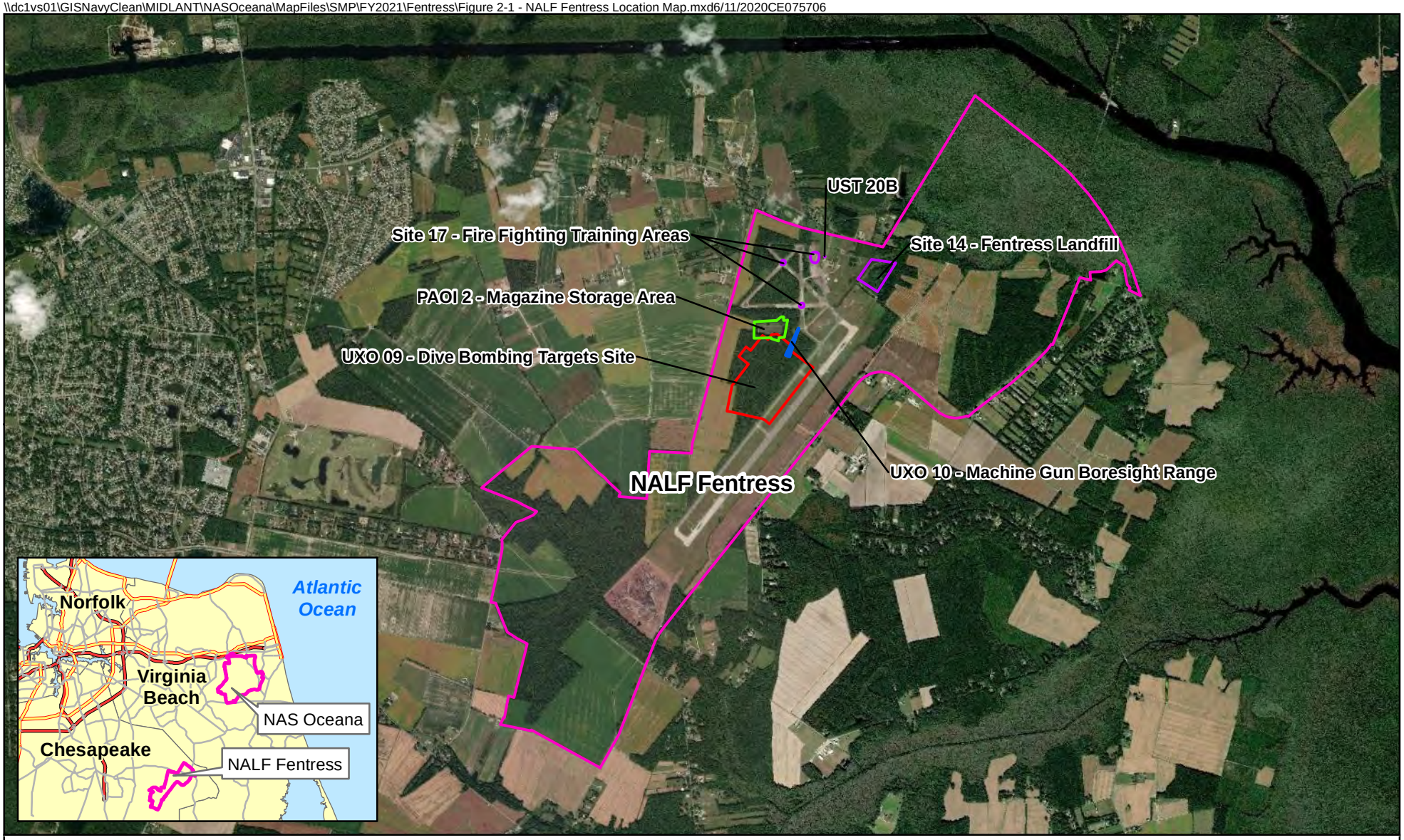
Table 2-2. Previous Investigations

Naval Auxiliary Landing Field Fentress, Site Management Plan for FY 2021

Investigation	Year	Admin Record Document Number	Sites Included	Conclusions and Recommendations
Initial Assessment Study (IAS)	1984	000014	Site 14	Site 14 was evaluated with regard to contamination characteristics, migration pathways, and pollutant receptors. Further investigation was recommended to evaluate the presence or absence of contaminants and extent of contamination at the site.
Round 1 Verification Study (RVS)	1986	000013	Site 14	This report suggested that little contamination was leaving Site 14, although unknown pathways of migration may exist. Additional sampling of groundwater and surface water was recommended.
Resource Conservation and Recovery Act Facility Assessment	1988	000375	SWMU 1; SWMU 23/Site 14; SWMU 64/Site 17; SWMU 76; SWMU 77; AOC D; AOC E	Five sites and two AOCs were identified at NALF Fentress during the RFA.
Environmental Investigation (EI)	1991	000134	Site 14 Site 17	Sampling of groundwater and surface water was conducted at Site 14. The samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals, total organic carbon, hexavalent chromium, chlorided, sulfate, and alkalinity. In general, the groundwater and surface water concentrations were either 1) not detected, 2) below accurately quantifiable detection limits, or 3) detected at levels not significantly different than the laboratory blanks. Therefore, no further action was recommended for Site 14. Sampling of soil and groundwater was conducted at Site 17. Thesse samples were analyzed for VOCs, SVOCs, TPH, lead, and ignitibility (soils only). TPH was found in both media, and additional action was recommended to monitor groundwater and remove soil.
Site Inspection (SI)	1992	000021	Site 17	An additional round of sampling was conducted at Site 17 for soil and groundwater, to further delineate the petroleum contamination. Contamination was found in both soil and groundwater north of the runway intersection and in soil west of the runway intersection. Further delineation was recommended.
Supplemental Site Inspection (SSI)	1993	000137	Site 14 Site 17	Sampling was conducted at Site 14, and results of previous investigations were confirmed. No additional action recommended. At Site 17, soil gas samples were anlyzed in the field to determine sampling locations for soil at Site 17. All samples were analyed for TPH and BTEX, and a select set were also analyzed for TCLP VOCs, SVOCs, and lead. A removal action of soil was recommended in areas with TPH concentrations of greater than 50 micrograms per kilogram. Installation of a downgradient well was also recommended.
Site Characterization Report	1994	N/A	UST 20B*	A site characterization was conducted for UST 20B to determine the extent of contamination after the report of a release of gasoline. Soil and groundwater samples were collected and analyzed for TPH, BTEX, TCLP lead (soil only) and total lead (groundwater only). TPH was detected in both soil and groundwater. A risk assessment was completed and determined that potential receptors include base personnel (groundwater ingestion) and construction workers during soil excavation activities. Exceedances of the State Water Control Board action levels for TPH and BTEX were detected in multiple soil samples. Exceedances of the MCL for benzene were detected in six groundwater samples and exceedances of the federal action level for dissolved lead were detected in 11 groundwater samples. Further delineation of groundwater contamination, followed by a remediation action was recommended.
Engineering Evaluation/Cost Analysis (EE/CA)	1994	000139	Site 17	Site 17 removal action alternatives were evaluated and excavation and onsite treatment using bioremediation was selected as the proposed removal action.
Drinking Water Supply Investigation	1995	N/A	Basewide	Drinking water supply wells basewide were sampled for BTEX and TCE after receiving recommendations from Virginia Department of Environmental Quality as a result of the UST leak at Building 20.

Notes:
AOC = Area of Concern
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
SVOC = semivolatile organic carbon
SWMU = solid waste management unit
TCE = trichloroethene
TCLP = Toxicity Characteristic Leachate
TPH = total petroleum hydrocarbon
UST = underground storage tank
VOC = volatile organic compound

\\dc1vs01\GISNavyClean\MIDLANT\NASOceana\MapFiles\SMP\FY2021\Fentress\Figure 2-1 - NALF Fentress Location Map.mxd6/11/2020CE075706



Legend

- Active IRP Site Boundary
- Active MRP Site Boundary
- Potential MRP Site Boundary
- MRP Site Boundary - NFA
- NALF Fentress Boundary

N
W E
S

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Feet

Imagery: Esri, 2019

Figure 2-1
NALF Fentress Location Map
NALF Fentress
Chesapeake, Virginia

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SECTION 3

Site Descriptions

3.1 Installation Restoration Program Sites

Although no additional investigation was recommended for NALF Fentress IRP sites, in October 2014, the Assistant Secretary of the Navy, Energy, Installations and Environment issued a statement requiring evaluation of sites with the potential for per- and polyfluoroalkyl substance (PFAS) contamination under the Defense Environmental Restoration Program. As a result of the review, Sites 14 and 17 (**Figure 2-1**) and several other potential source areas at NALF Fentress were identified for further evaluation of PFAS. Following PFAS investigations, the potential for presence of other contaminants was determined to require additional evaluation and a non-PFAS SSI at Site 14, Site 17, and UST 20B was completed in FY 2017 (CH2M, 2018b).

No formal closeout documentation has been located for SWMUs 10, 76, and 77 and AOCs D and E. The exact location of SWMU 10 is unknown. AOCs D and E are located in the same area as UST 20B; consequently, investigations of UST 20B have been representative of potential impacts from all three sites. SWMUs 76 and 77 are located in the same area as Site 17; consequently, investigations of Site 17 have been representative of potential impacts from all three sites. In accordance with a May 2019 NAS Oceana Partnering Team decision, all NALF Fentress IRP sites will be managed with VDEQ oversight only. This section includes information on all IRP sites, regardless of regulatory program, for the purpose of completeness. A summary of all active sites is provided below.

