DRAFT
ENVIRONMENTAL ASSESSMENT

FOR

UNDERWATER TEST TANK FACILITY

AT

NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MD

December 2024

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Abstract

Designation:	Environmental Assessment
Title of Proposed Action:	Underwater Test Tank Facility
Unique ID:	EAXX-007-17-USN-1727782357
Project Location:	Naval Support Facility Indian Head, Indian Head, Maryland
Lead Agency for the EA:	Department of the Navy
Affected Region:	Indian Head, Maryland
Action Proponents:	Commander Navy Installations Command (CNIC), Naval Support Facility (NSF) Indian Head and Naval Sea Systems Command (NAVSEA)
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Date:	December 2024

Naval Support Facility Indian Head, a command of the U.S. Navy (hereinafter, the Navy), prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act, as implemented by the Council on Environmental Quality Regulations and Navy regulations for implementing the National Environmental Policy Act. The Proposed Action would construct a new underwater test tank facility to provide controlled underwater explosions. The underwater test tank would simulate necessary conditions to develop new underwater technologies and energetic systems for Navy Explosive Ordnance Disposal divers. This EA evaluates the potential environmental effects associated with two action alternatives and the No Action Alternative on the following resource areas: air quality, water resources, geological resources, cultural resources, biological resources, visual resources, land use, noise, infrastructure, transportation, public health and safety, hazardous materials and wastes, socioeconomics, and environmental justice.

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Executive Summary

ES.1 Proposed Action

The Proposed Action includes the construction and operation of an aboveground underwater test tank (UTT) facility to conduct controlled underwater explosions of up to 500 grams (equal to 1.1 pounds) Net Explosive Weight (NEW) of Trinitrotoluene (TNT) equivalent explosives. The aboveground UTT would simulate necessary conditions to develop new underwater technologies and energetic systems for Navy Explosive Ordnance Disposal (EOD) divers, such as newly developed disruptors and sensors and methods of addressing emerging threats. The facility would include the aboveground UTT; wastewater holding tank; a build-up shed; and a control room, all resting on concrete pads, as well as associated utilities, storm water management structures, pavement and driveways/parking areas. Splash guards and a containment dike would be installed around the UTT facility and a tree clearing of 50 feet around the facilities would be required for a fire break. Personnel and traffic would not increase as a result of the Proposed Action.

ES.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to provide the facilities to facilitate the development of a new EOD underwater technologies and energetic systems for Navy EOD divers. The need for the Proposed Action is to develop advanced tactics and technologies that assist in clearing underwater hazards.

ES.3 Alternatives Considered

Alternatives were developed for analysis based on the following screening factors. The primary factors considered for the Proposed Action included:

- Availability of sufficient developable land within a controlled security area of the installation
- Compatibility with explosive safety siting requirements
- Compatibility with surrounding land use
- The site should be in a location proximate to other existing facilities and operations that strategically align or have similar programs

Additional screening factors are listed in Section 2.2. The Navy is considering two action alternatives and the No Action Alternative:

Alternative 1. The Proposed Action would be constructed at the corner of Lewis Road and Archer Avenue. The site is forested and would be cleared and graded to accommodate development. This would include approximately 43,560 square feet (sq ft) (1 acre) of earth disturbance and 39,006 sq ft (0.9 acres) of tree removal. Utilities would be installed and tied into existing utilities adjacent to the site. This area has the potential for unexploded ordnance (UXO); therefore, UXO Support would be needed throughout the planning and construction processes.

Alternative 2. The Proposed Action would be constructed at Stump Neck Annex off Archer Avenue. At this location, the site would be graded to accommodate development and the existing forested area cleared. This would include approximately 43,560 sq ft (1 acre) of earth disturbance and 34,394 sq ft (0.79 acres) of tree removal. Currently, the site does not have usable utilities for mechanical infrastructure. New infrastructure would be installed and connected to existing utilities adjacent to

Archer Avenue next to the site entrance. This area has the potential for UXO; therefore, UXO Support would be needed throughout the planning and construction processes.

No Action Alternative. Under the No Action Alternative, the Proposed Action would not be implemented. The Navy would not be able to develop new EOD underwater technologies and energetic systems to address emerging threats and assist Navy personnel with clearing explosive hazards.

ES.4 Summary of Environmental Resources Evaluated in the Environmental Assessment

The Council on Environmental Quality's (CEQ's) National Environmental Policy Act (NEPA) Implementing Regulations directs agencies to identify at an early stage the important environmental issues deserving analysis and to deemphasize issues not relevant to the analysis in order to narrow the scope of the environmental review, enhance efficiency, and produce concise environmental documents. For this Environmental Assessment (EA), the following resource areas are evaluated in detail for potential significant effects: air quality, water resources, geological resources, cultural resources, noise, biological resources, land use, infrastructure, public health and safety, hazardous materials and waste, and environmental justice. Effects related to climate change were analyzed and are briefly discussed in the water resources and biological resource sections. The potential environmental effects on several resource areas were initially analyzed, and it was determined there would be minimal effects. Such resource areas, which are only briefly addressed in this EA, include transportation, visual resources, and socioeconomics.

ES.5 Summary of Potential Environmental Consequences of the Action Alternatives

Table ES-1 summarizes the potential effects on the resource areas associated with the No Action Alternative and the action alternatives in this EA.

Table ES-1 Summary of Potential Effects on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1*	*Alternative 2*
Air Quality	No change to existing conditions. No significant effects.	Short-term increase in criteria air pollutants during construction. No long-term or significant effects.	Short-term increase in criteria air pollutants during construction; however, slightly lower than Alternative 1 from decrease in tree clearing. No long-term or significant effects.
Water Resources	No change to existing conditions. No significant effects.	Short-term effects during construction. No long-term or significant effects.	Short term effects similar to Alternative 1. Long-term effects on surface water, wetlands, and floodplains due to location within the floodplain and proximity to a wetland. No significant effects.

Resource Area	*No Action Alternative*	*Alternative 1*	*Alternative 2*
Geological Resources	No change to existing conditions. No significant effects.	Short- and long-term effects on soil disturbance and increased impervious surfaces. Soils have moderate erosion hazard. Long-term effects on topography from grading. No significant effects.	Similar to Alternative 1, except less soil erosion during construction because soils have a slight erosion hazard. No significant effects.
Cultural Resources	No change to existing conditions. No adverse or significant effects.	No known archaeological sites. One resource not evaluated for the NRHP within explosive safety arc; potential adverse effect. Evaluation of resource is planned and if determined NRHP eligible, SHPO consultation will determine how to minimize, mitigate, or avoid potential adverse effects. No significant effects.	One NRHP-eligible archaeological site; utility line excavation within a portion of the archaeological site that is not NRHP eligible and has been disturbed. Consultation with the SHPO will include the alignment of utilities. No aboveground historic properties. No adverse or significant effects.
Biological Resources	No change to existing conditions. No significant effects.	Removal of 0.90 acres of trees. Short- and long-term effects on bald eagles from construction and operational noise. Effects on federal- or state-listed species are not likely to occur, including bat species with time-of year restrictions in place. USFWS and MDNR consultation is ongoing. No significant effects.	Removal of 0.79 acres of trees. Effects on wildlife and listed species similar to Alternative 1. Short- and long-term effects on great blue heron rookeries from construction and operational noise. No effects on nesting bald eagles. Same consultation is ongoing. No significant effects.
Land Use	No change to existing conditions. No significant effects.	Increase land use constraints on Stump Neck; no effects on land use compatibility within the navigable waters or adjacent communities. No significant effects.	No effects on current land use at Stump Neck; no effects on land use compatibility within the navigable waters or adjacent communities. No significant effects.
Noise	No change to existing conditions. No significant effects.	Short-term effects from construction. Long-term effects from UTT operations. No significant effects.	Same as Alternative 1. No significant effects.

Resource Area	*No Action Alternative*	*Alternative 1*	*Alternative 2*
Infrastructure	No change to existing conditions. No significant effects.	Short-term effects on utility infrastructure capacity. Long-term effects on potable water usage. No significant effects.	Similar to Alternative 1. No significant effects.
Public Health and Safety	No change to existing conditions. No significant effects.	Short-term effects from construction activities. Long-term effects from potential risks associated with handling explosives. No significant effects.	Similar to Alternative 1. No significant effects.
Hazardous Materials and Waste	No change to existing conditions. No significant effects.	Short-term effects from construction and ground disturbance associated with the ERP sites. Long-term effects from the handling of hazardous materials and wastes. No significant effects.	Similar to Alternative 1. No significant effects.
Environmental Justice	No change to existing conditions. No significant effects.	No disproportionately adverse effects on human health or environment on minority or low-income populations. No significant effects.	Similar to Alternative 1. No significant effects.

Key: BMP = best management practice; ERP = Environmental Restoration Program; MDNR = Maryland Department of Natural Resources; NRHP = National Register of Historical Places; SHPO = State Historic Preservation Office; USFWS = U.S. Fish and Wildlife Services.

ES.6 Public Engagement

The Navy will publish a Notice of Availability for the Draft EA for two weekly publications of the *Maryland Independent*. The Navy will hold a public meeting to describe the environmental effects of the Proposed Action and alternatives and to receive comments on the Draft EA. The Navy will coordinate or consult with agencies regarding the Proposed Action, including, but not limited to, the U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), Maryland Department of the Environment (MDE), Maryland Department of Natural Resources (MDNR), Maryland Historical Trust (MHT) as the State Historic Preservation Office (SHPO), and Maryland Department of Planning (Maryland State Clearinghouse).

ENVIRONMENTAL ASSESSMENT

Underwater Test Tank Facility

Naval Support Facility Indian Head

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Abbreviations and Acronym

Acronym	Definition
ACM	asbestos-containing material
AT/FP	Anti-terrorism and Force Protection
APE	area of potential effect
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CDNL	C-weighted Day-Night Average Levels
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
COMAR	Code of Maryland Regulations
CT	Census Tract
CZMA	Coastal Zone Management Act
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels
DOD	United States Department of Defense
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EO	Executive Order
EOD	Explosive Ordnance Disposal
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ETR	Explosive Test Range
FEMA	Federal Emergency Management Agency
FIDS	forest interior dwelling bird species
GHG	greenhouse gas

Acronym	Definition
gpd	gallons per day
HAP	hazardous air pollutant
Hz	Hertz
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
IR	Installation Restoration
LBP	lead-based paint
Lmax	maximum A-weighted sound level
LPk	peak noise level
LsB	Liverpool silt loam
LUCs	Land Use Controls
LUPZ	Land Use Planning Zone
LZ	landing zone
MBTA	Migratory Bird Treaty Act
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MHT	Maryland Historical Trust
MRP	Munitions Response Program
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NEW	net explosive weight
NHPA	National Historic Preservation Act
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

Acronym	Definition
NSF	Naval Support Facility
NSR	New Source Review
NSWC	Naval Surface Warfare Center
NWI	National Wetlands Inventory
OPNAVINST	Office of the Chief of Naval Operations Instruction
PcA	Piccowaxen loam, slight erosion hazard
PcB	Piccowaxen loam, moderate erosion hazard
PCBs	polychlorinated biphenyls
$PM_{2.5}$	fine particulate matter less than or equal to 2.5 micrometers in diameter
PM_{10}	suspended particulate matter less than or equal to 10 micrometers in diameter
RCRA	Resource Conservation and Recovery Act
RDT&E	research, development, test, and evaluation
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SOP	Standard Operating Procedure
sq ft	square feet
SSP	System Safety Program
TNT	Trinitrotoluene
tpy	tons per year
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTT	underwater test tank
UXO	Unexploded Ordnance
VOC	volatile organic compound
WMA	Wildlife Management Area

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1 Purpose of and Need for the Proposed Action

1.1 Introduction

The U.S. Navy, in support of the Naval Surface Warfare Center (NSWC) Indian Head Division, is proposing to construct and operate an aboveground underwater test tank (UTT) facility at Naval Support Facility (NSF) Indian Head. The aboveground UTT would be used to develop new Explosive Ordnance Disposal (EOD) underwater technologies and energetic systems for Navy EOD divers. The facility would include the aboveground UTT; wastewater holding tank; a build-up shed; and control room, all resting on concrete pads; as well as associated utilities, storm water management structures, pavement, and driveways/parking areas.

The Navy prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) Regulations and Navy regulations for implementing NEPA.

1.2 Background

Established in 1890 as the Naval Proving Ground, NSF Indian Head has evolved into the Navy's premier facility for ordnance, energetics, and EOD solutions. In 1899, the Navy constructed the Naval Powder Factory to produce smokeless powder for the U.S. Fleet. The Navy moved proving ground activities to Dahlgren in 1918 due to the increasing range of naval guns tested at the Proving Ground and more civilian river traffic on the Potomac River. In 1921, all naval proving activities were located at Dahlgren and NSF Indian Head was renamed the Naval Powder Factory to reflect its main function as explosives manufacturing and research, development, test, and evaluation (RDT&E) work associated with explosives and energetics (NAVFAC Washington, 2019).

Naval Surface Warfare Center Indian Head Division Mission

Ensure operational readiness of U.S. and Allied forces by providing full-spectrum technical capabilities necessary to rapidly transition energetics products from concept through production, to operational deployment.

Today, NSF Indian Head has many operations and manufacturing facilities in support of the installation's mission, including RDT&E, manufacturing, and in-service support of energetics and energetic systems. The Navy also performs similar work for other government organizations, including the U.S. Army, U.S. Air Force, and U.S. Department of Homeland Security. A significant component of the operations at NSF Indian Head involves the development and testing of munitions and other energetics. The installation houses facilities for production, storage, testing, and detonation of explosives.

1.3 Location

NSF Indian Head occupies more than 3,200 acres in Charles County, Maryland. It is located between Mattawoman Creek and the Potomac River, approximately 30 miles south of Washington, DC (NAVFAC Washington, 2019). NSF Indian Head (also called the installation) consists of three main areas: Cornwallis Neck, Stump Neck Annex, and Bullitt Neck (see Figure 1-1).