3.1.1 Site 14 (SWMU 23) – Fentress Landfill

Site 14 (**Figure 3-1**) was described in the IAS as a 3-acre landfill used from 1945 until 1970. The landfill reportedly contained solvents, pesticides, construction debris, electrical conductors, and sanitary wastes which were burned and subsequently buried (Rogers, Golden & Halpern, 1984). Site 14 was recommended for NFA following the 1993 SSI. In December 2015, the site was reopened for investigation and an SI Sampling and Analysis Plan (SAP) was submitted to evaluate the possible presence of PFAS in groundwater. The results of the Basewide PFAS SI indicated that PFAS were present at the site at concentrations exceeding Regional Screening Levels (RSLs) for PFOA and PFOS based on a hazard quotient (HQ) of 0.1. Concentrations also exceeded the USEPA Provisional Health Advisories (PHAs) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), later replaced by the USEPA Lifetime Health Advisory, and it was noted that PFAS contamination had migrated off-installation (CH2M, 2018a). Actions taken on-installation and off-installation and planned activities as a result of PFAS contamination in groundwater are described in more detail in **Section 3.1.4**.

In January 2016, USEPA requested that the Navy review previous investigations at Site 14 to ensure there was no potential for other contamination to migrate off-installation. The Tier I Partnering Team agreed to conduct an SSI, including analysis of groundwater samples for VOCs, SVOCs, total and dissolved metals, pesticides, PCBs, and dioxins/furans. The SSI fieldwork was completed in August 2017 and the Final SSI Report was submitted in December of FY 2019.

Based on the Human Health Risk Screening (HHRS) completed in the Final SSI, lead was identified as a constituent of potential concern (COPC) for groundwater in the Yorktown aquifer at Site 14 and in the perimeter wells (CH2M, 2018b). The ecological risk screening identified iron, manganese, and lead as COPCs in the Yorktown and Surficial/Columbia aquifer and cyanide as a COPC in the Surficial/Columbia aquifer. A Basewide background study was recommended to determine if lead concentrations are the result of a release or naturally occurring conditions. Additionally, a Remedial Investigation (RI) was recommended to define the nature and extent of contamination in soil and groundwater and determine if there is potential unacceptable risk to human health or the environment due to COPCs. However, during development of a SAP, the Navy, in consultation with VDEQ, elected to conduct an Expanded SI. The Expanded SI was selected to allow the Navy to expedite site closure by going from the Expanded SI to a Non-Time-Critical Removal Action (NTCRA) followed by site closure rather than

proceeding with an RI followed by a Feasibility Study, Proposed Plan, and Record of Decision. Prior to completing the SAP, a geophysical investigation, which included a digital geophysical mapping (DGM) study, and subsequent test pitting activities were completed in FY 2019 to determine the horizontal and vertical extent of the landfill boundary. The type of landfill debris ranged from materials such as concrete, bricks, and tires, to pieces of metal, part of an airplane, and empty drums. The geophysical data suggested the lateral extent of the Fentress Landfill is confined within the current site boundary. Based on field observations, geophysical surveys, and the test pit investigation, the suspected landfill extent has been calculated to be 4.84 acres with buried debris generally not exceeding 2 feet below ground surface. The Expanded SI SAP and fieldwork were completed in FY 2020. The Expanded SI Report is anticipated to be completed in FY 2021. In addition, a background investigation SAP and fieldwork are anticipated to be completed in FY 2021. An EE/CA and Action Memorandum are anticipated to be completed in FY 2022.

3.1.2 Site 17 (SWMU 64) – Fire Fighting Training Areas

Site 17 (SWMU 64) consists of three different areas that were once used for firefighting training at NALF Fentress (**Figure 3-2**). Based on historical aerial photographs, the approximate dates of use of each area are as follows: 17A, the northwest firefighting training area (1959 to 1963), 17B, the southern firefighting training area (1982 to 1990), and Site 17C, the northeast firefighting training area (1961 to 1982). Site 17A was the original firefighting training area which consisted of a burn pit with an earthen berm to ignite fuels for firefighter training exercises. This site was identified as requiring further PFAS evaluation due to the use of aqueous film-forming foam (AFFF) after groundwater samples were collected from monitoring wells and concentrations exceeded the USEPA Lifetime Health Advisory. Site 17B was the second area to be identified as a former firefighter training area after reviewing aerial photographs. Concentrations of PFAS in groundwater samples from Site 17B also exceeded the USEPA Lifetime Health Advisory and this area was determined to require further evaluation. Site 17C was also used as a former firefighter training area. This area was originally identified as a PAOI during review of historical aerial photographs based on ground discoloration.

In December 2015, Site 17 was reopened for investigation and an SI SAP was submitted to evaluate the possible presence of PFAS in groundwater. The results of the December 2015 PFAS groundwater analysis indicated that PFOS and PFOA were present in groundwater at concentrations exceeding the RSLs and the USEPA PHAs (which were later replaced by the USEPA Lifetime Health Advisory), and PFAS contamination had migrated off-installation (CH2M, 2018a). Actions taken on-installation and off-installation and planned activities as a result of PFAS contamination in groundwater are described in more detail in **Section 3.1.4**.

In January 2016, USEPA requested that the Navy review previous investigations at Site 17 to ensure there is no potential contamination (other than PFAS) which has migrated off-installation. A review of historical data identified several data gaps that needed to be addressed. The Tier I Partnering Team agreed to conduct an SSI, including analysis of groundwater samples for VOCs, SVOCs, total and dissolved metals, and dioxins/furans. The SSI fieldwork was completed in August 2017 and the Final SSI Report was submitted in December FY 2019.

Based on the HHRS completed in the Final SSI, arsenic was identified as a COPC for groundwater in the Surficial/Columbia aquifer (CH2M, 2018b). The ecological risk screening identified iron, manganese, and lead as COPCs in the Yorktown and Surficial/Columbia aquifer and cyanide as a COPC in the Surficial/Columbia aquifer. A Basewide background study was recommended to determine naturally occurring conditions before further action is taken at Site 17. The Basewide background investigation SAP and fieldwork are anticipated to be completed in FY 2021.

Because the aerial photograph study was not completed until after the Basewide PFAS SI and SSI activities were completed, these studies only included firefighting training areas 17A and 17B. Site 17C was further evaluated during the PFAS SI Addendum fieldwork and the SI Addendum Report is anticipated for completion in FY 2021.

3.1.3 Underground Storage Tank 20B

UST 20B is the location of a former underground steel tank used to store gasoline. UST 20B was located south of Building 20 near AOC D and was removed in 1993 (**Figure 3-3**). A site characterization was conducted for UST 20B in 1994 to determine the extent of contamination after the report of a release of gasoline. Soil and groundwater samples were collected and analyzed for TPH, BTEX, toxicity characteristic leaching procedure lead (soil only), and total lead (groundwater only). Results indicated petroleum-related contamination was present in the soil and groundwater. Further delineation of groundwater contamination, followed by a corrective action, was recommended, as well as limited remediation of soil (Baker, 1994). In February 1995, an additional round of data was collected for TPH and BTEX from the monitoring wells installed during the site characterization.

Based on recommendations from VDEQ, the former NALF Fentress drinking water production wells were sampled for BTEX and trichloroethene monthly for one quarter in 1995, then quarterly until 1998. In 1998, the old water production wells were closed, and new production wells were put into use (Navy, 1995, 1996a, 1996b, 1999)

During the NALF Fentress Basewide PFAS SI (CH2M, 2018a), the UST 20B monitoring wells were located and sampled to aid with characterization of the nature and extent of PFAS contamination in groundwater at NALF Fentress since they are located near the former AFFF storage area. The results of the December 2015 PFAS groundwater analysis indicated that PFOS and PFOA were present in groundwater at concentrations exceeding the RSLs and the USEPA PHA (which was later replaced by the USEPA Lifetime Health Advisory), and that PFAS contamination had migrated off-installation (CH2M, 2018a). Actions taken on-installation and off-installation and planned activities as a result of PFAS contamination in groundwater are described in more detail in **Section 3.1.4**

Due to the PFAS detections, the Navy determined that UST 20B would also be included in the NALF Fentress SSI for Site 14 and Site 17 in order to evaluate any potential impacts from contaminants other than PFAS. The Tier I Partnering Team agreed to include analysis of groundwater samples for VOCs, SVOCs, and total and dissolved metals in the SSI. The SSI fieldwork was completed in August 2017 and the Final SSI Report was submitted December 2018 (CH2M, 2018b).

Based on the HHRS during the Final SSI, benzene, naphthalene, arsenic, and cobalt were identified as COPCs for groundwater in the Surficial/Columbia aquifer (CH2M, 2018b). The ecological risk screening identified iron, manganese, and lead as COPCs in the Yorktown and Surficial/Columbia aquifer and cyanide as a COPC in the Surficial/Columbia aquifer. A Basewide background study was recommended to determine if metals concentrations are the result of a release or naturally occurring conditions. Additional investigation is recommended to address elevated concentrations of benzene and naphthalene. A background investigation SAP and fieldwork are anticipated to be completed in FY 2021.

3.1.4 Basewide PFAS Investigation

During the evaluation of potential PFAS release areas at NALF Fentress, several potential release areas were identified which were not associated with sites included in the RFA. However, these areas have been, and will continue to be, included in PFAS investigations at NALF Fentress. Potential source areas include Site 14, Site 17a, Site 17b, Site 17c, and UST 20B. On-installation results of December 2015 sampling at source areas across NALF Fentress determined that PFAS were present in both groundwater and drinking water above the PHA. PFAS chemicals are not currently regulated; however, bottled water was provided for installation employees as a precautionary measure to prevent exposure at levels greater than the PHA. In February 2016, a public information session was held to notify nearby residents of potential PFAS contamination, a community drinking water station was established, and off-installation drinking water was sampled. Based on the results of the off-installation drinking water sampling, two residences, at which concentrations of PFOS and/or PFOA exceeded the PHA, were provided with bottled water. A second public information session was held in March 2016 to update the community on the water sampling process and on the Navy's plans to address impacts from PFAS contamination of drinking water from private wells in proximity to NALF Fentress. In May 2016, six additional residences were sampled, and results indicated that there were no additional exceedances of the PHA. The USEPA then released the new Lifetime Health Advisory for total PFOS/PFOA. Due to the more conservative USEPA Lifetime Health

Advisory, four additional residences were supplied with bottled water. A third public information session was held in June 2016 to discuss the new USEPA Lifetime Health Advisory and ensure homeowners that the Navy will continue to provide an alternate drinking water source to any properties with USEPA Lifetime Health Advisory exceedances. The Navy notified the attendees that a monitoring well network would be installed to define the horizontal and vertical boundaries of the groundwater plume allow for continued monitoring of migration potential. Additional monitoring wells were installed on-installation and off-installation in FYs 2017 and 2018.

Bench scale treatability studies began in 2016 to determine the efficacy of granular activated carbon (GAC) to remove PFAS during the drinking water treatment (on- and off-installation) and wastewater treatment (on-installation only) processes. A GAC system was installed at the on-installation wastewater system in November 2016. GAC systems were installed in off-installation homes in 2017 and 2018 and testing of these systems will continue into FY 2021. Bottled water provision will continue during testing. An EE/CA to evaluate remedial action alternatives for the off-installation homes was approved by regulatory agencies in September 2018. The EE/CA recommended Alternative 3: Connection to City Water to address current exposure potential to drinking water at on-installation and off-installation properties. The public comment period and public meeting were held in early FY 2019 and the Action Memorandum was signed in April 2019.

The Basewide PFAS SI Report, which included Site 14, Site 17a, Site 17b, and UST 20B, in addition to other potential release areas, was finalized in FY 2019. Due to exceedances of the USEPA Lifetime Health Advisory, scoping with the Tier I Partnering Team for an SI Addendum began in FY 2018 and a SAP was submitted to the regulators in FY 2019. Fieldwork was completed in 2019. A PFAS PA to identify other potential sources of PFAS at NALF Fentress not previously investigated is anticipated for completion in FY 2020. The SI Addendum Report is anticipated for completion in FY 2021.

3.2 Munitions Response Program Sites

MRP sites at NALF Fentress were investigated during the PA (Malcolm Pirnie, 2008), Aerial Photographic Analysis of NALF Fentress (CH2M, 2019a), and the 1986 Master Plan for NAS Oceana (NAVFAC, 1986). **Figure 2-1** shows the MRP site locations at NALF Fentress. The following sections describe the history, investigations, and planned activities for all active MRP sites (**Table 3-1**).

3.2.1 UXO 09 – Dive Bombing Targets

Two adjacent former DBTs are located northwest of the runway in a currently forested and undeveloped area (**Figure 3-4**). Although these targets were not portrayed in maps later than 1955, clear disturbances can be seen through aerial photography dates ranging from 1949 through 1961 (CH2M, 2018a). Each target is approximately 6.5 acres in size and the total area of the site, including potential MRP-impact area for the DBTs, is estimated to be 82.5 acres. Probable munitions used at the DBTs include practice bombs, MK4 signal cartridges, spotting/witness charges, and bomb signal cartridges (Malcolm Pirnie, 2008).

SI activities were conducted in 2009 and 2010 and included a magnetometer surface inspection and reconnaissance-level DGM survey at the north and south DBTs (CH2M, 2011). Three AN-MK23 practice bombs and an unfuzed M18 Signal Smoke Grenade were identified on the ground surface at the south DBT, and several subsurface anomalies were identified at both the north and south DBTs. As a result, the SI recommended further investigation, including additional vegetation removal and DGM survey activities with positioning at a high enough accuracy for reacquisition of anomalies. The SI also recommended an intrusive investigation to inspect and identify a selected subset of the anomalies. Munitions constituent (MC) sampling was recommended if the sources of the anomalies were identified as munitions and explosives of concern (MEC). Expanded SI activities, which included an intrusive investigation to evaluate select anomalies, were completed in March 2013 and identified AN-MK 23 practice bombs in the subsurface at the former DBTs (CH2M, 2015). Following the Expanded SI, the site moved into the RI phase to determine the extent of MEC and the hazards posed by the MEC. MC were not included within the RI as the MEC encountered during the Expanded SI were practice rounds that did not contain high explosives, only black powder as an expelling charge for the spotting cartridges.

A pre-RI reconnaissance conducted in March 2013 identified AN-MK 23 practice bombs in the subsurface at the former DBTs, and an RI was recommended to characterize the nature and extent of MEC and material potentially presenting an explosive hazard (MPPEH). The RI was implemented in three phases; Phase 1 was conducted November 2013 through March 2014; Phase 2 was conducted January 2015 through May 2015; and Phase 3 was conducted August 2017 through November 2017.

The general fieldwork approach for each phase included site setup, surface inspection of potential MEC/MPPEH and metal scrap, DGM survey, intrusive investigation of selected geophysical anomalies, and MEC/MPPEH management and processing, as follows:

- Phase 1 – DGM was conducted along transects split between the North and South DBT areas. DGM was conducted along 87 transects spaced at approximately 10 meters (33 feet) throughout 52.9 acres.
- Phase 2 – DGM was conducted in four areas along an additional 41 transects spaced at approximately 10 meters throughout 26.9 acres. Surface inspection activities were also performed across the entire site (including the Phase 1 area) concurrently.
- Phase 3 – DGM was conducted for an additional 2.7 acres in Area 40 along 10 transects spaced at approximately 10 meters.

A total of 196 AN-MK23 practice bombs were recovered during the pre-RI reconnaissance, RI, and surface inspection activities—34 were recovered from the surface and 162 from the subsurface. All practice bombs identified were classified material documented as safe. Four MEC items were found during RI and surface inspection activities: two Simulator Projectile Airbursts (used to simulate the airburst of artillery and propelled from a grenade launcher), one MK1 Hand Grenade (illumination), and one M49 Ground Signal Flare.

The RI/Feasibility Study Report summarizing the results of the previous investigations, RI activities, and the evaluation of remedial alternatives to address the explosive hazard at the site was completed in August 2019 (CH2M, 2019b). The Proposed Remedial Action Plan and Record of Decision are anticipated to be completed in FY 2021. Following completion of the Record of Decision, the Remedial Action Work Plan and Remedial Action Completion Report are anticipated for completion in FY 2022.

3.2.2 UXO 10 – Machine Gun Boresight Range

The former MGBR (**Figure 3-5**) at NALF Fentress encompasses about 1 acre and lies southwest of Runway 1-19, on the northern portion of the NALF Fentress facility (**Figure 2-1**). The southwestern half of the site is overgrown with brush and trees and features a deteriorating concrete range backstop and soil berm.

The site was initially used as a maintenance and testing range for aircraft-mounted machine guns but was later converted to a pistol range (Malcolm Pirnie, 2008). Ammunition used at the former MGBR was likely limited to .50- and .30-caliber rounds for aircraft guns. Additionally, expended 7-millimeter (mm), 9-mm, .38- and .30-caliber, and shotgun rounds have been found (Malcolm Pirnie, 2008); however, the additional rounds appeared to be from more recent, recreational use. Potential sources of contamination present at the former range are debris related to small-arms firing range ammunition; potential MC associated with these types of ammunition are lead, antimony, arsenic, copper, nickel, and zinc (Malcolm Pirnie, 2008).

The SI, which evaluated surface and subsurface soil, identified antimony, copper, lead, and zinc as COPCs in soil. All COPC results exceed established background values for eastern Virginia (Gustavsson et al., 2001) and the eastern United States (Shacklette and Boerngen, 1984), indicating a potential release occurred at the site. Based on the HHRS and ecological evaluations, potential unacceptable human health and ecological risks were identified for both surface soil and subsurface soil (CH2M, 2012).

An Expanded SI sampling was conducted in December 2013 and 2014 to further delineate the horizontal and vertical extent of COPCs exceeding human health and ecological screening levels and to assess site-specific background. Lead was the primary contaminant observed at the MGBR, exceeding the human health and/or ecological screening levels throughout much of the site. The results of the Expanded SI sampling indicated that

metals contamination exceeding screening levels extended beyond the toe of the berm, and that additional investigation was needed to fully delineate the horizontal and vertical extent of the soil COPCs (CH2M, 2015).

A NTCRA EE/CA (CH2M, 2017a) and Action Memorandum (CH2M, 2017b) to address contaminated soil at the site were finalized in July 2017 and August 2017, respectively. The recommended alternative was removal of the contaminated soil. A public notice was published in the local newspaper in June 2017 for public review of the EE/CA, and no comments were received during the comment period. The NTCRA was completed in July 2019 and the associated Construction Completion Report was finalized in September 2019 (APTIM, 2019). The Decision Document was signed by the Navy and VDEQ in September 2019 recommending No Further Action (CH2M, 2019c). The Decision Document is provided in **Appendix A**. With the No Further Action determination, detailed information for UXO 10 will not be provided in subsequent SMPs.