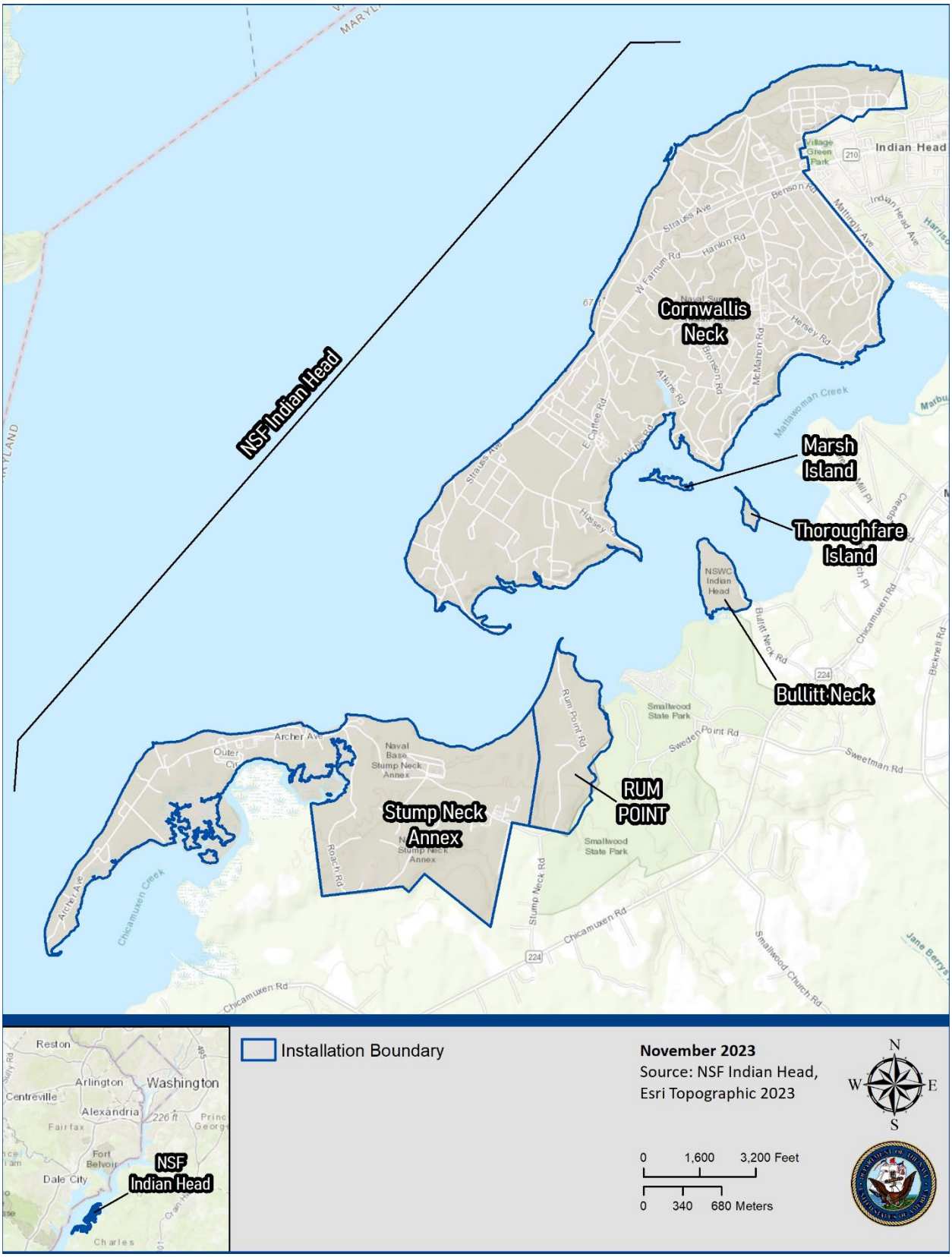

Figure 1-1 NSF Indian Head Location Map

The principal facilities are located on Cornwallis Neck, which is bounded on the west by the Potomac River, on the east by Mattawoman Creek, and on the north by the Town of Indian Head. Cornwallis Neck includes Marsh Island and Thoroughfare Island, both in Mattawoman Creek. There are additional facilities nearby at Stump Neck Annex. Stump Neck Annex is bounded on the west by the Potomac River, on the north by Mattawoman Creek, on the south by Chicamuxen Creek and residential land, and on the east by residential land. Bullitt Neck, which contains no operational facilities, is bounded on three sides by Mattawoman Creek with residential land to the south.

1.4 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to provide the facilities to develop new EOD underwater technologies and energetic systems for Navy EOD divers, such as newly developed disruptors and sensors.

The need for the Proposed Action is to develop advanced tactics and technologies that assist Navy personnel in addressing emerging threats and clearing underwater hazards. The technologies and systems developed through RDT&E work at this facility would expand and support the Navy EOD program and aid in the protection of the warfighter. Navy EOD personnel handle chemical, biological, and radiological threats while performing duties such as detonating and demolishing hazardous munitions, neutralizing various ordnance, remotely disabling unsafe ordnance, and clearing waterways of mines in support of ships and submarines (Navy, 2023).

Navy EOD

The Navy's EOD Mobile Diving and Salvage Units clear harbors of navigation hazards, engage in underwater search and recovery operations, and perform limited underwater repairs on ships. EOD personnel are highly trained, skilled technicians who are experts in explosives, diving, and parachuting.

1.5 Scope of Environmental Assessment

This EA includes an analysis of potential environmental effects associated with two action alternatives and the No Action Alternative. This EA analyzes in detail the following resource areas: air quality, water resources, geological resources, cultural resources, biological resources, land use, noise, infrastructure, public health and safety, hazardous materials and waste, and environmental justice. The EA briefly addresses resource areas for which potential effects were considered negligible or nonexistent, including transportation, visual resources, and socioeconomics.

The study area for each resource area analyzed may differ due to how the Proposed Action interacts with or affects the resource. For instance, the study area for geological resources might only include the footprint of proposed ground disturbance; whereas, the noise study area could extend out to additional areas that could be affected by project operations, traffic, or construction.

1.6 Relevant Laws and Regulations

The Navy prepared this EA based on federal and state laws, statutes, regulations, policies, and Executive Orders (EOs) pertinent to this Proposed Action. Appendix A details the relevant laws and regulations applicable to this EA. Additionally, a description of the Proposed Action's consistency with these laws and regulations, and the names of regulatory agencies responsible for their implementation, is provided in Appendix A, Table A-2. As necessary, important laws and regulations may also be discussed within Chapter 3 of this EA.

1.7 Public and Agency Engagement and Intergovernmental Coordination

Public engagement is a critical part of the NEPA process. Public engagement aids in the development of the issues addressed in an EA, identification of important issues related to a Proposed Action, and in making better informed decisions. CEQ's NEPA Implementing Regulations direct federal agencies to involve the public in the NEPA process. Public engagement and agency correspondence materials will be added to Appendix B as they occur.

The Navy will publish a Notice of Availability for the Draft EA for two weekly publications of the *Maryland Independent*. The notice will describe the Proposed Action, solicit public comments on the Draft EA, provide dates of the public comment period, and announce where a copy of the EA is available for review. The Navy will hold a public meeting to describe the environmental effects of the Proposed Action and alternatives and to receive comments on the Draft EA. The Navy will coordinate or consult with agencies regarding the Proposed Action, including, but not limited to, the U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), Maryland Department of the Environment (MDE), Maryland Department of Natural Resources (MDNR), Maryland Historical Trust (MHT) as the State Historic Preservation Office (SHPO), and Maryland Department of Planning (Maryland State Clearinghouse).

2 Proposed Action and Alternatives

2.1 Proposed Action

The Proposed Action would include the construction and operation of an aboveground UTT facility to conduct controlled underwater explosions of up to 500 grams (equal to 1.1 pounds) Net Explosive Weight (NEW) of Trinitrotoluene (TNT) equivalent explosives.

The UTT would simulate necessary conditions to develop new underwater technologies and energetic systems for Navy EOD divers, such as newly developed disruptors and sensors and methods of addressing emerging threats. The facility would include an aboveground UTT; wastewater holding tank; a build-up shed; and a control room, all resting on concrete pads; as well as associated utilities, stormwater management structures, pavement and driveways/parking areas. The UTT facility would include a metal canopy with an overhead crane, splash guards, and a containment dike. A clearing of 50 feet around all the facilities would be required for a fire break, which would consist of maintained grass. Personnel and traffic would not increase as a result of the Proposed Action.

The UTT would be approximately 20-feet long by 8-feet wide by 10 feet tall on a concrete pad 20 feet by 30 feet (totaling 600 square feet (sq ft)). It would be designed to accommodate a maximum of 500 grams (equal to 1.1 pounds) NEW of TNT equivalent explosives and would be structurally reinforced both externally and along the interior walls. Plates would be installed to extend the exterior walls up the tank to form a splashguard. Additional blast analysis could be conducted to determine supplementary splash height requirements. The UTT would consist of water filtration, instrumentation-ready portholes, a waste containment area, and lightning protection systems. A 15,000-gallon wastewater holding tank would be sited adjacent to the UTT.

A built-up shed adjacent to the UTT would serve as a separate staging area. The shed would be a small, open-sided structure approximately 10 feet tall. Fire suppression systems would not be required.

The control room would serve as the site for range operations. The structure would have factory-installed heating, ventilation, air conditioning, and plumbing and would connect to existing utilities with extensions, as necessary.

Concrete pads would be provided for the UTT, wastewater tank, build-up shed, and control room. This would involve forming and pouring four new concrete pads: 20 feet by 30 feet for the UTT, 16 feet in diameter for the wastewater tank, 20 feet by 10 feet for the built-up shed, and 25 feet by 21 feet for the control room.

As appropriate, the proposed facility would incorporate antiterrorism features for force protection measures such as mass notification systems, emergency shutoffs for ventilation systems, laminated windows, blast-resistant window and door frames, and emergency lighting and signage. The Proposed Action would also include a sanitary lift station; stormwater management facilities; and necessary utilities, pavement, driveways/parking areas.

Underwater Test Tank Design Considerations

A significant component of the operations at NSF Indian Head involves the development and testing of munitions and other energetics. Facilities for production, storage, testing, and detonation of explosives are located on Mainside. Materials are stored, handled, and transported in strict compliance with applicable federal standards. Underwater test tank design and siting take these strict criteria into consideration.

2.2 Screening Factors

NEPA-Implementing Regulations provide guidance on the consideration of alternatives to a federally proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable and to meet the purpose and need (see Section 1.4) require detailed analysis.

Most of NSF Indian Head is encompassed by explosive safety arcs and magazines, which result in development constraints. Explosive safety arcs are generated by the storage, removal, loading, and potential detonation of ordnances. Explosive safety arcs are also established to prohibit populated structures within certain distances of these activities (NAVFAC Washington, 2019). The majority of Cornwallis Neck is encompassed by explosive safety arcs; however, the northern portion does not have these constraints. Portions of Stump Neck Annex are categorized as highly constrained, stemming mostly from explosive safety arcs. Stump Neck's northern area along the river is also classified as highly constrained because of steep slopes.

Given the nature of the Proposed Action, the UTT facility would have explosive safety arcs around each of the proposed components.

The Proposed Action should be sited in an area with land use that is compatible with the operations under both existing and future land use plans. The UTT facility would be used to detonate underwater explosives. As a result, this action should be sited in an area with land use that is categorized as RDT&E. At NSF Indian Head, which includes Stump Neck Annex, RDT&E land use includes activities such as research, development, and testing of weapons (NAVFAC Washington, 2019).

NSF Indian Head accesses explosive materials from various magazine complexes on Stump Neck Annex. Energetics used for UTT testing and operations would be transported from magazine locations on Stump Neck Annex along approved transportation routes and follow standard operating procedures and Navy instructions. Energetics used for UTT testing would be stored in day lockers; no overnight storage would be permitted at the UTT. Locating the proposed UTT off the installation would require the transportation of explosives over public roads, which is not preferred. The primary factors considered for siting of the Proposed Action include:

- Availability of sufficient developable land within a controlled security area of the installation
- Compatibility with explosive safety siting requirements
- Compatibility with surrounding land use on the installation
- The site should be in a location proximate to other existing facilities and operations that strategically align or have similar programs

Additional screening factors considered for the Proposed Action include:

- The site should be in close proximity to existing utilities so that new infrastructure could be connected to support a main distribution panel, surge protectors, and other on-site utilities (such as water, wastewater, electrical, and communications)
- The facility should be located in an area that minimizes direct effects to cultural and natural resources (wetlands, forests, surface waters, floodplains, sensitive, rare, and threatened and endangered species)

Various alternatives were evaluated against the screening factors and are discussed in more detail in Sections 2.3 and 2.4.

2.3 Alternatives Carried Forward for Analysis

Based on the reasonable alternative screening factors and meeting the project purpose and need, the following alternatives were identified and will be analyzed in this EA:

- Constructing an aboveground UTT at Lewis Road location (Alternative 1)
- Constructing an aboveground UTT at Archer Avenue location (Alternative 2)
- Taking no action (the No Action Alternative)

2.3.1 Alternative 1: Construct UTT at Lewis Road

Under Alternative 1, the Proposed Action would be implemented as discussed in Section 2.1, at Stump Neck Annex at the corner of Lewis Road and Archer Avenue (see Figure 2-1). At this location, the site would need to be graded to accommodate development and the forested area would be cleared. A paved access drive would be constructed off Archer Avenue. The construction of the new UTT facility would result in approximately 43,560 sq ft (1 acre) of earth disturbance, including utilities, laydown areas, access road, parking area, and concrete building pads. This would result in approximately 13,068 sq ft (0.3 acres) of new impervious surface for the access road, concrete pads, parking area, and containment dike. A 50-foot fire-break buffer is required around the proposed facilities. Approximately 39,006 sq ft (0.9 acres) of trees would be removed.

The site is near existing utilities, but infrastructure would need to be extended to the proposed facilities. Utility work would include water, wastewater, electrical, and communications. Potable water utilities and fixtures, a sump pump, and a water meter would be installed and connected to the underground potable water line. New work would include an underground electrical service connection and support for a distribution panel and surge protectors. New powerlines would be installed underground to avoid bald eagle and other raptor mortalities; this would assist with NSF Indian Head Bald and Golden Eagle Protection Act (BGEPA) 5-year Programmatic Permit compliance. To provide lightning protection, wooden or metal lightning masts would be placed around the perimeter of the site. A new fire hydrant would be tied into the existing potable water main to provide fire suppression water to the site. The built-up shed would not have fire protection because this facility would consist of a floor (slab) and a roof and is not considered a building.

At this location, the UTT facility would be sited and designed to fit into a relatively narrow space. Alternative 1 would be adjacent to the Potomac River, which is used by the public for boating and transportation. As previously discussed, the UTT facility would comply with explosive siting requirements including explosive safety arcs.

Alternative 1 is in an area with the potential for Unexploded Ordnance (UXO) due to past operations; therefore, an explosive safety submission would be prepared and, once approved, adhered to during construction. UXO Support would be needed throughout the planning and construction process.

1

Figure 2-1 Alternative 1 Site Location

2.3.2 Alternative 2: Construct UTT at Archer Avenue

Under Alternative 2, the Proposed Action would be implemented as discussed in Section 2.1. Alternative 2 would be located off Archer Avenue as shown in Figure 2-2. The site is forested and would be cleared and graded to accommodate development. An existing gravel drive would be used for construction vehicles. This gravel drive would then be paved, with an extension to the UTT and control room. A new paved parking lot would also be constructed. An access control gate would be installed by Archer Avenue. The size of the facilities would be the same as described in the Proposed Action and under Alternative 1. The construction of the UTT facility would include a total of approximately 43,560 sq ft (1 acre) of earth disturbance and approximately 13,068 sq ft (0.3 acres) of new impervious surface area for the concrete pads, access road, parking, and containment dike. Approximately 34,394 sq ft (0.79 acres) of trees would be removed. Utilities such as water, wastewater, electrical, and communications would be installed at the proposed location and tied into existing utilities adjacent to the site. The closest power pole is adjacent to the main road next to the site entrance. To provide telecommunications, a 45-foot pole would be installed next to the power pole at the site entrance.

Alternative 2 is in an area with the potential for UXO due to past operations; therefore, an explosive safety plan submission would be prepared and once approved, adhered to during construction. UXO Support would be needed throughout the planning and construction process.