3.2.3 Magazine Storage Area

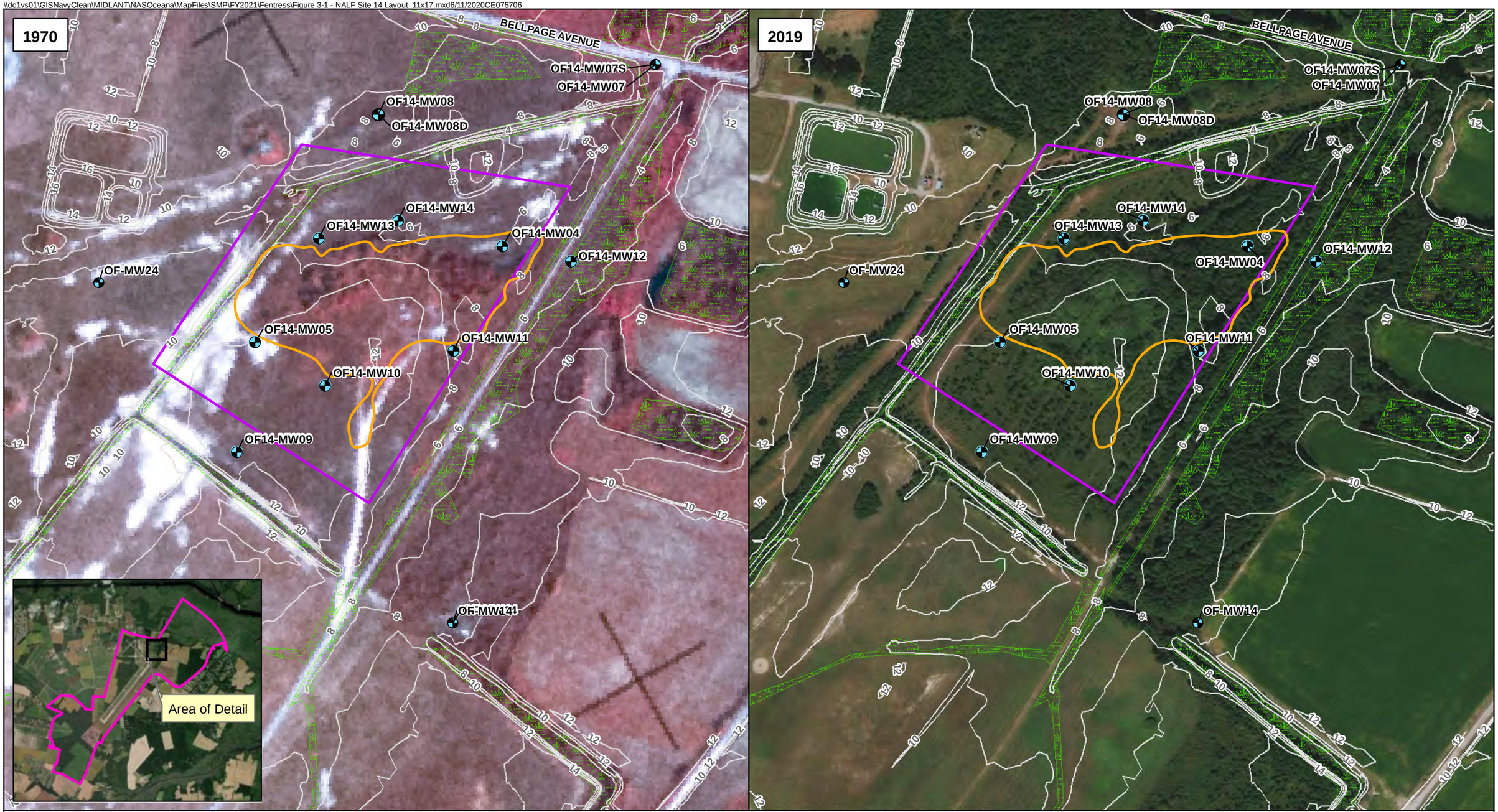
The Magazine Storage Area (**Figure 3-6**) was identified as PAOI 2 in the aerial photograph analysis report (CH2M, 2019a). The Magazine Storage Area consists of five ammunition and explosive storage magazines (Buildings 73-77) and one inert material storage building (Building 78). An SI is in progress to determine if MEC/MPPEH are present due to historical activities and if so, determine the nature of the associated threat(s). SI field activities are anticipated to be completed in FY 2020 and an SI report is anticipated to be completed in FY 2021.

Table 3-1. Current Status Summary of Active Munitions Response Program Sites
Naval Auxiliary Landing Field Fentress, Site Management Plan for FY 2021

Site Number	MRP Site Name	PA	SI	SI Recommendation	Expanded SI	NTCRA	RI/FS	PRAP	DD/ROD	Path Forward
UXO 9	NALF Fentress Dive Bombing Targets	Oct-08	Feb-11	Further Investigation	Mar-13	-	Aug-19	FY 2021	FY 2021	PRAP/ROD anticipated during FY 2021
UXO 10	NALF Fentress Machine Gun Boresight Range	Oct-08	Jan-11	Further Investigation	Dec-13	Jul-19	-	-	Sep-19	None
NA	NALF Fentress Magazine Storage Area	NA	FY 2021	-	-	-	-	-	-	SI anticipated during FY 2021

Notes:
DD = Decision Document
FY = fiscal year
NA = Not Applicable
NALF = Naval Auxiliary Landing Field
NTCRA = Non-Time-Critical Removal Action
PA = Preliminary Assessment
RI/FS = Remedial Investigation/Feasibility Study
SI = Site Inspection
UXO = unexploded ordnance

\\dc1vs01\GISNavyClean\MIDLANT\NASOceana\MapFiles\SMP\FY2021\Fentress\Figure 3-1 - NALF Site 14 Layout_11x17.mxd6/11/2020CE075706



Legend

- Monitoring Well
- Elevation Contour (2 ft interval)
- Wetland
- Suspected Landfill Boundary Based on DGM Results and Test Pit Excavations
- Site Boundary
- NALF Fentress Boundary

N
W E
S

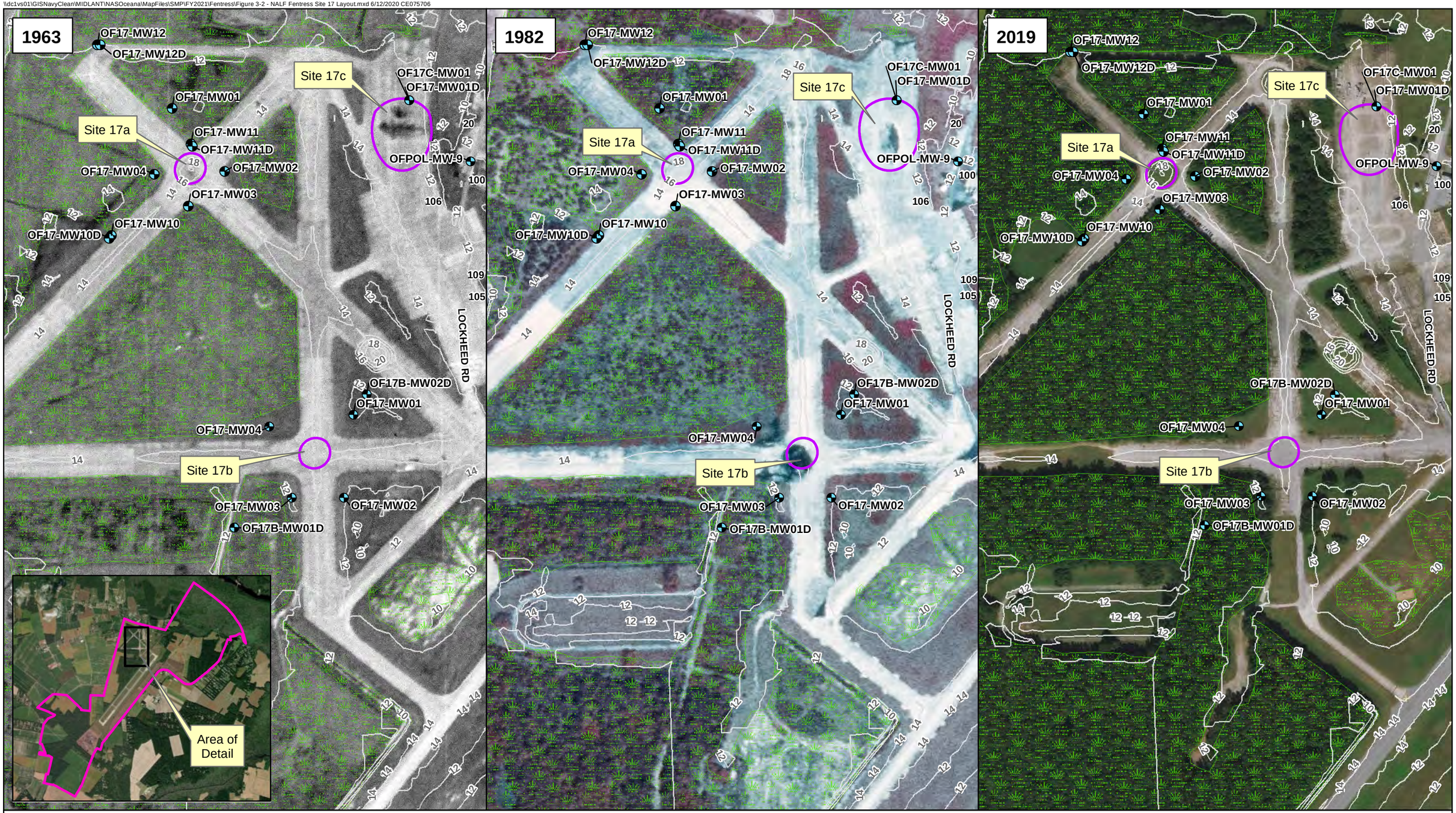
0 125 250
Feet

Imagery Source: ©2019, Esri

Figure 3-1
Site 14 - Fentress Landfill Layout
NALF Fentress
Chesapeake, Virginia

ch2m.

\\dc1vs01\GISNavyClean\MIDLANT\NASOceana\MapFiles\SMP\FY2021\Fentress\Figure 3-2 - NALF Fentress Site 17 Layout.mxd 6/12/2020 CE075706



Legend

- Monitoring Well
- Elevation Contour (2 ft interval)
- Fire Fighting Training Area
- Wetland
- NALF Fentress Boundary

N
W E
S

0 200 400
Feet

Figure 3-2
Site 17 - Fire Fighting Training Area Layout
NALF Fentress
Chesapeake, Virginia

ch2m:

\\dc1vs01\GISNavyClean\MIDLANT\NASOceana\MapFiles\SMP\FY2021\Fentress\Figure 3-3 - Underground Storage Tank 20B.mxd6/12/2020CE075706

Legend
- Monitoring Well
- Elevation Contour (2 ft interval)
- Site Location

N
W E
S

0 25 50
Feet

Imagery: Esri, 2019

Figure 3-3
Underground Storage Tank 20B
NALF Fentress
Chesapeake, Virginia

ch2m

\\brooksidefiles\GIS_SHARE\ENBG\00_Proj\N\Navy\CLEAN\MIDLANT\NASOceana\MapFiles\SMP\FY2019\Fentress\Figure 3-4 - NALF Dive Bombing Targets Layout_11x17.mxd 9/14/2018 AM 038876

Legend

- Elevation Contour (2 ft interval)
- MRP Site Boundary
- Target Area
- Wetland
- NALF Fentress Boundary

N
W E
S

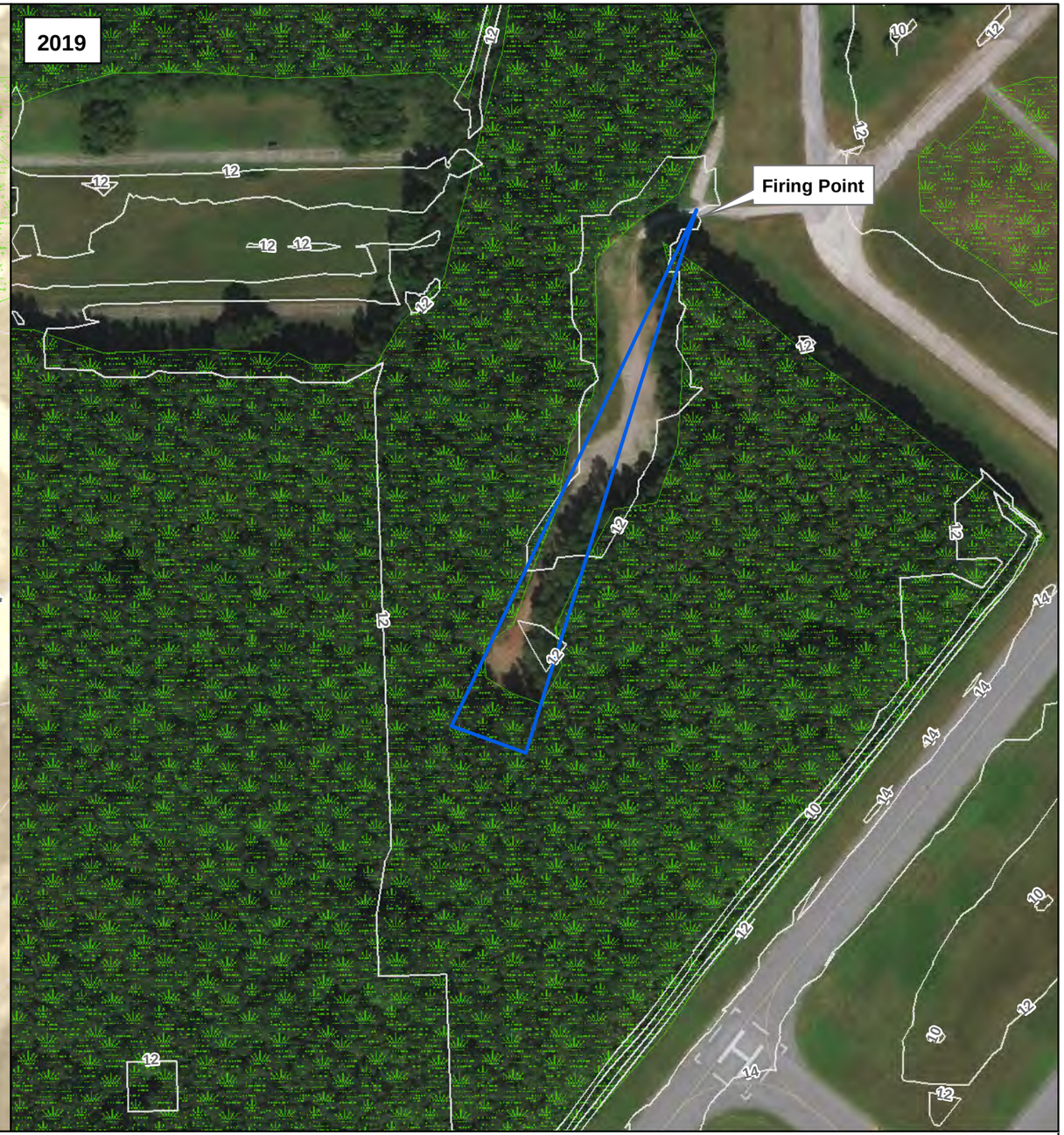
0 250 500
Feet

Imagery Source: ©2017, Esri

Figure 3-4
UXO 09 - Dive Bombing Targets Layout
NALF Fentress
Chesapeake, Virginia

ch2m

\\dc1vs01\GISNavyClean\MIDLANT\NASOceana\MapFiles\SMP\FY2021\Fentress\Figure 3-5 - NALF MGBR Layout_11x17.mxd6/11/2020CE075706



Legend

- Elevation Contour (2 ft interval)
- MRP Site Boundary - NFA
- Wetland
- NALF Fentress Boundary

N
W E
S

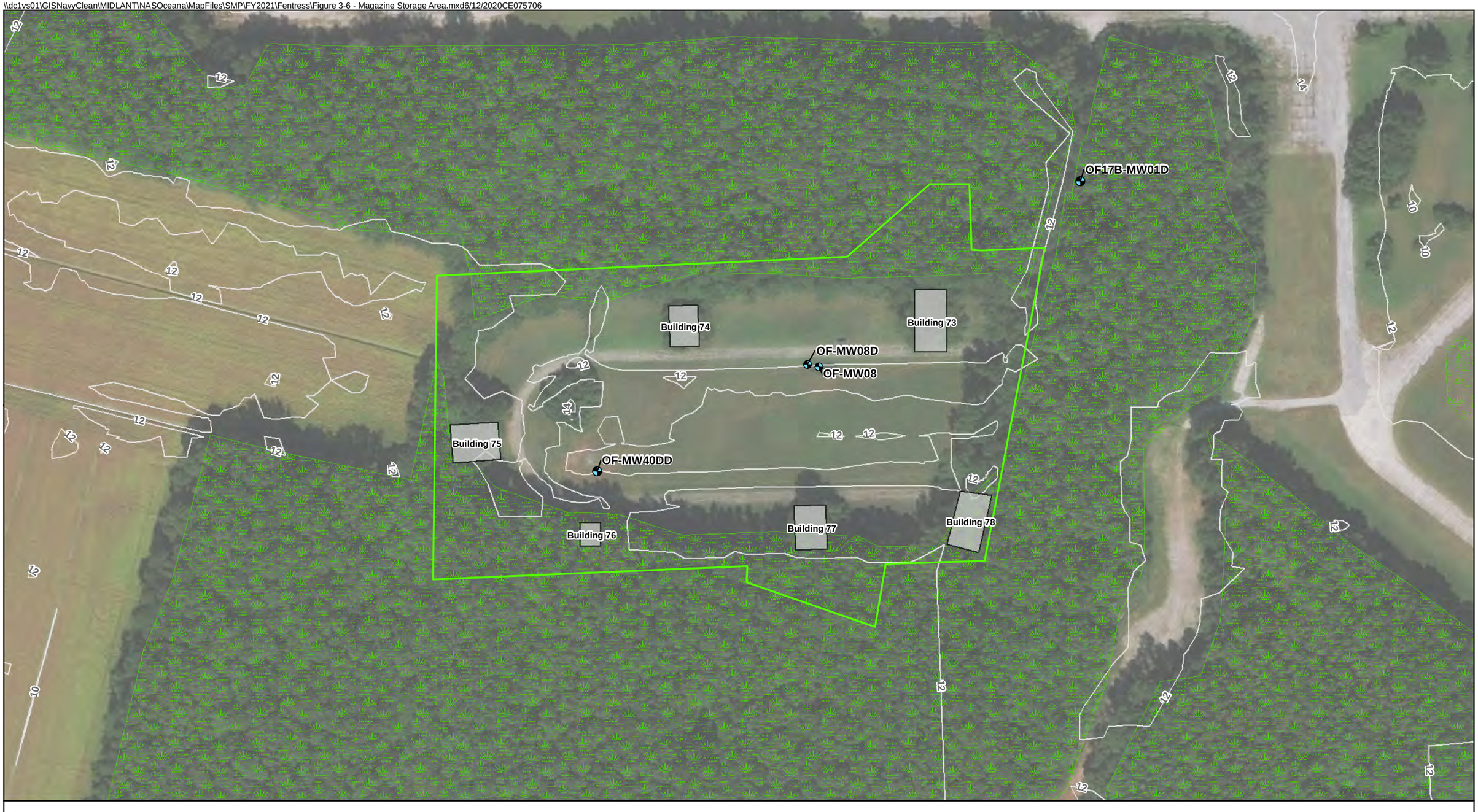
0 100 200
Feet

Imagery: Esri, 2019

Figure 3-5
UXO 10 - Machine Gun Boresight Range Layout
NALF Fentress
Chesapeake, Virginia

ch2m.

\\dc1vs01\GISNavyClean\MIDLANT\NASOceana\MapFiles\SMP\FY2021\Fentress\Figure 3-6 - Magazine Storage Area.mxd6/12/2020CE075706



Legend
- Monitoring Well
- Elevation Contour (2 ft interval)
- Wetland
- Current and Former Building Location
- Magazine Storage Area Boundary

N
W E
S

0 75 150
Feet

Imagery: Esri, 2019

Figure 3-6
Magazine Storage Area
NALF Fentress
Chesapeake, Virginia

ch2m.