Alternative 2 would comply with explosive siting requirements including explosive safety arcs.

2.3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. The UTT facility would not be constructed and Navy's ability to develop new EOD underwater technologies and energetic systems would be limited. As a result, the Navy's capability to address emerging threats for their EOD divers would be reduced. The No Action Alternative would not meet the purpose of and need for the Proposed Action. However, the No Action Alternative is carried forward for analysis in this EA to establish a comparative baseline.

2.4 Alternatives Considered but not Carried Forward for Detailed Analysis

2.4.1 Cornwallis Neck

The majority of the land on Cornwallis Neck is heavily encumbered by explosive safety arcs that are generated from existing explosive operations. This creates explosive siting compatibility issues with the Proposed Action. Approximately two-thirds of Cornwallis Neck is encumbered by explosive safety arcs. The co-location of operations is restricted within these arcs unless the operations are functionally aligned. The proposed UTT operations are not functionally aligned with any existing operations that generate arcs on Cornwallis Neck. There is insufficient available space outside of these existing arcs on the restricted side to locate the UTT facility. In addition, constructing the UTT facility on Cornwallis Neck would not position it near operations that strategically align.

Given these screening factors, there is not an area on Cornwallis Neck that is suitable for the Proposed Action. Therefore, this alternative would not meet the screening factors identified in Section 2.2 and is not carried forward for further analysis in this EA.

Figure 2-2 Alternative 2 Site Location

2.4.2 Rum Point

As shown in Figure 1-1, the Stump Neck Annex and Rum Point are on a separate peninsula to the south of Cornwallis Neck. A locked and typically unmanned gate exists at Rum Point, where limited operations are conducted. Rum Point is not encompassed by explosive safety arcs and there is developable land in this region. However, most of the land is used for recreation, which is not compatible with the proposed operations. In addition, the area has limited access to utilities such as water and sewer. Rum Point is not located within a Restricted Area (Craft, 2023) and adjoins a state park with no fence or access control. Restricted Areas are regions where special security measures are employed to prevent or minimize interference and to protect public safety. Given the nature of the proposed operations, the Proposed Action should be sited within a controlled security area of the installation. Therefore, this alternative would not meet the screening factors identified in Section 2.2 and is not carried forward for further analysis in this EA.

2.4.3 Lease Facilities

Leasing facilities off the installation is not a viable option because of the classified nature of work and the risks associated with energetic materials. Transporting explosive hazardous materials off-site requires special Department of Transportation procedures to maintain the safety and security of public roadways. Although this could be done, it requires additional time and creates risks to the public that are not present if the materials remain on the installation. In addition, leasing facilities off the installation would not meet the need of being within a controlled security area of the installation. Therefore, this alternative would not meet the screening factors identified in Section 2.2 and is not carried forward for further analysis in this EA.

2.4.4 Repurpose Other Department of Defense or Federal Agency Facilities

There are no Department of Defense (DOD) or federal agency facilities near NSF Indian Head that could provide adequate processing and support space for underwater testing of explosives. Explosive hazardous materials must be transported in approved vehicles and storage containers. As discussed in Section 2.2, the installation accesses explosive materials from various magazine complexes on Stump Neck Annex. Locating the proposed UTT facility off the installation would require the transportation of explosives over public roads, which is not preferred. Although other military installations outside of NSF Indian Head were considered, they were not carried forward because they lack the advantage of being located near the strategically aligned operations/facilities on Stump Neck. This alternative would also have detrimental effects on existing efficiencies. Therefore, it is not carried forward for further analysis in this EA.

2.5 Best Management Practices Included in Proposed Action

Best management practices (BMPs) incorporated into the Proposed Action reflect existing policies, practices, and measures the Navy would adopt to reduce the environmental effects of designated activities, functions, or processes. BMPs mitigate potential effects by avoiding, minimizing, or reducing/eliminating effects and are distinguished from potential mitigation measures because they are existing requirements for the Proposed Action; considered ongoing, regularly occurring practices; or not unique to this Proposed Action. Table 2-1 identifies BMPs inherently part of the Proposed Action and are not mitigation measures required by regulatory consultations.

Table 2-1 Best Management Practices

Best Management Practice	*Description*	*Effects Reduced/Avoided*
Erosion and Sediment Control Plan	Projects involving earth disturbance of ≥ 5,000 sq ft or 100 cubic yards	Reduce and control erosion and sediment
NPDES General or Individual Permit for Stormwater Associated with Construction Activity	Disturb one acre or more	Reduce discharges into waters of the United States
Stormwater Management Plan	Adhere to Energy Independence and Security Act Section 438 and the Navy Low Impact Development policy	Reduce stormwater runoff to protect water resources

Key: NPDES = National Pollutant Discharge Elimination System

3 Affected Environment and Environmental Consequences

The affected environment sections within this chapter describe the existing environmental conditions for those resource areas affected by the alternatives. This includes reasonably foreseeable environmental trends and planned actions in the area. The affected environment discussion informs the environmental consequences analysis and mitigation measures. The environmental consequences sections include a discussion of the reasonably foreseeable direct and indirect environmental effects of implementing the alternatives on the resource areas.

Direct and Indirect Effects

Direct effects are, "caused by the action and occur at the same time and place."

Indirect effects are, "caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable." [40 CFR part 1508.1]

The word, "significantly," as used in NEPA, requires consideration to both context and intensity. Context means that the significance of a proposed action must be analyzed in several contexts such as society (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world. Both short- and long-term effects are relevant. Intensity refers to the severity or extent of the potential environmental effect, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential effect needs to be in order to be considered significant. Conversely, the less sensitive the context, the more intense a potential effect needs to be in order to be considered significant.

CEQ's NEPA Implementing Regulations directs agencies to identify at an early stage the important environmental issues deserving analysis and to deemphasize issues not relevant to the analysis to narrow the scope of the environmental review, enhance efficiency, and produce concise environmental documents. Issues deemed not relevant to a proposed action must be only briefly discussed. For this EA, the following resource areas were evaluated in detail for potential significant effects: air quality, water resources, geological resources, cultural resources, noise, biological resources, land use, infrastructure, public health and safety, hazardous materials and waste, and environmental justice. Anticipated climate change-related effects on the affected environment were analyzed and are briefly discussed in the water resources, and biological resources sections.

All potentially relevant environmental resource areas were initially considered for analysis in this EA. Potential environmental effects on several resource areas were determined to be negligible, minimal, or nonexistent adverse effects. Thus, in compliance with CEQ's NEPA Implementing Regulations and Navy guidelines, the affected environment and environmental consequences for this EA focuses only on those relevant resource areas potentially subject to environmental effects. In addition, the level of detail used in describing a resource area is commensurate with the anticipated level of potential environmental effect. The following summarizes those resource areas not analyzed in detail and the basis for this conclusion:

Transportation: During construction of the Proposed Action, localized traffic would be generated from workers arriving at and departing from the site, movement of materials and equipment, and removal of construction and/or demolition materials. However, this localized traffic would only last during construction. Therefore, the Proposed Action would result in negligible, short-term, localized increases

in construction-related traffic in the vicinity of Stump Neck Annex and the alternative locations. Temporary road closures could sometimes be necessary near alternative locations, but these would not affect overall traffic circulation. The Proposed Action does not include a long-term increase in personnel, and the operations would be consistent with existing operations. There would not be any change in traffic patterns on or off the installation. Therefore, transportation is not analyzed in further detail.

Visual Resources: Visual resources are not analyzed in detail since the alternative locations chosen are within the RDT&E land use area of the installation and would be surrounded by trees. Therefore, the alternative locations for the Proposed Action would not change the land use or significantly change the visual resources on NSF Indian Head. Section 3.4, Cultural Resources discusses visual effects on historic resources.

Socioeconomics: The Proposed Action is not expected to alter the number of personnel employed at NSF Indian Head, as existing personnel would operate the UTT facility. The Proposed Action would result in negligible, short-term expenditures from construction activities which could benefit local or regional employment and the economy during the duration of such activities. There would be no anticipated change to the number of personnel, and short-term benefits to the community and economy from construction activities would be negligible; therefore, socioeconomics is not analyzed in further detail.

3.1 Air Quality

This discussion of air quality includes criteria pollutants, standards, sources, permitting, and greenhouse gas (GHG) emissions. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors, including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, buses), stationary sources (e.g., factories, refineries, power plants), and indoor sources (e.g., some building materials and cleaning solvents). Air pollutants can also be released from natural sources such as forest fires.

For this analysis, the study area includes the local air quality at Stump Neck and the surrounding communities along with the larger Southern Maryland Interstate Air Quality Control Region.

3.1.1 Affected Environment

Under the Clean Air Act, the USEPA established National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] part 50) for principal pollutants. These pollutants, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide, ozone, suspended particulate matter less than or equal to 10 micrometers in diameter (PM_{10}), fine particulate matter less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$), and lead. Areas that violate a federal air quality standard are designated as nonattainment areas. State Implementation Plans are then prepared to identify the measures by which that area will achieve attainment. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

NSF Indian Head is in Charles County, which is within the Southern Maryland Interstate Quality Control Region (40 CFR 81.156). MDE is responsible for implementing and enforcing state and federal air quality regulations in Maryland. Charles County is designated as a moderate nonattainment area with the 2015

8-hour ozone NAAQS. Charles County is also in maintenance for the 2008 Ozone NAAQS (USEPA, 2023a), but because those *de minimis* thresholds are higher, the 2015 standard and values are used for the air analysis. *De minimis* emission levels are, "the minimum threshold for which a conformity determination must be performed" (USEPA, 2023).

NSF Indian Head is also within an ozone transport region, meaning that regional urban influences from well outside Charles County and the Southern Maryland Intrastate Air Quality Control Region also contribute substantially to local ozone pollution. The ozone transport region was established by the 1990 Clean Air Act Amendments and includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, the District of Columbia, and portions of the Northern Virginia suburbs. Because Charles County is in nonattainment for ozone, a General Conformity evaluation is required (USEPA, 2023a).

Under the Clean Air Act (section 176(c)(4)), General Conformity requires federal agencies to collaborate with state, tribal, and local governments when proposed actions within nonattainment or maintenance areas have the potential to affect local air quality implementation plans. Under this rule, a General Conformity Determination is required when new emissions have the potential to exceed *de minimis* thresholds of criteria pollutants. *De minimis* thresholds for NAAQS within an ozone transport region are 50 ton/year volatile organic compounds (VOCs), 100 ton/year nitrogen oxides (NO_x), and 100 ton/year for SO_2 (USEPA, 2023a).

A General Conformity Determination is a regulatory process under the USEPA that ensures federal actions are consistent with the goals of maintaining or improving air quality. This determination is required for any federal project or activity in areas that do not meet NAAQS. The process evaluates whether the emissions from a federal action will conform to the state or local air quality management plans. If a project's emissions are below certain *de minimis* thresholds, it may be exempt from further analysis. However, if the emissions are equal to or exceed these thresholds, a more detailed assessment is required to ensure that the federal action would not worsen air quality or delay the attainment of air quality standards. This process is crucial for protecting public health and the environment from the potential negative effects of federal projects on air quality.

Table 3-1 shows the most recent emissions inventory for Charles County and the Southern Maryland Intrastate Air Quality Control Region. VOC and NO_x emissions are used to represent ozone generation because they are precursors of ozone.

NSF Indian Head operates under Title V permit no. 24-017-0040 that includes a combined heat and power plant, auxiliary steam plant, miscellaneous diesel engines, generators and boilers, storage tanks, painting booths, explosives and propellent processes, and mixers (MDE, 2022). The Title V permit includes New Source Review (NSR) Synthetic Minor limits of 25 ton/year for VOCs and 39 ton/year for NO_x. Table 3-2 shows recent annual criteria pollutant and hazardous air pollutants (HAPs) emissions for NSF Indian Head.

In addition to criteria pollutants, NSF Indian Head quantifies and reports facility-wide GHG emissions annually under the Title V permit requirements, though Prevention of Significant Deterioration requirements for GHG emissions have not been triggered for any operations changes or construction projects to date. The most recent GHG emissions inventory for Charles County is in Table 3-3. Table 3-4 shows recent GHG emissions for NSF Indian Head.

Children, elderly people, and people with illnesses are especially sensitive to the effects of air pollutants; therefore, hospitals, schools, convalescent facilities, and residential areas are sensitive receptors for air

quality effects. According to the USEPA's online mapping tool NEPAssist, there are no elementary schools, hospitals, or healthcare facilities within a mile of the alternative study areas (USEPA, 2023d).

Table 3-1 Charles County Criteria and Hazardous Air Pollutant Air Emissions Inventory (2020)

Location	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*	*Total HAP (tpy)*
Charles County	1,710	14,771	13,827	803	2,533	1,048	1,284
Southern Maryland Air Quality Control Region	4,462	33,908	33,441	993	5,465	2,186	3,151

Source: (USEPA, 2020)
Note: The Southern Maryland Intrastate Air Quality Control Region includes Calvert, Charles, and St. Mary's counties.
Key: NO_x = nitrogen oxides; VOC = volatile organic compound; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter; HAP = hazardous air pollutant (including lead); tpy = tons per year.

Table 3-2 NSF Indian Head Air Emissions Inventory (2023)

Year	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy*	*Total HAP (tpy)*
2023	29.0	7.46	28.9	0.808	0.699	0.694	0.99

Source: (Naval Support Activity South Potomac, 2023)
Key: NO_x = nitrogen oxides; VOC = volatile organic compound; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter; HAP = hazardous air pollutant (including lead); tpy = tons per year.

Table 3-3 Charles County Greenhouse Gas Air Emissions Inventory (2020)

Location	*CO_2e from CO_2 (tpy)*	*CO_2e from CH_4 (tpy)*	*CO_2e from N_2O (tpy)*	*Total CO_2e (tpy)*
Charles County	3,565,615	81,650	11,324	3,658,589
Southern Maryland Air Quality Control Region	5,707,975	89,500	17,284	5,814,759

Source: (USEPA, 2020)
Notes: The Southern Maryland Intrastate Air Quality Control Region includes Calvert, Charles, and St. Mary's counties. Conversion factors for CO_2e are different for each greenhouse gas. CO_2 = 1, CH_4 = 25, and N_2O = 298.
Key: CO_2e = carbon dioxide equivalents; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; tpy = tons per year.

Table 3-4 NSF Indian Head Greenhouse Gas Emissions (2023)

Year	*CO_2e from CO_2 (tpy)*	*CO_2e from CH_4 (tpy)*	*CO_2e from N_2O (tpy)*	*Total CO_2e (tpy)*
2023	47,446	41.53	303.45	47,790.98

Source: (Naval Support Activity South Potomac, 2023)
Note: CO_2 = 1, CH_4 = 25, and N_2O = 298.
Key: CO_2e = carbon dioxide equivalents; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; tpy = tons per year.

3.1.2 Environmental Consequences

Effects on air quality are based on estimated direct and indirect emissions associated with the action alternatives.

Estimated emissions from a proposed federal action are typically compared with relevant national and state standards to assess the potential for increases in pollutant concentrations.