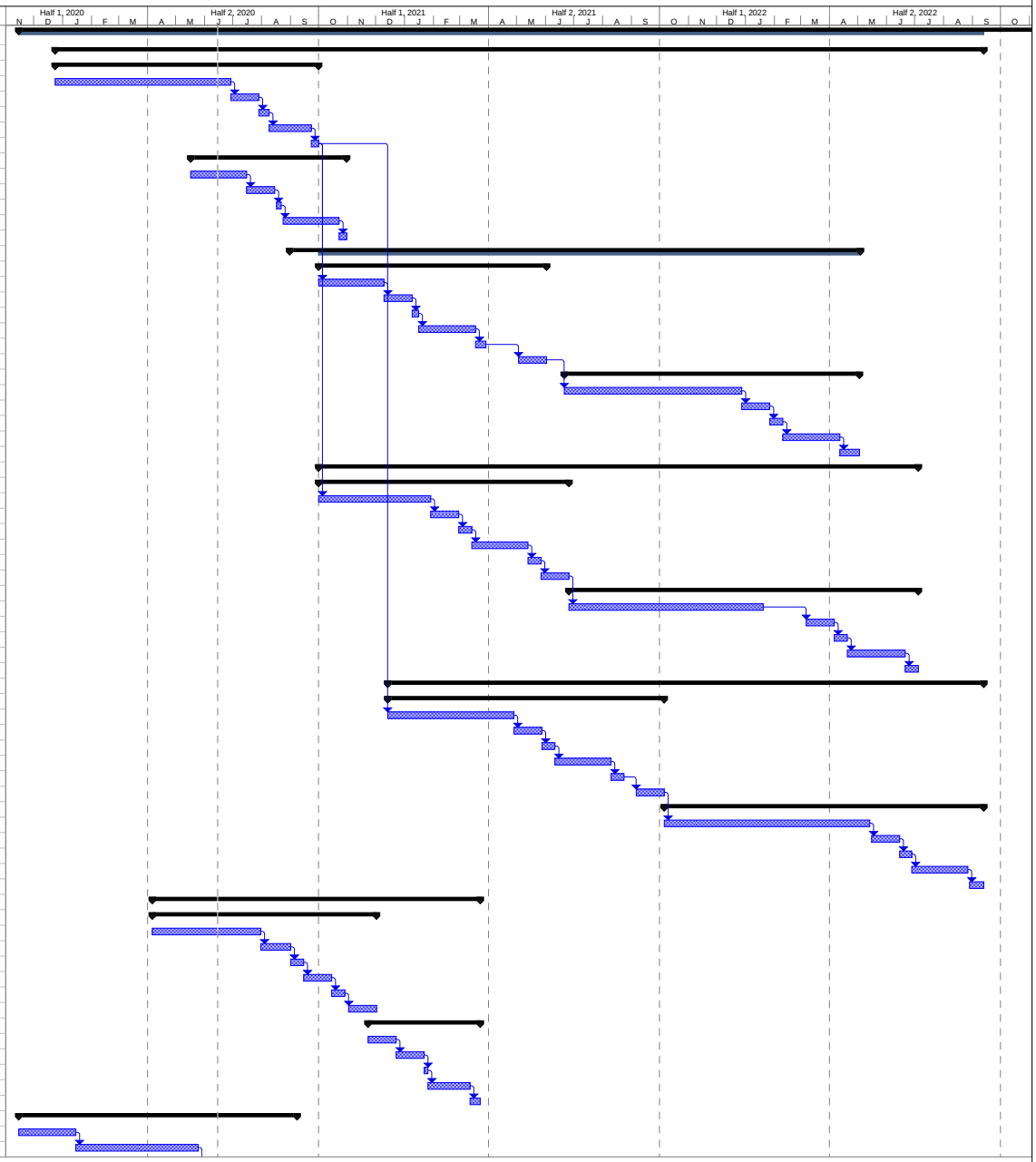
SECTION 4

Management Schedules for Active Sites and SWMUs

The current active SWMUs and site management schedules are shown on the figures at the end of this section. Projected schedules for active IRP and MRP sites are shown on **Figure 4-1**.

Figure 4-1
Schedule for NALF Fentress IRP and MRP Sites
FY 2021

ID	Task Name	Duration	Start	Finish	Notes
1	**NALF Fentress**	**1245 days**	**Fri 11/15/19**	**Wed 4/12/23**	
2	**Basewide PFAS Investigation**	**994 days**	**Tue 12/24/19**	**Mon 9/12/22**	
3	**Preliminary Assessment**	**282 days**	**Tue 12/24/19**	**Wed 9/30/20**	
4	Preliminary Draft Generation	188 days	Tue 12/24/19	Sun 6/28/20	
5	Navy Review of Preliminary Draft	30 days	Mon 6/29/20	Tue 7/28/20	
6	Navy RTCs and Draft Generation	11 days	Wed 7/29/20	Sat 8/8/20	
7	Regulator Review of Draft	45 days	Sun 8/9/20	Tue 9/22/20	
8	Regulator RTCs and Final Generation	8 days	Wed 9/23/20	Wed 9/30/20	
9	**Site Inspection Addendum Report**	**167 days**	**Sun 5/17/20**	**Fri 10/30/20**	
10	Preliminary Draft Generation	60 days	Sun 5/17/20	Wed 7/15/20	
11	Navy Review of Preliminary Draft	30 days	Thu 7/16/20	Fri 8/14/20	
12	Navy RTCs and Draft Generation	5 days	Mon 8/17/20	Fri 8/21/20	
13	Regulator Review of Draft	60 days	Mon 8/24/20	Thu 10/22/20	
14	Regulator RTCs and Final Generation	8 days	Fri 10/23/20	Fri 10/30/20	
15	**Remedial Investigation (AOC 1)**	**611 days**	**Mon 8/31/20**	**Tue 5/3/22**	
16	**Remedial Investigation SAP**	**244 days**	**Thu 10/1/20**	**Tue 6/1/21**	
17	Preliminary Draft Generation	70 days	Thu 10/1/20	Wed 12/9/20	
18	Navy Review of Preliminary Draft	30 days	Thu 12/10/20	Fri 1/8/21	
19	Navy RTCs and Draft Generation	7 days	Sat 1/9/21	Fri 1/15/21	
20	Regulator Review of Draft	61 days	Sat 1/16/21	Wed 3/17/21	
21	Regulator RTCs and Final Generation	11 days	Thu 3/18/21	Sun 3/28/21	
22	Field Work	30 days	Mon 5/3/21	Tue 6/1/21	
23	**Remedial Investigation Report**	**316 days**	**Mon 6/21/21**	**Mon 5/2/22**	
24	Preliminary Draft Generation	190 days	Mon 6/21/21	Mon 12/27/21	
25	Navy Review of Preliminary Draft	30 days	Tue 12/28/21	Wed 1/26/22	
26	Navy RTCs and Draft Generation	14 days	Thu 1/27/22	Wed 2/9/22	
27	Regulator Review of Draft	61 days	Thu 2/10/22	Mon 4/11/22	
28	Regulator RTCs and Final Generation	21 days	Tue 4/12/22	Mon 5/2/22	
29	**Remedial Investigation (AOC 2)**	**642 days**	**Thu 10/1/20**	**Mon 7/4/22**	
30	**Remedial Investigation SAP**	**268 days**	**Thu 10/1/20**	**Fri 6/25/21**	
31	Preliminary Draft Generation	120 days	Thu 10/1/20	Thu 1/28/21	
32	Navy Review of Preliminary Draft	30 days	Fri 1/29/21	Sat 2/27/21	
33	Navy RTCs and Draft Generation	14 days	Sun 2/28/21	Sat 3/13/21	
34	Regulator Review of Draft	60 days	Sun 3/14/21	Wed 5/12/21	
35	Regulator RTCs and Final Generation	14 days	Thu 5/13/21	Wed 5/26/21	
36	Field Work	30 days	Thu 5/27/21	Fri 6/25/21	
37	**Remedial Investigation Report**	**374 days**	**Sat 6/26/21**	**Mon 7/4/22**	
38	Preliminary Draft Generation	208 days	Sat 6/26/21	Wed 1/19/22	
39	Navy Review of Preliminary Draft	30 days	Mon 3/7/22	Tue 4/5/22	
40	Navy RTCs and Draft Generation	14 days	Wed 4/6/22	Tue 4/19/22	
41	Regulator Review of Draft	62 days	Wed 4/20/22	Mon 6/20/22	
42	Regulator RTCs and Final Generation	14 days	Tue 6/21/22	Mon 7/4/22	
43	**Remedial Investigation (AOC 3)**	**638 days**	**Mon 12/14/20**	**Mon 9/12/22**	
44	**Remedial Investigation SAP**	**296 days**	**Mon 12/14/20**	**Tue 10/5/21**	
45	Preliminary Draft Generation	135 days	Mon 12/14/20	Tue 4/27/21	
46	Navy Review of Preliminary Draft	30 days	Wed 4/28/21	Thu 5/27/21	
47	Navy RTCs and Draft Generation	14 days	Fri 5/28/21	Thu 6/10/21	
48	Regulator Review of Draft	60 days	Fri 6/11/21	Mon 8/9/21	
49	Regulator RTCs and Final Generation	14 days	Tue 8/10/21	Mon 8/23/21	
50	Field Work	30 days	Mon 9/6/21	Tue 10/5/21	
51	**Remedial Investigation Report**	**342 days**	**Wed 10/6/21**	**Mon 9/12/22**	
52	Preliminary Draft Generation	220 days	Wed 10/6/21	Fri 5/13/22	
53	Navy Review of Preliminary Draft	30 days	Mon 5/16/22	Tue 6/14/22	
54	Navy RTCs and Draft Generation	13 days	Wed 6/15/22	Mon 6/27/22	
55	Regulator Review of Draft	60 days	Tue 6/28/22	Fri 8/26/22	
56	Regulator RTCs and Final Generation	15 days	Mon 8/29/22	Mon 9/12/22	
57	**Basewide Background Investigation**	**351 days**	**Mon 4/6/20**	**Mon 3/22/21**	
58	**Background Investigation SAP**	**240 days**	**Mon 4/6/20**	**Tue 12/1/20**	
59	Preliminary Draft Generation	116 days	Mon 4/6/20	Thu 7/30/20	
60	Navy Review of Preliminary Draft	32 days	Fri 7/31/20	Mon 8/31/20	
61	Navy RTCs and Draft Generation	14 days	Tue 9/1/20	Mon 9/14/20	
62	Regulator Review of Draft	30 days	Tue 9/15/20	Wed 10/14/20	
63	Regulator RTCs and Final Generation	14 days	Thu 10/15/20	Wed 10/28/20	
64	Field Work	30 days	Mon 11/2/20	Tue 12/1/20	
65	**Background Investigation Report**	**120 days**	**Mon 11/23/20**	**Mon 3/22/21**	
66	Preliminary Draft Generation	30 days	Mon 11/23/20	Tue 12/22/20	
67	Navy Review of Preliminary Draft	30 days	Wed 12/23/20	Thu 1/21/21	
68	Navy RTCs and Draft Generation	4 days	Fri 1/22/21	Mon 1/25/21	
69	Regulator Review of Draft	45 days	Tue 1/26/21	Thu 3/11/21	
70	Regulator RTCs and Final Generation	11 days	Fri 3/12/21	Mon 3/22/21	
71	**Community Involvement Plan**	**298 days**	**Fri 11/15/19**	**Mon 9/7/20**	
72	Preliminary Draft Generation	61 days	Fri 11/15/19	Tue 1/14/20	
73	Navy Review of Preliminary Draft	131 days	Wed 1/15/20	Sun 5/24/20	

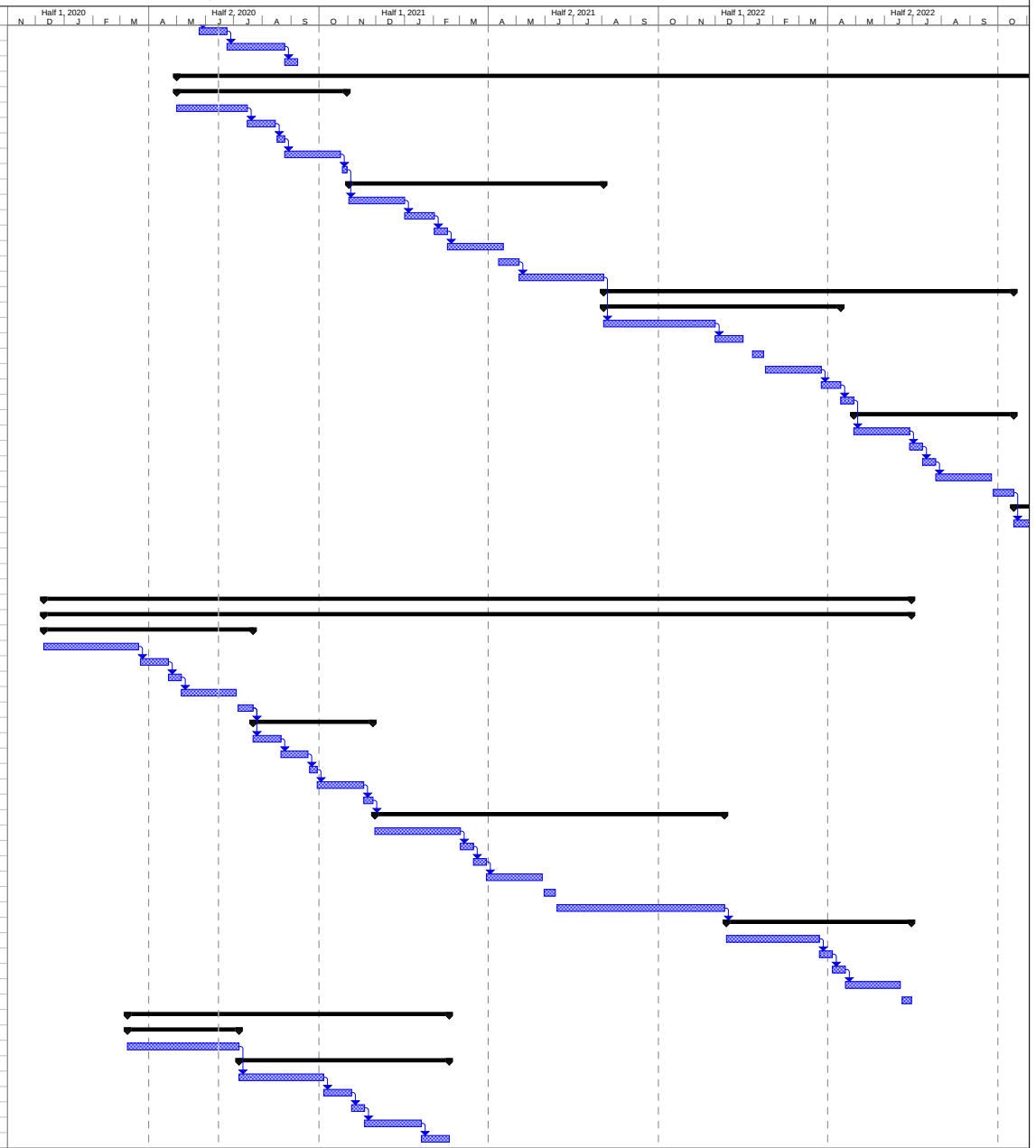


Date: Mon 6/15/20

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

Figure 4-1
Schedule for NALF Fentress IRP and MRP Sites
FY 2021

ID	Task Name	Duration	Start	Finish	Notes
74	Navy RTCs and Draft Generation	30 days	Mon 5/25/20	Tue 6/23/20	
75	Regulator Review of Draft	62 days	Wed 6/24/20	Mon 8/24/20	
76	Regulator RTCs and Final Generation	14 days	Tue 8/25/20	Mon 9/7/20	
77	**Site 14**	**1077 days**	**Fri 5/1/20**	**Wed 4/12/23**	
78	**Expanded Site Inspection Report**	**183 days**	**Fri 5/1/20**	**Fri 10/30/20**	
79	Preliminary Draft Generation	76 days	Fri 5/1/20	Wed 7/15/20	
80	Navy Review of Preliminary Draft	30 days	Thu 7/16/20	Fri 8/14/20	
81	Navy RTCs and Draft Generation	8 days	Mon 8/17/20	Mon 8/24/20	
82	Regulator Review of Draft	60 days	Tue 8/25/20	Fri 10/23/20	
83	Regulator RTCs and Final Generation	5 days	Mon 10/26/20	Fri 10/30/20	
84	**Engineering Estimate/Cost Analysis (EE/CA)**	**274 days**	**Mon 11/2/20**	**Mon 8/2/21**	
85	Preliminary Draft Generation	60 days	Mon 11/2/20	Thu 12/31/20	
86	Navy Review of Preliminary Draft	32 days	Fri 1/1/21	Mon 2/1/21	
87	Navy RTCs and Draft Generation	14 days	Tue 2/2/21	Mon 2/15/21	
88	Regulator Review of Draft	60 days	Tue 2/16/21	Fri 4/16/21	
89	Regulator RTCs and Final Generation	22 days	Mon 4/12/21	Mon 5/3/21	
90	Prepare Action Memorandum for Signature	91 days	Tue 5/4/21	Mon 8/2/21	
91	**Removal Action**	**441 days**	**Tue 8/3/21**	**Mon 10/17/22**	
92	**Removal Action SAP**	**255 days**	**Tue 8/3/21**	**Thu 4/14/22**	
93	Preliminary Draft Generation	120 days	Tue 8/3/21	Tue 11/30/21	
94	Navy Review of Preliminary Draft	30 days	Wed 12/1/21	Thu 12/30/21	
95	Navy RTCs and Draft Generation	12 days	Mon 1/10/22	Fri 1/21/22	
96	Regulator Review of Draft	60 days	Mon 1/24/22	Thu 3/24/22	
97	Regulator RTCs and Final Generation	21 days	Fri 3/25/22	Thu 4/14/22	
98	**Fieldwork**	**14 days**	**Fri 4/15/22**	**Thu 4/28/22**	
99	**Construction Completion Report**	**172 days**	**Fri 4/29/22**	**Mon 10/17/22**	
100	Preliminary Draft Generation	60 days	Fri 4/29/22	Mon 6/27/22	
101	Navy Review of Preliminary Draft	14 days	Tue 6/28/22	Mon 7/11/22	
102	Navy RTCs and Draft Generation	14 days	Tue 7/12/22	Mon 7/25/22	
103	Regulator Review of Draft	60 days	Tue 7/26/22	Fri 9/23/22	
104	Regulator RTCs and Final Generation	22 days	Mon 9/26/22	Mon 10/17/22	
105	**No Further Action Decision Document**	**177 days**	**Tue 10/18/22**	**Wed 4/12/23**	
106	Preliminary Draft Generation	60 days	Tue 10/18/22	Fri 12/16/22	
107	Navy Review of Preliminary Draft	15 days	Mon 12/19/22	Mon 1/2/23	
108	Navy RTCs and Draft Generation	10 days	Tue 1/3/23	Thu 1/12/23	
109	Regulator Review of Draft	60 days	Fri 1/13/23	Mon 3/13/23	
110	Regulator RTCs and Final Generation	30 days	Tue 3/14/23	Wed 4/12/23	
111	**MRP Sites**	**933 days**	**Tue 12/10/19**	**Wed 6/29/22**	
112	**UXO 09 - NALF Fentress Dive Bombing Targets**	**933 days**	**Tue 12/10/19**	**Wed 6/29/22**	
113	**PRAP**	**225 days**	**Tue 12/10/19**	**Tue 7/21/20**	
114	Preliminary Draft Generation	102 days	Tue 12/10/19	Fri 3/20/20	
115	Navy Review of Preliminary Draft	30 days	Mon 3/23/20	Tue 4/21/20	
116	Navy RTCs and Draft Generation	14 days	Wed 4/22/20	Tue 5/5/20	
117	Regulator Review of Draft	59 days	Wed 5/6/20	Fri 7/3/20	
118	Regulator RTCs and Final Generation	16 days	Mon 7/6/20	Tue 7/21/20	
119	**ROD**	**129 days**	**Wed 7/22/20**	**Fri 11/27/20**	
120	Preliminary Draft Generation	30 days	Wed 7/22/20	Thu 8/20/20	
121	Navy Review of Preliminary Draft	29 days	Fri 8/21/20	Fri 9/18/20	
122	Navy RTCs and Draft Generation	8 days	Mon 9/21/20	Mon 9/28/20	
123	Regulator Review of Draft	50 days	Tue 9/29/20	Tue 11/17/20	
124	Regulator RTCs and Final Generation	10 days	Wed 11/18/20	Fri 11/27/20	
125	**Remedial Action Work Plan**	**376 days**	**Mon 11/30/20**	**Fri 12/10/21**	
126	Preliminary Draft Generation	92 days	Mon 11/30/20	Mon 3/1/21	
127	Navy Review of Preliminary Draft	14 days	Tue 3/2/21	Mon 3/15/21	
128	Navy RTCs and Draft Generation	14 days	Tue 3/16/21	Mon 3/29/21	
129	Regulator Review of Draft	60 days	Tue 3/30/21	Fri 5/28/21	
130	Regulator RTCs and Final Generation	12 days	Mon 5/31/21	Fri 6/11/21	
131	Removal Action Field Work	180 days	Mon 6/14/21	Fri 12/10/21	
132	**Remedial Action Completion Report**	**199 days**	**Mon 12/13/21**	**Wed 6/29/22**	
133	Preliminary Draft Generation	100 days	Mon 12/13/21	Tue 3/22/22	
134	Navy Review of Preliminary Draft	14 days	Wed 3/23/22	Tue 4/5/22	
135	Navy RTCs and Draft Generation	14 days	Wed 4/6/22	Tue 4/19/22	
136	Regulator Review of Draft	59 days	Wed 4/20/22	Fri 6/17/22	
137	Regulator RTCs and Final Generation	10 days	Mon 6/20/22	Wed 6/29/22	
138	**PAOI 2 - Magazine Storage Area**	**346 days**	**Mon 3/9/20**	**Wed 2/17/21**	
139	**Site Inspection QAPP**	**120 days**	**Mon 3/9/20**	**Mon 7/6/20**	
140	Fieldwork	120 days	Mon 3/9/20	Mon 7/6/20	
141	**Site Inspection Report**	**226 days**	**Tue 7/7/20**	**Wed 2/17/21**	
142	Preliminary Draft Generation	91 days	Tue 7/7/20	Mon 10/5/20	
143	Navy Review of Preliminary Draft	30 days	Tue 10/6/20	Wed 11/4/20	
144	Navy RTCs and Draft Generation	14 days	Thu 11/5/20	Wed 11/18/20	
145	Regulator Review of Draft	61 days	Thu 11/19/20	Mon 1/18/21	
146	Regulator RTCs and Final Generation	30 days	Tue 1/19/21	Wed 2/17/21	