Air Quality Potential Effects:

- **No Action Alternative:** No change to existing conditions. No significant effects.
- **Alternative 1:** Minor, short-term increase in criteria air pollutants during construction. No significant or long-term effects.
- **Alternative 2:** Slightly lower increase in short-term, minor criteria air pollutants than Alternative 1. No significant or long-term effects.

3.1.2.1 No Action Alternative

Since there would be no construction under the No Action Alternative, there would be no increases in criteria pollutants or GHG emissions. There would be no effects on baseline emissions or overall air quality at NSF Indian Head and within the 16 surrounding communities; therefore, a general conformity determination and new source review would not be required. The No Action Alternative would not result in significant effects on air quality.

3.1.2.2 Alternative 1 Potential Effects

Under Alternative 1, short-term emissions from construction would be well below NSR Synthetic Minor thresholds established by NSF Indian Head's Title V operating permit, and insignificant relative to *de minimis* levels established by the USEPA for Charles County and the Southern Maryland Air Quality Control Region. GHG emissions from construction would be temporary and short-term in nature, and negligible when compared to overall GHG emissions within the State of Maryland and the United States.

To estimate the short-term Criteria Pollutants and GHG emissions for construction activities under Alternative 1, standard USEPA emission factors and equations (USEPA, 2024) were used and the following conservative assumptions were made:

- Site tree clearing/grubbing would last approximately 1 month. This would include using gas-powered saws operating up to 8 hours per day and a combination of diesel-powered dozers, tractors, loaders, and backhoes, operating 6 hours per day. The total area of tree clearing/grubbing would be approximately 39,006 sq ft (0.9 acres). The average haul capacity of trucks hauling off debris would be 20 cubic yards, with an average haul distance of 20 miles round trip. The average worker commute is estimated to be 20 miles round trip.
- Site grading would last approximately 1 month using a combination of diesel-powered graders, dozers, tractors, loaders, and backhoes operating 6 to 8 hours per day. The total area to be graded would be 43,560 sq ft (1 acre), with an estimated 50 cubic yards of material hauled on-site and 100 cubic yards hauled off-site. The average capacity of trucks hauling debris would be 20 cubic yards, with average haul distance of 20 miles round trip. The average worker commute is estimated to be 20 miles round trip.
- Trenching for utility infrastructure would last approximately 1 month using a combination of diesel-powered excavators, tractors, loaders, and backhoes operating 8 hours per day. A total area of 4,500 sq ft (0.10 acres) would be trenched. The average worker commute is estimated to be 20 miles round trip.

- Building construction and installation of prefabricated components would last approximately 3 months including on-site construction of a 1,325 sq ft (0.03 acres) building approximately 10 feet tall. A combination of diesel- and gas-powered equipment would be used including cranes, forklifts, tractors, loaders, and backhoes. The average worker commute is estimated to be 20 miles round trip, and the average vendor round trip commute is estimated to be 40 miles round trip.
- The access road and parking lot would include approximately 19,700 sq ft (0.45 acres) of asphalt paving. Paving operations would use a combination of pavers, rollers, and miscellaneous tractors/loaders/backhoes.

Table 3-5 details the criteria pollutant emissions estimates for Alternative 1 based on these assumptions, and Table 3-6 details GHG emissions estimates with significance comparisons. As demonstrated in the General Conformity Applicability Analysis, found in Appendix C, air emissions would be well below *de minimis* thresholds. Therefore, a full conformity determination is not required. A Record of Non-Applicability was prepared and included in Appendix C. Overall, there would be minor, short-term emissions associated with construction.

No long-term increases in emissions would be expected from operation of the UTT facility. In addition, no increase in personnel is expected for the UTT facility, and there would be no on-site generators or heating using propane or natural gas.

Table 3-5 Alternative 1 Criteria Pollutants Emissions

Source	*CO (tpy)*	*NO_x (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*	*SO_2 (tpy)*	*VOC (tpy)*
Clearing/Demolition	0.08	0.06	0.13	--	--	0.01
Site Grading	0.14	0.13	0.81	0.01	--	0.01
Trenching and Utilities	0.06	0.04	0.05	--	--	--
Building Construction	0.19	0.13	0.01	0.01	--	0.02
Architectural Coatings	--	--	--	--	--	--
Paving	0.07	0.05	--	--	--	0.01
UTT Operations	--	--	--	--	--	--
Total	**0.54**	**0.41**	**1.0**	**0.02**	**--**	**0.05**
NSR Synthetic Minor threshold	**--**	**39**	**--**	**--**	**--**	**25**
***De minimis* threshold**	**--**	**100**	**--**	**--**	**100**	**50**

Key: CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound; tpy = tons per year; UTT = underwater test tank; NSR = New Source Review.

Table 3-6 Alternative 1 GHG Emissions and Relative Significance (metric tons)

Total GHG Relative Significance (metric ton) 2025-2036				
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Alternative 1	87	0.003414	0.001650	88
State Total	58,221,463	107,271	6,992	58,335,727
U.S. Total	5,136,454,179	25,626,912	1,500,708	5,163,581,798
Alternative 2 as a Percent of State Totals	0.00015%	0.0000031%	0.000024%	0.00015%
Alternative 2 as a Percent of U.S. Totals	0.0000017%	0.00000001%	0.00000011%	0.0000017%

Notes: From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00000028%. Global value based on the U.S. emits 13.4% of all global GHG annual emissions (Center for Climate And Energy Solutions, 2024).
Key: CO_2e = carbon dioxide equivalents; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; tpy = tons per year.

3.1.2.3 Alternative 2 Potential Effects

Under Alternative 2, short-term emissions associated with construction would be well below NSR Synthetic Minor thresholds established by NSF Indian Head's Title V operating permit, and insignificant relative to *de minimis* levels established by the USEPA for Charles County and the Southern Maryland Air Quality Control Region. PM_{10} and GHG CO_2 emissions under Alternative 2 would be slightly lower than those under Alternative 1, due to a small decrease in the amount of tree clearing required. Overall, GHG emissions would be negligible and insignificant when compared with total GHG emissions for the State of Maryland and the United States.

The proposed facilities and footprint associated with Alternative 2 would be the same size as described under Alternative 1 but with slightly less tree clearing required (0.79 acres would be cleared under Alternative 2, compared to 0.90 acres of tree clearing for Alternative 1). Accordingly, the emissions were estimated using the same assumptions as those used for Alternative 1 and described in Section 3.1.2.2, except with slightly less tree clearing. Appendix C contains more detailed information about project inputs and assumptions used in estimating air emissions. Criteria pollutant emissions are detailed in Table 3-7 and GHG emissions estimates with significance comparisons are detailed in Table 3-8. Under Alternative 2, there would be short-term, minor emissions associated with the construction of the UTT.

No long-term increases in emissions would be expected from operating the UTT once it is constructed; no increase in personnel is expected for the facility, and there would be no on-site generators or heating using propane or natural gas.

Table 3-7 Alternative 2 Criteria Pollutants Emissions

Source	*CO (tpy)*	*NO_x (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*	*SO_2 (tpy)*	*VOC (tpy)*
Clearing/Demolition	0.08	0.06	0.10	--	--	0.01
Site Grading	0.14	0.13	0.81	0.01	--	0.01
Trenching and Utilities	0.06	0.04	0.05	--	--	--
Building Construction	0.19	0.13	0.01	0.01	--	0.02
Architectural Coatings	--	--	--	--	--	--
Paving	0.07	0.05	--	--	--	0.01
UTT Operations	--	--	--	--	--	--
Total	**0.54**	**0.41**	**0.97**	**0.02**	**--**	**0.05**
NSR Synthetic Minor threshold	**--**	**39**	**--**	**--**	**--**	**25**
***De minimis* threshold**	**--**	**100**	**--**	**--**	**100**	**50**

Key: CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound; tpy = tons per year; UTT = underwater test tank; NSR = New Source Review

Table 3-8 Alternative 2 GHG Emissions and Relative Significance (metric tons)

Total GHG Relative Significance (metric ton) 2025–2036				
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Alternative 2	86	0.003382	0.001482	86
State Total	58,221,463	107,271	6,992	58,335,727
U.S. Total	5,136,454,179	25,626,912	1,500,708	5,163,581,798
Alternative 1 as a Percent of State Totals	0.00015%	0.0000031%	0.000021%	0.00015%
Alternative 1 as a Percent of U.S. Totals	0.0000017%	0.00000001%	0.00000010%	0.0000017%

Notes: From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00000028%. Global value based on the U.S. emits 13.4% of all global GHG annual emissions (Center for Climate And Energy Solutions, 2024).
Key: CO_2e = carbon dioxide equivalents; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; tpy = tons per year.

3.2 Water Resources

The discussion of water resources includes groundwater, surface water, wetlands, floodplains, and shorelines. The Proposed Action would not occur in or adjacent to marine waters; therefore, marine waters are not discussed in this analysis. Coastal zone management is discussed in Section 3.6, Land Use.

Groundwater is subsurface water found beneath the water table in soils and geologic formations. It is recharged by surface water that flows or seeps into the soil. Groundwater is the most prevalent source of available fresh water for potable, agricultural, and industrial uses, especially in areas that lack riverine systems. Groundwater quality is affected by interactions with soil, sediments, rocks, surface waters, and the atmosphere and is known to be negatively affected by agricultural, industrial, urban, and other human activities.

Surface water generally consists of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude exceedances of water quality standards. If verified as jurisdictional by the USACE, surface waters are regulated as waters of the United States (33 CFR 328.3).

Wetlands are jointly defined by USEPA and USACE as, "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include "swamps, marshes, bogs and similar areas" (33 CFR 328.3). Development in wetlands and waters of the United States is regulated by the USACE and the representative state agency (here, MDE) pursuant to Section 404 and Section 401 of the Clean Water Act (33 CFR 320–329 and 33 CFR 328.3). The 1987 USACE Wetlands Delineation Manual uses the presence or absence of hydrology, hydrophytic vegetation (vegetation with the ability to grow in water), and hydric soils to determine if an area is a wetland. Normally, all three parameters must be present for an area to be considered a wetland under the USACE's jurisdiction (USACE, 1987).

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplains help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body.

Shorelines are located along marine (oceans), brackish (estuaries), or fresh (lakes) bodies of water. Physical dynamics of shorelines include tidal influences, channel movement and hydrological systems, flooding or storm surge areas, erosion and sedimentation, water quality and temperature, presence of nutrients and pathogens, and areas with potential for protection or restoration. Shore zones provide different types of habitats; thus, they support different kinds of biological resources.

For this analysis, the study area is defined as the alternative site boundary and adjacent area that could be directly or indirectly affected by changes in water resources.

3.2.1 Affected Environment

The following discussions describe the existing conditions for each of the categories of water resources at NSF Indian Head. Figure 3-1 and Figure 3-2 show the water resources found near the Alternative 1 and Alternative 2 study areas, respectively.

3.2.1.1 Groundwater

Groundwater is present in four water-bearing formations under Charles County. From deepest to shallowest, they are the Patuxent, Patapsco, Magothy, and Aquia formations (Charles County Planning Commission, 2006). The Patuxent and Patapsco formations compose the Potomac group, the lowermost and most widespread formation of the Coastal Plain aquifer system. Both provide the main potable water supply for NSF Indian Head. Because of their vast size, the aquifers within the Potomac group provide groundwater for many other counties in North Carolina, Virginia, Maryland, Delaware, and New Jersey.

3.2.1.2 Surface Water

NSF Indian Head has 55 miles of freshwater non-tidal streams, of which 26 miles are characterized as annually flowing and 6 miles are intermittent flowing. The remaining 23 miles are constructed drainage systems, dry streambeds, and estuarine waters (U.S. Navy, 2020). Major surface waters surrounding Stump Neck Annex include the Potomac River, Mattawoman Creek, and Chicamuxen Creek, which can support recreational use and limited aquatic life. The Potomac River and both creeks are tributaries of the Chesapeake Bay.

The Alternative 1 study area is approximately 140 feet away from the Potomac River at its closest point (see Figure 3-1). The new access road entrance would slightly overlap with an ephemeral drainage area during storm events. This drainage area could be considered jurisdictional by the USACE.

The Alternative 2 study area is approximately 237 feet away from Chicamuxen Creek at its closest point (see Figure 3-2) and 245 feet away from the Potomac River at its closest point (the start of the existing gravel road/proposed paved road). The Alternative 2 study area contains an ephemeral drainage area during storm events located at the northern side of the proposed fire break buffer. In addition, another ephemeral drainage area runs parallel to and approximately 30 feet from the existing gravel road to the proposed building location. Another ephemeral drainage area exists approximately 133 feet west of the proposed parking lot. These drainage areas could be considered jurisdictional by the USACE.

3.2.1.3 Wetlands

NSF Indian Head has both non-tidal and tidal wetlands. The NSF Indian Head Integrated Natural Resources Management Plan (INRMP) identifies approximately 249 acres of wetlands (U.S. Navy, 2020). The NSF Indian Head Environmental Office maintains wetlands information that is updated through project-specific wetland delineations. Non-tidal wetlands, also known as palustrine or freshwater, compose approximately 69 percent of the wetlands at NSF Indian Head (U.S. Navy, 2020). Approximately 31 percent of wetlands at NSF Indian Head are classified as tidal wetlands. Four types of brackish tidal wetland communities have been identified at NSF Indian Head: tidal shrub swamps, tidal marshes, intertidal mudflats, and intertidal shore (U.S. Navy, 2020).

3.2.1.4 Floodplains

Climate change is associated with more extreme weather events, including flood events. Coastal areas are especially vulnerable to rising sea levels and flooding. Even a sea level rise of two feet would inundate areas along the Potomac River and Chicamuxen Creek at NSF Indian Head (NOAA, 2024).

Floodplains are designated areas that have either a 1 percent chance of a flood occurring in any one year, identified as a 100-year floodplain, or a 0.2 percent chance of being inundated by a flood in any one year, identified as a 500-year floodplain. The Federal Emergency Management Agency (FEMA) produces floodplain delineation maps. In addition to complying with EO 11988, *Floodplain Management*, utility crossings within a 100-year floodplain are regulated under the Code of Maryland Regulations (COMAR) 26.17.04.08, *Temporary Construction in a Stream Channel or Floodplain*, which establishes technical requirements for temporary construction activities within a 100-year floodplain.

The 100-year floodplain at NSF Indian Head is approximately 10 feet above mean sea level (MSL) (FEMA, 2024) and covers approximately 284 acres of Stump Neck Annex. Steep slopes on the northwestern shoreline of the annex limit the extent of the Potomac River floodplain (U.S. Navy, 2020).