Date: Mon 6/15/20

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

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Appendix A
Tier I Partnering Team Consensus Statements

TECHNICAL MEMORANDUM

Decision Document for No Further Action at the Former Machine Gun Boresight Range, Naval Auxiliary Landing Field Fentress, Chesapeake, Virginia

PREPARED FOR:	Angela Jones – NAVFAC Mid-Atlantic Stephen Mihalko -- Virginia Department of Environmental Quality
PREPARED BY:	CH2M HILL
DATE:	September 18, 2019

This Technical Memorandum (TM) documents approval of No Further Action (NFA) at the Naval Auxiliary Landing Field (NALF) Fentress Former Machine Gun Boresight Range (MGBR), located in Chesapeake, Virginia. This TM includes a summary of the site background, previous investigations, and the solid waste removal activities conducted at the site. In 2017, the Navy and Virginia Department of Environmental Quality (VDEQ) agreed that the impacted soil at the site would be removed as part of a Non-Time Critical Removal Action (NTCRA), as documented in the Engineering Evaluation/Cost Analysis (EE/CA) (CH2M, 2017a) and Action Memorandum (CH2M, 2017b). The NTCRA and site restoration activities were completed by APTIM Federal Services LLC (APTIM) in July 2019.

After completion of the NTCRA, NFA is warranted for the NALF Fentress MGBR as it meets the statutory requirements of CERCLA and is protective of human health and the environment, complies with Federal and Commonwealth regulations that are applicable or relevant and appropriate, and allows for unlimited use and unrestricted exposure to the site. There are no hazardous substances remaining at unacceptable levels at the NALF Fentress MGBR. Background documents relevant to this site are provided in the Administrative Record; a brief summary of the site, environmental investigations and removal actions, along with the no further action consensus statement is provided in this TM.

Background

NALF Fentress is located in Chesapeake, Virginia, approximately 7 miles southwest of Naval Air Station Oceana. Established in 1940, the installation encompasses just over 2,500 acres and approximately 8,700 acres in restrictive easements. The former MGBR at NALF Fentress encompasses approximately 1 acre and lies southwest of Runway 1-19, on the northern portion of the facility. The site was initially used as a maintenance and testing range for aircraft-mounted machine guns, but was later converted to a pistol range, as shown on a 1974 archival map (Malcolm Pirnie, 2008). The former MGBR is oriented northeast-southwest, with the former firing point at the northernmost end and a concrete backstop located in the southwestern portion of the site.

Ammunition used at the former MGBR was historically reported to consist of .50- and .30-caliber rounds for aircraft guns. Additionally, expended 7-millimeter (mm), 9-mm, .38- and .30-caliber, and shotgun rounds were observed at the site during a site reconnaissance by Malcolm Pirnie in 2007 (Malcolm Pirnie, 2008) and by CH2M HILL (CH2M) in 2009; however, the additional rounds appeared to be from more-recent, recreational use.

Previous Investigations

Previous investigations at the NALF Fentress MGBR included the 2010 Site Inspection and the 2013-2014 Expanded Site Inspection. The proposed site remedy was evaluated and documented in the 2017 EE/CA.

2010 Site Inspection

In June 2010, initial Site Inspection (SI) field activities were conducted at the former MGBR. Soil sampling areas were visually inspected for evidence of past site use related to military munitions. At the site, .223-caliber small arms projectiles and jackets, .45-caliber cartridges, .30-caliber machine gun rounds, 9-mm pistol rounds, and shotgun rounds were found on the ground surface of the soil berm. In addition, significant bullet scarring was observed on the backstop of the former range site (CH2M, 2012). Soil sample collection was also part of the 2010 SI. Discrete surface and subsurface soil samples were collected from the soil berm at the site. Subsurface soil samples were dug following the trajectory (horizontally) of the bullet into the berm (instead of vertically). Samples were analyzed for antimony, arsenic, copper, lead, nickel, and zinc and the results indicated potentially unacceptable risks; therefore, an Expanded Site Inspection (ESI) was recommended.

2013-2014 Expanded Site Inspection

In order to better define the horizontal and vertical extent of contamination in preparation for remediation activities, ESI activities were performed in December 2013 and from September to November 2014. Both soil sampling and analysis and X-ray fluorescence field screening methods were utilized in the ESI. The eight sampling locations established in the 2010 SI were resampled (at greater depths than previous). Additionally, surface and subsurface soil samples were collected from the toe of the berm. The extent of site constituents of potential concern (COPCs) exceeding human health and ecological screening criteria was delineated during the ESI (CH2M, 2015).

Based on the data and results of the SI (CH2M, 2012) and the ESI (CH2M, 2015), it was determined that there are potentially unacceptable risks to human health from exposure to metals (copper and lead) and to ecological receptors from exposure to metals (copper, lead, and zinc) in soil.

2017 Engineering Evaluation/Cost Analysis

The EE/CA was prepared to evaluate alternatives for the removal of surface and subsurface soils at the site that pose unacceptable risks to human and ecological receptors and to support a future final remedy to achieve the goal of unrestricted future land use for this area.

The Remedial Action Objective (RAO) for the MGBR is to prevent or limit human and ecological exposure to metals in soil at concentrations greater than acceptable risk levels for unrestricted land use. If the post-remedy soil concentration (for the applicable depth stratum) based on the 95% Upper Confidence Level (UCL) is less than the Site Remediation Goals (SRGs) for all COPCs, post-remedial risks to human and ecological receptors are at an acceptable level for unrestricted land use.

The SRGs were derived based on the lower of the risk-based ecological and human health screening criteria and site-specific background concentrations. SRGs were developed for copper (70 milligrams per kilogram [mg/kg]), lead (120 mg/kg), and zinc (120 mg/kg).

The selected alternative for the MGBR was Excavation, Stabilization, Transport, and Disposal of Impacted Soil. The lateral and vertical extent of the removal action were determined based on the 95% UCL evaluation assuming residential use.

NTCRA Activities

The NTCRA was completed by APTIM between October 2018 and July 2019, as detailed in the Construction Completion Report (APTIM, 2019).

During the removal action, approximately 626 cubic yards of contaminated soil were removed in accordance with the EE/CA and based on the post-excavation confirmation sampling results. During excavation, the soils were screened to remove ammunition fragments and other debris. All excavated soil was stabilized onsite using Portland cement to reduce leachable metals concentrations, allowing the soil to be disposed of as a

non-hazardous waste. Characterization sampling of the soil confirmed that all site soil could be transported and disposed of as a non-hazardous waste.

A post-removal 95% UCL evaluation was conducted utilizing the post-excavation confirmation samples and the previously-collected data from unremediated portions of the site. The post-removal 95% UCL concentration for each COPC was less than its respective SRG, which confirms that the soil removal action conducted at the site has met the RAO for the site. Therefore, there are no unacceptable human health or ecological risks remaining at the site and, no further action is required. Site restoration included backfilling, compaction, and revegetation of the site.

Conclusions

The COPC-impacted soil at the Fentress MGBR has been removed and the area restored in accordance with the EE/CA (CH2M, 2017a) and Action Memorandum (CH2M, 2017b). The Construction Completion Report (APTIM, 2019), as well as this TM, document the NTCRA activities and the post-excavation 95% UCL evaluation results. The resulting site conditions at the Fentress MGBR are acceptable for unrestricted land use for human and ecological receptors.

No Further Action Consensus

The Navy and VDEQ agree the RAO for the NALF Fentress MGBR has been met, as post-remedial risks to human and ecological receptors are an acceptable level for unrestricted land use. Therefore, NFA for the NALF Fentress MGBR is warranted.

Ms. Angela Jones
NAVFAC Mid-Atlantic

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Date: _____

Mr. Stephen Mihalko
VDEQ

Stephen Mihalko

Date: 9-19-19

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