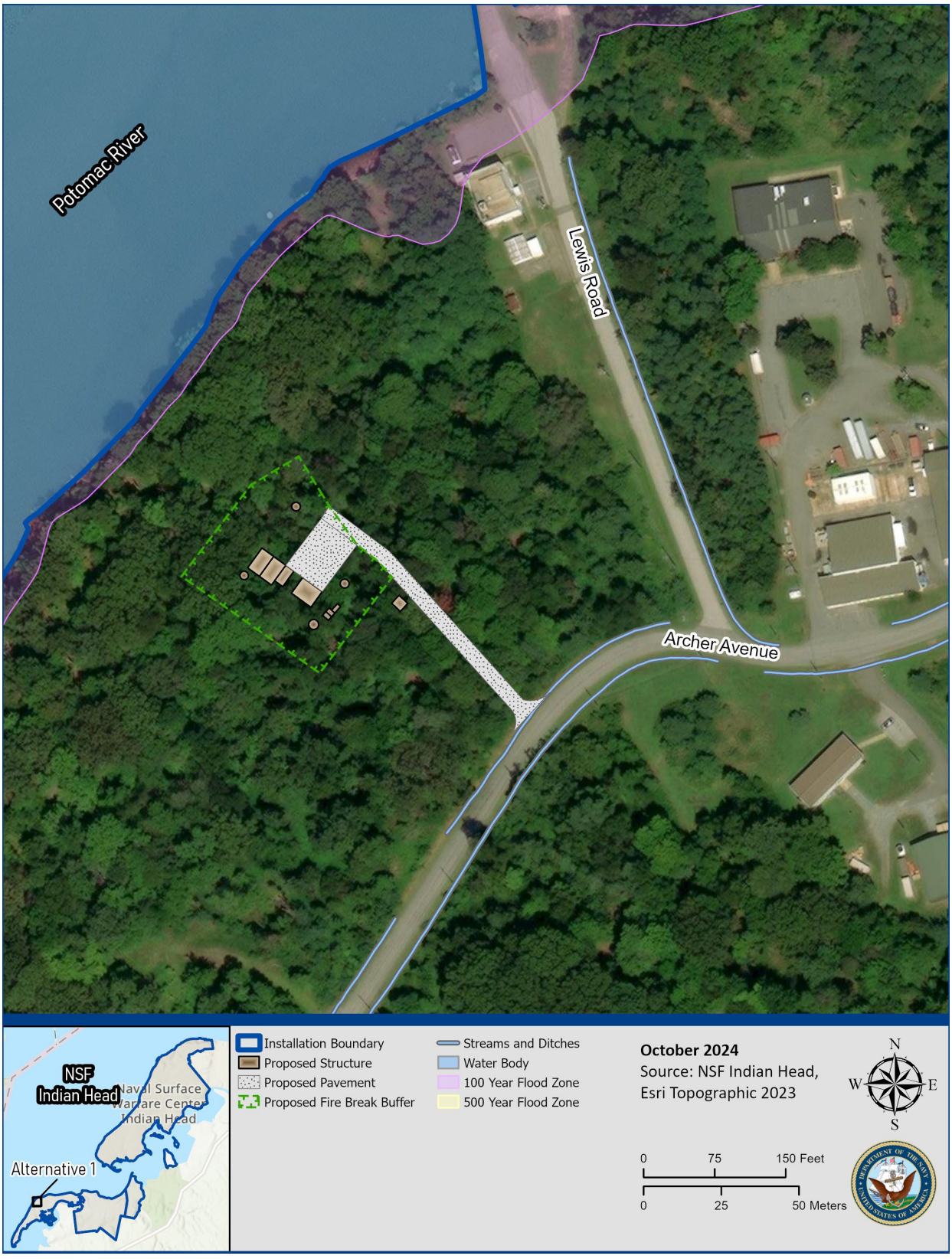

Figure 3-1 Water Resources at the Alternative 1 Study Area

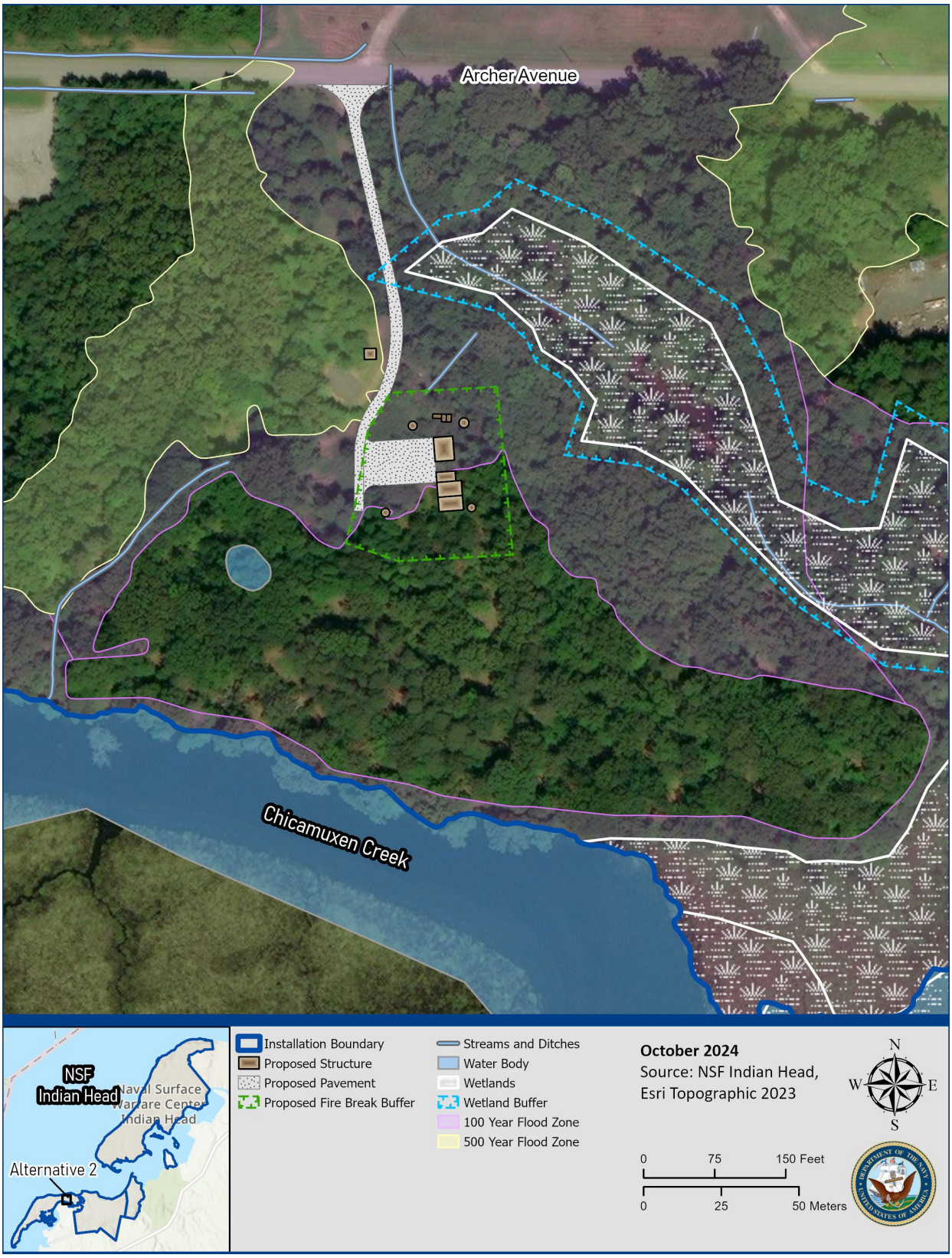

Figure 3-2 Water Resources at the Alternative 2 Study Area

3.2.1.5 Shorelines

Due to the location of NSF Indian Head on peninsulas and islands between the Potomac River, Mattawoman Creek, and Chicamuxen Creek, the installation has extensive shorelines—approximately 17 miles (U.S. Navy, 2020).

3.2.2 Environmental Consequences

This section analyzes potential effects from the alternatives on groundwater, surface water, wetlands, floodplains, and shorelines. Groundwater effect analysis focuses on potential effects on the quality, quantity, and accessibility of the groundwater. Surface water effect analysis considers potential effects that could directly alter or degrade surface waters, water quality, or hydrology. Wetland effect assessment considers potential effects that could directly alter or degrade wetlands or wetland quality, or indirectly alter wetland hydrology, soils, or vegetation. Floodplain effect analysis considers if any new construction is proposed within a floodplain or could impede the functions of floodplains in conveying floodwaters. Shoreline effect assessment considers ecological functions, such as channel hydrology or flooding/storm surge protection. It also considers effects from erosion and sedimentation to shoreline quality including nutrients and pathogens to areas with the potential for protection or restoration.

Water Resources Potential Effects:

- **No Action Alternative:** No change to existing conditions. No significant effects.
- **Alternative 1:** Minor, short-term effects during construction. No direct effects on wetlands, groundwater, or floodplains. No significant effects.
- **Alternative 2:** Minor, short-term effects during construction, and minor, long-term effects on surface water, wetlands, and floodplains. No significant effects.

3.2.2.1 No Action Alternative

Under the No Action Alternative, the construction of the UTT facility at NSF Indian Head would not occur. Thus, there would be no change to existing water resources and no direct effect on water resources. Therefore, the No Action Alternative would not result in significant effects on water resources.

3.2.2.2 Alternative 1 Potential Effects

Groundwater

Under Alternative 1, no new groundwater demand or use is anticipated. Alternative 1 would result in approximately 13,068 sq ft (0.3 acres) of new impervious (non-porous) surface, which would decrease the area available for water infiltration back into the ground (groundwater recharge). Since the increase in proposed impervious surfaces is minimal and sufficient adjacent areas would remain pervious (porous; vegetated), this indirect effect on groundwater recharge would be negligible to minor.

Appropriate BMPs, such as an Erosion and Sediment Control Plan, would be implemented during and after construction to manage additional stormwater runoff carrying sediments and contaminants (such as fertilizers and other chemicals) that could leach into groundwater. Therefore, leaching of pollutants into groundwater is not anticipated.

Surface Water and Wetlands

According to the National Wetlands Inventory (NWI) map and NSF Indian Head staff, there are no wetlands within or near the Alternative 1 study area. There would be no direct effects on wetlands.

The ephemeral drainage area at the proposed access road entrance would experience erosion and sedimentation effects during construction. However, due to the minimal overlap and the implementation of erosion and sedimentation BMPs throughout the construction process, the overall function of the drainage area would be preserved. Should the drainage area be identified as jurisdictional, NSF Indian Head would obtain the necessary permits from MDE. Therefore, effects on the drainage area would be minor in the short-term and negligible in the long-term.

Alternative 1 would result in the addition of a minimal amount of impervious surface, which would increase stormwater runoff, pollutants, and sediments entering on-site and adjacent surface water and wetlands. Tree removal (0.90 acres) could adversely affect the hydrology and water quality of the on-site and adjacent water and wetlands. However, with the implementation of BMPs during and after construction, including the Erosion and Sediment Control Plan, to manage stormwater runoff, sedimentation, and pollutants, effects on surface water and wetlands would be minor.

Floodplains

The Alternative 1 study area is not within a 100-year or 500-year floodplain, as shown in Figure 3-1. Thus, there would be no effects on floodplains.

Shorelines

Alternative 1 is approximately 140 feet away from the Potomac River. Direct effects on shorelines would not occur because the Potomac River shoreline lies outside of the limits of proposed development. During construction, adherence to BMPs, including an MDE-approved erosion and sediment control plan, would manage stormwater runoff and sediments. Therefore, there would be no indirect effects on shoreline quality (from soil erosion/sedimentation) and shoreline erosion potential (from increased stormwater runoff).

Implementation of Alternative 1 would not result in direct effects on water resources. There would be indirect, short-term effects on groundwater and surface water during construction. Therefore, no significant effects on water resources are expected under Alternative 1.

3.2.2.3 Alternative 2 Potential Effects

Groundwater

Under Alternative 2, no new groundwater demand or use is anticipated. Similar to Alternative 1, there would be an increase of approximately 13,068 sq ft (0.3 acres) of new impervious surface. Because this increase is minimal and sufficient adjacent areas would remain pervious, effects on groundwater recharge would be negligible to minor.

Surface Water and Wetlands

The NWI identified, and an informal wetland investigation conducted by NSF Indian Head staff confirmed, a wetland near the Alternative 2 study area (depicted on Figure 3-2). This 0.63-acre wetland is approximately 12 feet from the existing gravel road/proposed paved road and approximately 8 feet from the proposed sanitary sewer line (not shown on Figure 3-2 for security purposes). According to the

NWI map, the wetland is classified as Palustrine Forested Broad-Leaved Deciduous Seasonally Flooded/Saturated (USFWS, 2024). Such wetlands are nontidal dominated by trees and shrubs that have woody vegetation at least 6 meters (20 feet) tall (Federal Geographic Data Committee, 2013). These trees or shrubs have relatively wide, flat leaves that are shed during the cold or dry season, with surface water present for an extended time during the growing season. This wetland has not yet been field-verified by the USACE.

As shown in Figure 3-2, the proposed fire break buffer is within a small portion of an ephemeral drainage area. Vegetation within the fire break would be converted to maintained grass and would result in minimal effects on the drainage area. The existing gravel road crosses a small portion of the 25-foot wetland buffer. The proposed paved road and sanitary sewer line may extend beyond the existing gravel road footprint. Thus, there could be additional wetland buffer effects in this location; however, these effects are anticipated to be minimal. Consultation with and verification of wetland/stream boundaries from the USACE and MDE would occur prior to construction to ensure compliance with Section 401/404 of the Clean Water Act. If required, Section 401/404 permitting would be obtained and any subsequent mitigation would be implemented.

The tidal wetlands along the Chicamuxen Creek shoreline are designated as wetlands of special state concern. MDE regulates activities within a 100-foot buffer of such wetlands; however, the construction area for Alternative 2 is located outside of the Chicamuxen Creek wetland 100-foot buffer.

Similar to Alternative 1, Alternative 2 would result in the addition of a minimal amount of impervious surface. The additional impervious surface could increase stormwater runoff and pollutants entering adjacent surface water, such as Chicamuxen Creek. In addition, 0.79 acres of trees would be removed. This could adversely affect the hydrology and water quality of nearby surface water. However, with the implementation of BMPs during and after construction to manage stormwater runoff and pollutants, this indirect effect on surface water and wetlands would be minor.

Floodplains

According to the FEMA Flood Insurance Rate Map, the Alternative 2 study area is located primarily within Flood Zone AE and partially within Flood Zone X (Figure 3-2). A Flood Zone AE classification is given to special flood hazard areas that are susceptible to flooding from a 100-year flood event. A Flood Zone X classification is given to areas that are susceptible to flooding from a 500-year flood event. EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse effects associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. New construction within the floodplain must meet regulatory criteria to offset the effects of flooding. EO 11988 states that, if the floodplain cannot be avoided, “accepted floodproofing and other flood protection measures shall be applied to new construction or rehabilitation. To achieve flood protection, agencies shall, whenever practicable, elevate structures above the base flood level rather than filling in land.” Thus, under Alternative 2, flood risks would be mitigated by constructing the UTT facility and any flood-susceptible utilities at a minimum of 3 feet above the 100-year flood level, or a waiver would be sought to comply with EO 11988. In addition to complying with EO 11988, Alternative 2 would comply with COMAR 26.17.04.08.

Construction within a floodplain requires a joint permit under USACE and MDE. The permit requires that steps be taken to avoid effects on water resources, that potential effects be minimized, and that compensation be provided for all remaining unavoidable effects.

Under Alternative 2, the proposed development would cause some of the existing pervious (porous; vegetated) area that is available for flood storage to be converted into impervious (non-porous) area. Thus, flood storage capacity would be reduced, flood height and velocity would increase, and flood hazards in the surrounding vicinity would increase. Considering that the conversion to impervious area is minimal, construction within the floodplain would meet regulatory criteria, BMPs would be implemented, and the effects on floodplains would be minor.

Shorelines

The proposed development under Alternative 2 is approximately 237 feet away from Chicamuxen Creek. The existing gravel/proposed paved road is approximately 245 feet away from the Potomac River. Similar to Alternative 1, effects on shoreline quality and erosion would be negligible because the Chicamuxen Creek and Potomac River shorelines are a distance away from the proposed impervious surfaces and construction site. The Chicamuxen Creek shoreline is also protected by a vegetated buffer that would naturally trap sediments and stormwater runoff from entering the shoreline. Increased stormwater runoff would not likely cross over Archer Avenue to the Potomac River. BMPs would be implemented during and after construction.

Implementation of Alternative 2 would result in minor, short-term effects on groundwater and surface water during construction, and minor, long-term effects on surface water, wetlands, and floodplains from construction activities, tree removal, reduced flood storage, and stormwater runoff. Therefore, no significant effects on water resources are expected under Alternative 2.

3.3 Geological Resources

This discussion on geological resources includes topography, geology, soils, and marine sediments. Topography is typically described with respect to the elevation, slope, and surface features found within the study area. The geology of an area includes bedrock materials, mineral deposits, and fossil remains. The principal geological factors influencing the stability of man-made structures are soil stability and seismic properties. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility determine the ability for the ground to support structures and facilities. Soils are typically described in terms of their type, slope, physical characteristics, and relative land use compatibility or building limitations.

Geological resources also include bathymetry. Bathymetry is the study of the beds or floors of water bodies, including the ocean, lakes, rivers, and streams (NOAA, 2024). For purposes of this discussion, bathymetry involves analyzing the effect of the Proposed Action on the topography of nearby river or creek beds. The Proposed Action would not occur directly in any waterways; therefore, there would be no effect on bathymetry, and it was dismissed from analysis.

For this analysis, the study area is defined as the alternative site boundary and associated ground disturbance.

3.3.1 Affected Environment

The following discussions provide a description of the existing geological resources within the study areas at NSF Indian Head.

3.3.1.1 Topography

Like other areas within the Coastal Plain, NSF Indian Head is relatively flat and at a low elevation. However, the slopes of NSF Indian Head along the neighboring river and creeks tend to be steep, often more than a 15 percent grade (U.S. Navy, 2020). At the Alternative 1 study area, elevations range from 23 feet above MSL at the proposed access road entrance to 11 feet above MSL near the building site. Elevations at the Alternative 2 study area range from 7 feet above MSL at the building site to 0 feet above MSL near the Chicamuxen Creek shoreline. (USGS, 2024a).

3.3.1.2 Geology

NSF Indian Head is in the Potomac River Basin in the Atlantic Coastal Plain physiographic province, which was formed more than 500 million years ago. The geology of the study areas consists mostly of gravel, sand, silt, and clay deposits from the Appalachian and Piedmont regions. The deposits rest on dense, hard, crystalline metamorphic or igneous rocks with origins in the Precambrian and Cambrian Ages. Crystalline bedrock typically lies approximately 600 feet below the surface and is composed of quartz, chlorite, mica, and kaolonite (U.S. Navy, 2013a).

3.3.1.3 Soils

In general, the soils of NSF Indian Head consist of silty and sandy loams with minor amounts of gravel and tend to have low permeability (U.S. Navy, 2020). The alternative study areas contain various soil types (Table 3-9 and Figures 3-3 and 3-4). At the Alternative 1 study area, the soil is composed of Liverpool silt loam (LsB). This soil type is moderately well-drained, non-hydric (upland soil), and has a medium runoff rating and moderate erosion hazard. At the Alternative 2 study area, the soil is composed primarily of Piccowaxen loam (PcA). A small portion of a proposed utility line would cross through Piccowaxen loam (PcB), which is not shown on Figure 3-4 due to security purposes. Both PcA and PcB soils are somewhat poorly drained, non-hydric (upland soil), and have a very high runoff rating. PcB has a moderate erosion hazard, making it more susceptible to erosion than the other loam type within the Alternative 2 study area (NRCS, 2024).

The alternative study areas contain soils classified as prime farmland soils and farmland soils of statewide importance (LsB, PcA, and PcB) (USDA, 2024). However, federal property is not subject to the provisions of the Farmland Protection Policy Act.

Table 3-9 Soil Conditions within the Study Areas

Soil Type	*Parent Material*	*Drainage Class*	*Runoff Class*	*Ecological Site*	*Erosion Hazard*	*Study Area Where Present*
Liverpool silt loam (LsB)	Silty and loamy fluviomarine deposits	Moderately well-drained	Medium	F153CY020MD — Moist Loess Upland	Moderate	Alternative 1
Piccowaxen loam (PcA)	Silty and loamy fluviomarine deposits	Somewhat poorly drained	Very high	F153CY020MD — Moist Loess Upland	Slight	Alternative 2
Piccowaxen loam (PcB)	Silty and loamy fluviomarine deposits	Somewhat poorly drained	Very high	F153CY020MD — Moist Loess Upland	Moderate	Alternative 2

Source: (NRCS, 2024)

Figure 3-3 Soil Types at the Alternative 1 Study Area

Figure 3-4 Soil Types at the Alternative 2 Study Area

3.3.1.4 Marine Sediments

Increases in marine sedimentation is a major conservation concern of the Potomac River and Chesapeake Bay watersheds, which encompass NSF Indian Head. Increases in marine sedimentation can directly affect water quality, harm submerged vegetation, degrade fisheries, and reduce drinking water availability (USEPA, 2023b). Streamside management zones, wetland protections, and other erosion-control methods have reduced the level of sedimentation in the Potomac River watershed (CBP, 2005). The proposed structures under Alternative 1 would be constructed within approximately 140 feet of the Potomac River. The proposed structures under Alternative 2 would be constructed within approximately 245 feet of the Potomac River and 237 feet of Chicamuxen Creek.

3.3.2 Environmental Consequences

Geological resources are analyzed in terms of drainage, erosion, land subsidence, and stability. The analysis of topography and soils focuses on the area that would be disturbed, the potential for erosion from construction areas, and the potential for eroded soils to become pollutants in downstream surface water during storm events. BMPs are identified to minimize soil effects and prevent or control pollutant releases into stormwater.

Geological Resources Potential Effects:

- **No Action Alternative:** No change in existing conditions. No significant effects.
- **Alternative 1:** Minor, short-and long-term effects on soils from construction, grading, and increased impervious surfaces. Minor, long-term effects on topography. BMP implementation would minimize soil erosion. No significant effects.
- **Alternative 2:** Effects would be similar to Alternative 1. No significant effects.

3.3.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline topography, geology, soils, or marine sediments. Therefore, no significant effects on geological resources would occur with implementation of the No Action Alternative.

3.3.2.2 Alternative 1 Potential Effects

Demolition under Alternative 1 would include the clearing and grubbing of existing trees. Fine grading and soil compaction would occur at the location of the proposed concrete slabs. No changes to bedrock geology are anticipated. Construction of the new facility would include a total of approximately 43,560 sq ft (1 acre) of soil disturbance. Because the construction disturbance exceeds one acre, a General Construction Permit under the National Pollutant Discharge Elimination System (NPDES) would be required. Although the LsB soil type found at the Alternative 1 study area has a moderate erosion hazard, effects would be considered minor. An Erosion and Sediment Control Plan and stormwater management plan would be required as part of the NPDES and building permit process, minimizing adverse effects from runoff into nearby surface waters.

The Erosion and Sediment Control Plan would show the existing topography of the study area, indicate how the topography would be altered, and identify measures to minimize effects. Because most of the study area is relatively flat, minimal change in topography would occur from construction grading. NSF Indian Head would comply with applicable state erosion and sediment control laws and stormwater management laws.

The four proposed concrete pads, parking area, paved road, and containment dike would increase impervious surfaces in the study area by approximately 13,068 sq ft (0.3 acres). Impervious surfaces cannot absorb water like natural landscapes can; instead, water drains across these surfaces towards localized downhill areas. Such areas could see corresponding long-term increases in soil erosion; however, with BMPs implemented, this effect would be minimal.

Tree removal would lead to higher rates of soil erosion, since tree roots hold soil in place, increasing the stability and containment of soils within an area. Similarly, laying new utility lines to connect to existing utilities would temporarily disturb soil structure. However, only minor, short-term effects on soils from erosion would occur because BMPs would be in place. Additionally, vegetation would be re-established to stabilize soils once construction is complete. Pursuant to Section 438 of the Energy Independence and Security Act, post-development hydrology of the study area would meet or improve the pre-development hydrology.

In summary, there would be direct soil disturbance of 1 acre. With the use of BMPs, there would be minor, short- and long-term effects on soils from construction, grading, and increased impervious surfaces. Direct, long-term effects would be expected from localized changes in soil and topography; however, with BMPs implemented, these effects would be minor. Therefore, implementation of Alternative 1 would not result in significant effects on geological resources.

3.3.2.3 Alternative 2 Potential Effects

Under Alternative 2, effects on geological resources would be similar to Alternative 1, with slightly less erosion during construction. The predominant soil type in the Alternative 1 study area (LsB) has a moderate erosion hazard, while the predominant soil type in the Alternative 2 study area (PcA) poses only a slight erosion hazard. The PcB soil type is found on a very small area of the Alternative 2 study area and has a moderate erosion hazard. An Erosion and Sediment Control Plan and stormwater management plan would be required as part of the NPDES and building permit process. The use of site-specific BMPs would limit the potential for soil erosion and sediment transport from construction, demolition, and facility operations.

Under Alternative 2, the existing gravel drive would be repaired, paved, and extended to the new UTT facility. Earth disturbance would be similar to Alternative 1, but Alternative 2 would require more utility trenching as it is further from the existing utility infrastructure. BMPs would minimize potential erosion or sedimentation effects. Therefore, implementation of Alternative 2 would not result in significant effects on geological resources.

3.4 Cultural Resources

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, and districts; and physical entities and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into three major categories:

- Archaeological resources (precolonial and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.

- Traditional cultural places include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

Discussion of visual resources includes the natural and built features of the landscape visible from public views that contribute to an area's visual quality. Visual perception is an important component of environmental quality that can be affected through changes created by various projects. Visual effects occur as a result of the relationship between people and the physical environment.

3.4.1 Affected Environment

Cultural resources listed in the National Register of Historic Places (NRHP) or eligible for listing in the NRHP are "historic properties" as defined by the National Historic Preservation Act (NHPA). The list was established under the NHPA and is administered by the National Park Service on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable SHPO. An NRHP-eligible property has the same protections as a property listed in the NRHP. Historic properties include archaeological and architectural resources.

The Navy has conducted inventories of cultural resources at NSF Indian Head to identify historic properties that are listed or potentially eligible for listing in the NRHP (NAVFAC Washington, 2020). The entire Stump Neck Annex is an NRHP-eligible area—the Explosive Ordnance Disposal Historic District, which was determined eligible in 2016. These and other cultural resources identified within the entirety of NSF Indian Head have been incorporated into the facility's Integrated Cultural Resources Management Plan (ICRMP), finalized in October 2020. The Navy developed specific guidance for the stewardship of historic properties on NSF Indian Head, including Standard Operating Procedures (SOPs) for compliance with Section 106 and Section 110 of the NHPA.

The area of potential effect (APE) for cultural resources is the geographic area or areas within which an undertaking (project, activity, program, or practice) could cause changes in the character or use of any historic properties present. The APE is influenced by the scale and nature of the undertaking and might be different for various kinds of effects caused by the undertaking.

For this Proposed Action, the Navy determined that the APE for archaeological resources encompasses the area that would be subject to ground disturbance, including utility trenching, road improvements, stormwater management facilities, and laydown areas. The archaeological APE consists of the limits of disturbance for Alternative 1 and Alternative 2. The APE for aboveground resources includes an area defined as the entire project area for both alternative locations with a buffer to include visual effects. The APE for Alternatives 1 and 2 generally includes a 400-foot buffer around aboveground resources (see Figure 3-5 and Figure 3-6). All APEs are within the Explosive Ordnance Disposal Historic District.

3.4.1.1 Archaeological Resources

There are nearly 120 archaeological sites within the bounds of NSF Indian Head, most of which have been identified as a result of large-scale surveys conducted during the 1980s and 1990s. Among the known resources, nine sites have been determined eligible for the NRHP. The NRHP-eligible sites are predominantly representative of precolonial Native American occupation of the installation.

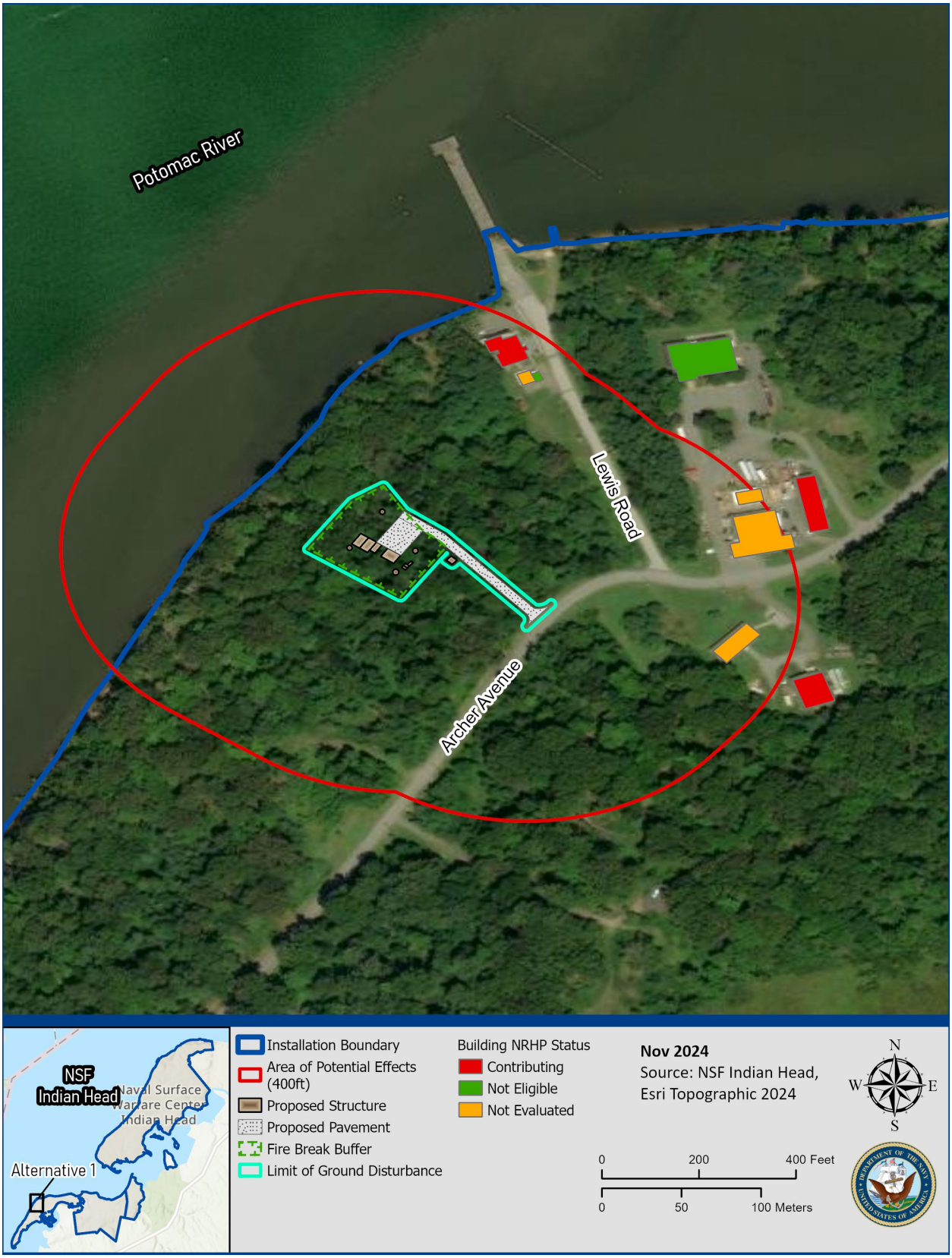

Figure 3-5 Alternative 1 Area of Potential Effect

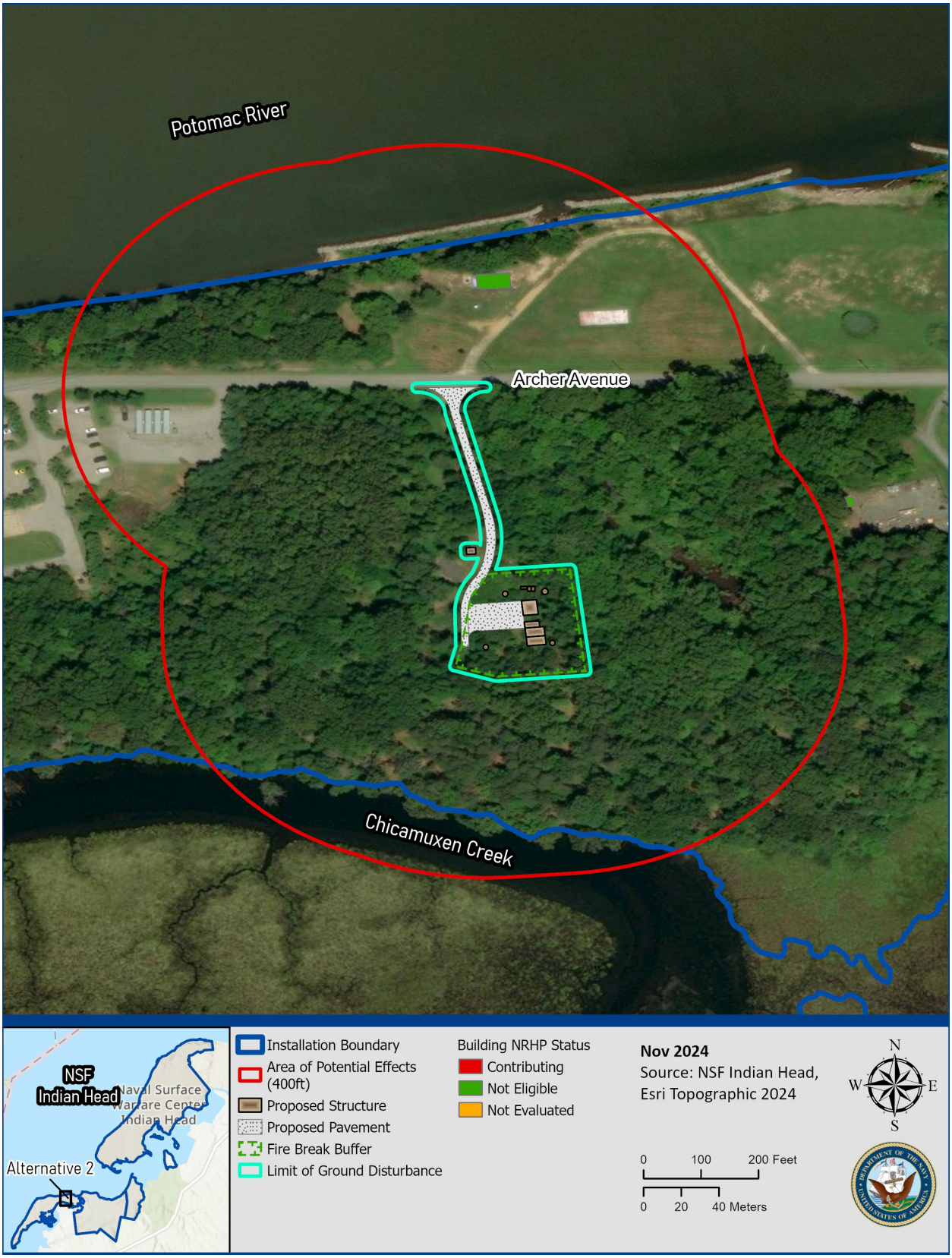

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Figure 3-6 Alternative 2 Area of Potential Effect

The majority of Stump Neck Annex has been surveyed for archaeological resources. There are a few small areas on Stump Neck that are unsurveyed; some of these appear to be marsh lands. Three of the nine NRHP-eligible sites are located on Stump Neck Annex.

No archaeological sites have been identified within or immediately adjacent to the Alternative 1 APE (areas of ground disturbance).

Within the archaeological Alternative 2 APE is one of these NRHP-eligible sites, 18CH388. Several Phase II investigations have been conducted on portions of this site. Selected areas within 18CH388 have been determined eligible due to their integrity, presence of features, and span of artifacts from the Middle Archaic to Late Woodland periods (NAVFAC Washington, 2020).

Within a half-mile buffer of the Alternative 1 and 2 APEs, there are seven sites that have been determined either not eligible for the NRHP or need additional investigation to make a determination. Table 3-10 shows the eligibility of these sites.

Table 3-10 Archaeological Sites Within a Half-Mile of Alternatives 1 and 2

Site Number	*NRHP Status*
18CH388	Eligible
18CH389	Not Eligible
18CH395	Not Eligible
18CH626	Not Eligible
18CH631	Not Eligible
18CH633	Not Eligible
18CH634	Phase II required
18CH635	Not Eligible

Source: (NAVFAC Washington, 2020)
Key: NRHP = National Register of Historic Places

3.4.1.2 Architectural Resources

A variety of historic districts have been identified and surveyed at NSF Indian Head including the Explosive Ordnance Disposal Historic District among several others. However, the Maryland SHPO, MHT, suggests that the entire installation is a single historic district referred to as the Naval Ordnance Station Indian Head. MHT has determined these previously identified historic districts are historic "areas." These areas, as well as numerous individual buildings, contribute to the significance of the Naval Ordnance Station Historic District.

At the Alternative 1 site, there are several architectural resources within and adjacent to the APE, which are listed in Table 3-11. There is one contributing resource within the APE—Building 2076. One building within the APE has previously been determined not eligible: Building 2171. Four resources within the APE remain unevaluated: Buildings 2100, 2106, 2121, and 2222.

There are no contributing architectural resources within or adjacent to the Alternative 2 APE. In addition, there are no architectural resources within view of the proposed construction within the APE. There is one non-contributing resource within the APE.

Table 3-11 Architectural Resources within the Areas of Potential Effect of the Proposed Undertaking

Facility Number	*NRHP Status*	*MHT ID Number*
Alternative 1		
2076	Contributing	CH-371-113
2100	Not Evaluated	—
2106	Not Evaluated	—
2121	Not Evaluated	—
2171	Not Eligible	—
2222	Warehouse	—
Alternative 2		
2174	Not Eligible	—

Source: (NAVFAC Washington, 2020)
Key: ID = identification; MHT = Maryland Historical Trust; NRHP = National Register of Historic Places.

3.4.1.3 Traditional Cultural Places

NSF Indian Head has not been formally evaluated as a Traditional Cultural Place for listing to the NRHP; however, until such an evaluation is made, it is considered potentially eligible for planning purposes.

3.4.2 Environmental Consequences

Analysis of potential effects on cultural resources considers both direct and indirect effects. Direct effects can be the result of physically altering, damaging, or destroying all or part of a resource. Indirect effects include altering characteristics of the surrounding environment that contribute to the importance of the resource; introducing visual, atmospheric, or audible elements that are out of character for the period the resource represents (thereby altering the setting); or neglecting the resource to the extent that it deteriorates or is destroyed.

Cultural Resources Potential Effects:

- **No Action:** No change to existing conditions. No effects; no significant effects.
- **Alternative 1:** No known archaeological sites. One NRHP resource not evaluated within the outermost explosive safety arc; potential adverse effect. No significant effects.
- **Alternative 2:** One archaeological site; utility line excavation may cause an adverse effect. No aboveground historic properties. No significant effects.

3.4.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to cultural resources. Therefore, no significant effects on cultural resources would occur with implementation of the No Action Alternative.

3.4.2.2 Alternative 1 Potential Effects

Archaeological Effects

There would be no effects on known archaeological sites from Alternative 1. Much of the area within the APE has been investigated for archaeological resources including the areas of ground disturbance.

Site 18CH631 is located adjacent to the proposed UTT complex; however, it is not within areas of ground disturbance. This site has been determined not eligible for the NRHP (NAVFAC Washington, 2020).

Architectural Effects

Under Alternative 1, there would be no direct effects from construction to architectural resources. Accidental detonations could result in potential adverse effects to contributing buildings within the explosive safety arcs; however, if this were to occur, the Navy would follow emergency procedures for Section 106 and NEPA to consult and address any adverse effects.

Within the APE is one NRHP-eligible resource contributing to the Naval Ordnance Station Historic District; the Explosive Ordnance Disposal Historic Area, Building 2076. Construction and use of the UTT would not have any direct or indirect effects on Building 2076. The proposed structures and landscape features would be set back from Lewis Road and Archer Avenue and surrounded by the existing woods as a buffer. There would be no adverse visual or audible effects on the NRHP-eligible resource.

Within the APE are four resources that have not been evaluated (Buildings 2106, 2100, 2121, and 2222). There would be no direct or indirect effects to these four buildings. These buildings would not be affected from visual or audible effects.

Summary

The construction of the proposed UTT facility and associated resources under Alternative 1 would result in no direct and indirect effects, visual or audible, to historic properties.

3.4.2.3 Alternative 2 Potential Effects

Archaeological Effects

One archaeological site within the Alternative 2 APE has been identified—Site 18CH388 (Maymon, Jeffrey, et al., 1998). While portions of this site have been determined NRHP-eligible they are located outside of the limits of disturbance. Additionally, the majority of the APE south of Archer Road has been previously disturbed from past development, which includes several structures, radio towers, a blast pond, and the existing dirt/gravel drives providing access from Archer Avenue. In addition, the 1998 archaeological investigations identified no sites or features within the areas of ground disturbance for the UTT (Maymon, Jeffrey, et al., 1998).

Architectural Effects

There are no aboveground historic properties (NRHP-eligible resources) within the APE. There is one architectural resource within the APE, which is non-contributing (Building 2174). In addition, there are no historic properties adjacent to the APE that would be indirectly affected from visual or audible effects.

Summary

The construction of the proposed UTT facility and associated resources under Alternative 2 would result in no adverse effects on known cultural resources. Much of the new construction would be located in a previously disturbed area. Some utilities would be placed within previously disturbed, non-eligible portions of an NRHP-eligible archaeological site. Therefore, the implementation of Alternative 2 would not result in significant effects on cultural resources.

3.5 Noise

This discussion of noise includes the types or sources of noise and the associated sensitive receptors in the human and biological environment. Noise effects regarding environmental justice are discussed in Section 3.11.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

- Intensity — the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
- Frequency — the number of cycles per second the air vibrates, in Hertz (Hz)
- Duration — the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual.

For this analysis, the study area for noise effects is defined as the alternative site boundary and adjacent area that could be directly or indirectly affected by changes in noise.

3.5.1 Basics of Sound

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The decibel is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or Hz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies to replicate human sensitivity. It is common to add the "A" to the measurement unit to identify that the measurement has been made with this filtering process. In this document, the decibel unit refers to A-weighted sound levels for human receptors.

C-weighting is applied to intense low-frequency noise that can cause vibrations, such as large caliber weapons and bombs. C-weighting does not apply adjustments to noise signals over most of the audible frequencies but does apply small adjustments to the very low and very high frequencies. C-weighting is appropriate for impulsive sounds. When experienced indoors, impulsive sounds can create secondary noise from rattling and vibrations of the building.

3.5.2 Noise Metrics

A metric is a system for measuring or quantifying a characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. The noise metrics used in this EA are described in summary format in this section and in a more detailed manner in Appendix D and Appendix E.

Construction Noise. The maximum A-weighted sound level, or Lmax, is the highest A-weighted sound level measured during a single event where the sound level changes value with time (e.g., an aircraft overflight). During an aircraft overflight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. Lmax defines the maximum sound level occurring for a fraction of a second.

Operational Noise. Noise guidelines for using explosives are described in the U.S. CFR (Title 30, Chapter VII, Subchapter K, Part 816, section 816.67). These guidelines require that blasting operations are done safely to avoid injury, prevent property damage, and protect underground resources and watercourses beyond the permitted blasting area. Airblast levels, which refer to the sound pressure waves caused by explosions, must stay below certain decibel limits at specific low frequencies to avoid disturbing nearby residences or public buildings (see Table 3-12). Blasting sites need monitoring equipment to ensure airblast levels stay within safe ranges. Additionally, debris from blasts, known as flyrock, must not travel beyond specified boundaries. Ground vibrations are also controlled to prevent structural damage to nearby infrastructure, with allowed vibration levels depending on the distance from the site. There are some exceptions for structures owned or leased by the blasting company, but they must still meet local permissions.

Table 3-12 Airblast Limits

Lower frequency limit of measuring system, in Hz (±3 dB)	*Maximum level, in dB*
0.1 Hz or lower—flat response[1]	134 peak
2 Hz or lower—flat response	133 peak
6 Hz or lower—flat response	129 peak
C-weighted—slow response[1]	105 peak dBC

[1]Only when approved by the regulatory authority
Key: dBC = C-weighted decibel

The noise environment at NSF Indian Head is dominated by impulsive noise events at the EOD ranges. Humans perceive and react differently to impulsive and continuous noise events depending on the level, frequency, and duration of the event. Because of the difference in human response to these types of noise events, military operational noise is assessed using several noise metrics. The two most commonly used noise metrics are the Day-Night Average Sound Level (DNL) and peak noise level (LPk).

DNL is defined as the average sound energy in a 24-hour period with an adjustment (in decibels) added to nighttime noise events occurring between the hours of 10:00 p.m. and 7:00 a.m. DNL is a useful descriptor for weapons noise because (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. DNL provides a measure of the overall acoustical environment, but it does not directly represent the sound level at any given time. DNL contours are based on the average annual day and averaged over 365 days for long-term compatible land use planning. Although DNL provides a single measure of the overall noise effect, it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour period. For example, a daily average sound level of 65 dB could result from only a few loud events or many relatively quiet events.

To assess impacts from different types of noise events, the DNL metric is used with different weighting factors that emphasize certain parts of the audio frequency spectrum. The normal human ear detects sounds in the range from 20 Hz to 20,000 Hz, and it is most sensitive to sounds in the 1,000 to 4,000 Hz range. Community noise is assessed using a filter that approximates the frequency response of the human ear to moderate sound levels, which adjusts low and high frequencies to match the sensitivity of the ear.

EOD operations at NSF Indian Head produce noise that is impulsive in nature with sudden bursts of sound pressure from explosions. For impulsive noise, C-weighted sound levels are used. "C-weighted" denotes an adjustment to the frequency content of a noise event to represent human response to louder noise levels. Compared to A-weighting, C-weighting enhances the lower frequency content. The DNL metric is utilized to characterize the cumulative blast sound levels occurring during a 24-hour period, and C-weighted sound levels account for the lower frequency content and higher levels of explosions.

For blast noise, the U.S. Army recommends using the LPk to assess the potential for complaints. The LPk is the highest instantaneous, un-weighted sound level over any given period of time. It is used to quantify impulsive, short duration events such as a weapon firing, EODs, or a sonic boom. High peak sound levels can generate complaints from people in the local community.

Noise level recommendations for large caliber weapons are obtained from Army guidelines (AR 200-1). Noise Zones are developed based on C-weighted DNL (CDNL) and LPk and depict areas where noise-sensitive land uses are not recommended due to the total noise based on loudness, frequency, and time of operations. Noise Zone descriptions and recommendations are described below and shown in Table 3-13.

- Noise Zone III: consists of the area around the source of the noise in which the level is greater than 70 C-weighted decibels (dBC) CDNL and greater than 130 LPk. Noise within Noise Zone III is considered so severe that noise-sensitive land uses are never recommended within it.
- Noise Zone II: consists of the area between 62 and 70 dBC CDNL and between 115 and 130 LPk. Exposure to noise within this area is considered high, and use of land within Noise Zone II should normally be limited to activities such as industrial, manufacturing, transportation, and resource production.
- Noise Zone I: includes the areas around a noise source where the sound is less than 62 dBC CDNL and less than 115 LPk. This area is usually acceptable for all types of land use activities.
- Land Use Planning Zone (LUPZ): includes the areas around a noise source where the contours are 57 to 62 dBC CDNL. For residential land uses, depending on attitudes and other factors, a 57 dBC CDNL may be considered by the public as an effect on the community environment.

Table 3-13 Land Use Planning Guidelines

Noise Zones	*CDNL*	*LPk*
LUPZ	57–62	N/A
I	< 62	< 115
II	62–70	115–130
III	> 70	> 130

The federal government supports conditions free from noise that threaten human health and welfare and the environment. Response to noise varies, depending on the type and characteristics of the noise, distance between the noise source and whoever hears it (the receptor), receptor sensitivity, and time of day. A noise-sensitive receptor is defined as a land use where people involved in indoor or outdoor activities might be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species.

3.5.3 Affected Environment

The main sources of noise at NSF Indian Head are from live fire operational ranges, including two active ranges at Stump Neck Annex used by the Naval Explosive Ordnance Disposal Technology Division: Explosive Test Range 2 (ETR-2) and Explosive Test Range 3 (ETR-3). ETR-2 and ETR-3 are active ranges for ordnance detonations and EODs and are adjacent to Chicamuxen Creek (see Figure 3-7). The future operational levels at ETR-2 and ETR-3 are anticipated to be the same as current operational levels with no plans of EOD increases. Infrequent but loud noise occurs from explosives detonations at Stump Neck Annex and operations at Cornwallis Neck, including open burning of waste propellants, explosives, and pyrotechnics and pyrotechnics-contaminated material (Charles County, 2016). There are also two helicopter landing zones (LZs) at NSF Indian Head, one of which is located on Stump Neck Annex. Most of the southwestern part of Stump Neck Annex is within the Operational Noise Zone II, Zone III, and the LUPZ.

3.5.4 Environmental Consequences

Analysis of potential noise effects includes estimating noise levels from the Proposed Action and determining potential effects on sensitive receptor sites.

Noise Potential Effects:

- **No Action:** No change in existing conditions. No significant effects.
- **Alternative 1:** Short-term effects from construction. No significant effects.
- **Alternative 2:** Short-term effects from construction. No significant effects.

3.5.4.1 No Action Alternative

The Proposed Action would not occur under the No Action Alternative and noise levels would remain the same as existing conditions. The noise environment under the No Action Alternative would continue to be affected by noise sources like the live fire operational ranges, including ETR-2 and ETR-3, explosives detonations, open burning of explosives and other hazardous materials, and the helicopter landing zones. Therefore, no significant effects on the noise environment would occur under the No Action Alternative.

3.5.4.2 Alternative 1 Potential Effects

Construction Noise. Short-term effects from Alternative 1 would include intermittent noise from construction activities. Noise levels from the construction of the UTT facility would diminish with distance from the study area. Appendix D lists typical noise levels at 50 feet from the source of heavy equipment that could be used during construction activities. As shown, the Lmax level from construction equipment and trucks can range from 74 to 90 A-weighted decibels (dBA) at 50 feet. Most of the equipment used would generate intermittent noise levels in the 80 dBA range during the duration of

their use, which would be confined to daytime hours. The closest populations are on the installation at the surrounding facilities and off the installation on the Potomac River, which are about 250 feet away from the UTT. Given the anticipated noise levels, construction at 250 feet would range from 60 to 76 dBA (see Appendix E, Noise Calculations). Additionally, the trees surrounding the Alternative 1 study area would provide a buffer from the noise. The RDT&E land uses surrounding the study area are not considered noise-sensitive and already experience noise from explosives and large caliber weapons at the live fire operational ranges on Stump Neck Annex. Off-base populations on the Potomac River are already accustomed to noise from explosions at the installation. Short-term effects would occur on the noise environment from construction with the implementation of Alternative 1, but these effects would not be significant.

Operational Noise. A noise study was completed for the No Action Alternative and the Proposed Action (see Appendix F). The No Action Alternative includes current operational levels at ETR-2, ETR-3, and a large motor testing facility. The future operational levels at ETR-2, ETR-3, and the large motor testing facility are anticipated to be the same as the current operational levels. The Proposed Action scenario only includes the addition of the UTT facility EOD and ordnance detonation operations.

The Alternative 1 study area is within the RDT&E land use at NSF Indian Head and within Noise Zone II from existing operations, which has noise from explosions and large caliber weapons between 62 and 70 dBC CDNL (NAVFAC Washington, 2009). There are a few buildings and facilities approximately 50 feet north, 150 feet east, and 400 feet southeast of the study area, all of which are within the RDT&E land use. The Alternative 1 study area is surrounded by trees in each direction. Lewis Road is directly adjacent to the study area and the Potomac River lies approximately 250 feet northwest of the proposed UTT.

Figure 3-7 shows the CDNL noise contours from UTT operations under Alternative 1 and the No Action Alternative. Each contour line represents a different level of noise exposure around the site. The green 57 dBC CDNL contour, which has the largest radius, forms a continuous boundary around ETR-2, ETR-3, and Alternative 1. Similarly, the orange 62 dBC CDNL contour, which has a smaller radius, also creates a continuous contour around the three sites. The red 70 dBC CDNL contour around Alternative 1 has the smallest radius and does not connect to the red 70 dBC CDNL contour surrounding ETR-2 and ETR-3. The red 70 dBC CDNL contour surrounding ETR-2 and ETR-3 would remain unchanged, whether or not Alternative 1 is implemented. The No Action Alternative contours are shown in white for comparison. Note that Figure 3-7 shows bald eagle nests and heron rookeries, which is discussed in Biological Resources, Section 3.6.

Nearby populations at installation facilities and along the Potomac River may experience increased noise from UTT operations under Alternative 1, but this would only include a small area around the UTT facility. Noise from the orange 62 dBC CDNL contour would reach a small area on the Potomac River where off-base populations are not likely to be present. The green 57 dBC CDNL contour would slightly expand onto the Potomac River; however, this general area is already affected by noise from ETR-2 and ETR-3.

As discussed in Section 3.5.2, 62 dBC CDNL contours and less are usually acceptable for all types of land use activities. In addition, trees surrounding the Alternative 1 study area would provide a buffer from the noise associated with UTT operations. Long-term effects would occur on the noise environment from UTT operations with the implementation of Alternative 1, but these effects would not be significant.

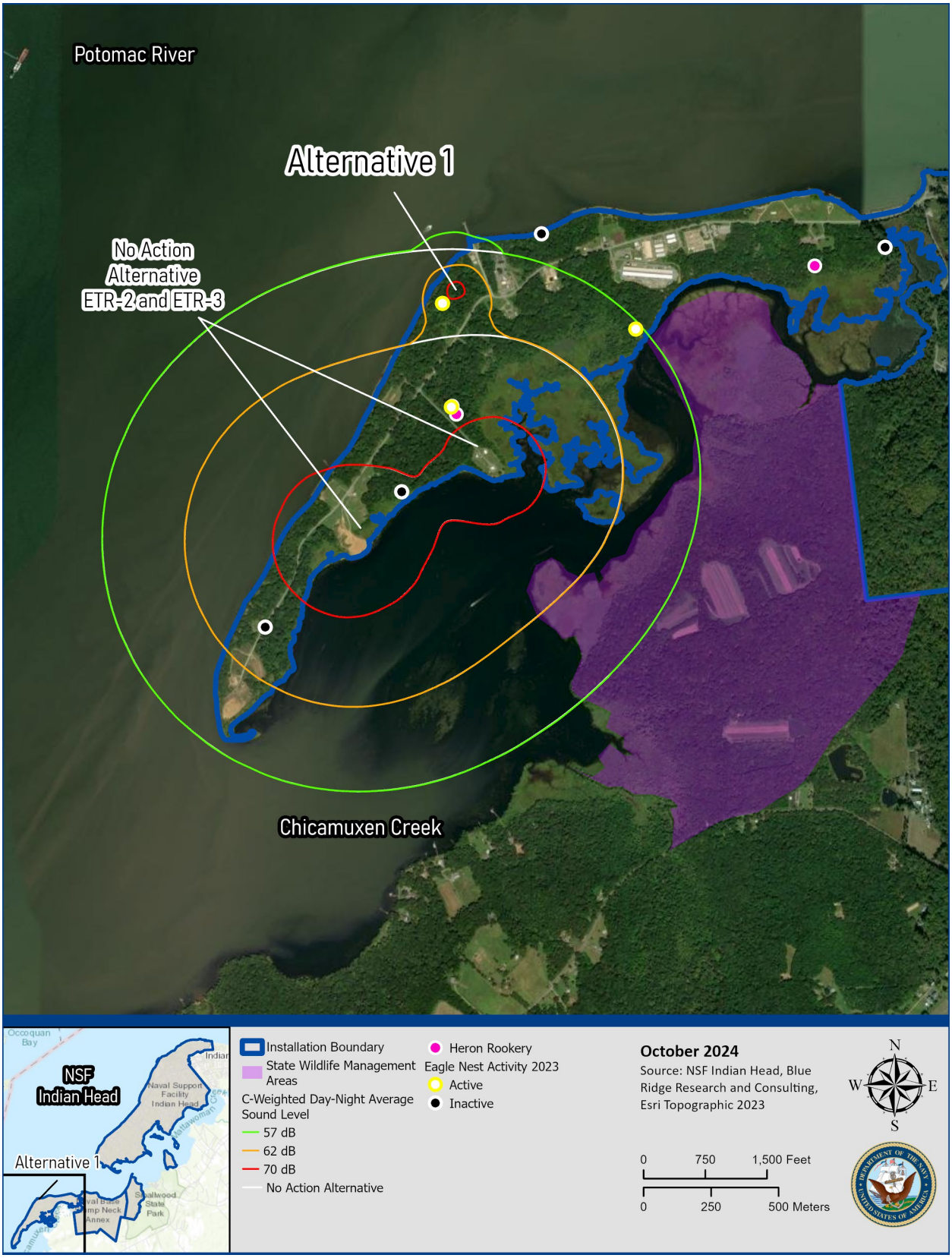

Figure 3-7 CDNL Contours for No Action Alternative and Alternative 1

3.5.4.3 Alternative 2 Potential Effects

Construction Noise. Short-term effects from Alternative 2 would include intermittent noise from construction activities; noise would diminish with distance from the study area, similar to Alternative 1. As shown in Appendix D and discussed under Alternative 1, the Lmax level from construction equipment can range from 74 to 90 dBA at 50 feet; most noise levels would be in the 80 dBA range. Populations outside of the installation could be present on the Chicamuxen Creek. Using a conservative estimate of 250 feet, noise from construction would be similar to Alternative 1 and would range from 60 to 76 dBA (see Appendix E, Noise Calculations). Populations at Chicamuxen Creek and Chicamuxen Wildlife Management Area (WMA) could experience short-term effects from increased noise levels during the construction period. Additionally, the trees surrounding the Alternative 2 study area would provide a buffer from the noise. The RDT&E land uses surrounding the study area are not considered noise-sensitive and already experience noise from the live fire operational ranges on Stump Neck Annex. Short-term effects would occur on the noise environment from construction with the implementation of Alternative 2, but these effects would not be significant.

Operational Noise. A noise study was completed for the No Action Alternative and the Proposed Action (see Appendix F). Alternative 2 and the surrounding facilities are within the RDT&E land use area of NSF Indian Head. It is also within the LUPZ noise zone from existing operations, which has 57 to 62 dB CDNL (NAVFAC Washington, 2009). A helicopter LZ is located approximately 40 feet northeast of the Alternative 2 study area, across Archer Avenue. Other buildings and facilities are approximately 450 feet east and 300 feet west of the study area. The Alternative 2 study area is surrounded by trees in each direction. Chicamuxen Creek is approximately 250 feet to the south and Chicamuxen WMA, where hunting occurs, is about 400 feet south of the study area.

Figure 3-8 shows the CDNL noise contours from UTT operations under Alternative 2 and the No Action Alternative. The green 57 dBC CDNL contour from the ETR-2 and ETR-3 sites would slightly extend to connect with the 57 dBC CDNL contour from Alternative 2. The orange 62 dBC CDNL contour has a radius of approximately 450 feet around the Alternative 2 site, and it does not overlap with the orange 62 dBC CDNL contour surrounding the ETR-2 and ETR-3. The red 70 dBC CDNL contour around Alternative 2 has a smaller radius, extending up to 170 feet from the site. The 62 and 70 dBC CDNL contours surrounding ETR-2 and ETR-3 would remain unchanged, whether or not Alternative 2 is implemented. The No Action Alternative contours are shown in white for comparison.

Under Alternative 2, the 57 dBC CDNL contour would extend onto the Potomac River, Chicamuxen Creek, and onto the Chicamuxen WMA. Although some populations might access these areas by boat, there are no buildings and no populations residing in the areas with the expanded 57 dBC CDNL noise contour. In addition, trees surrounding the study area would provide a buffer from the noise. Long-term effects would occur on the noise environment from UTT operations with the implementation of Alternative 2, but this would only include a small area around the UTT facility and these effects would not be significant.

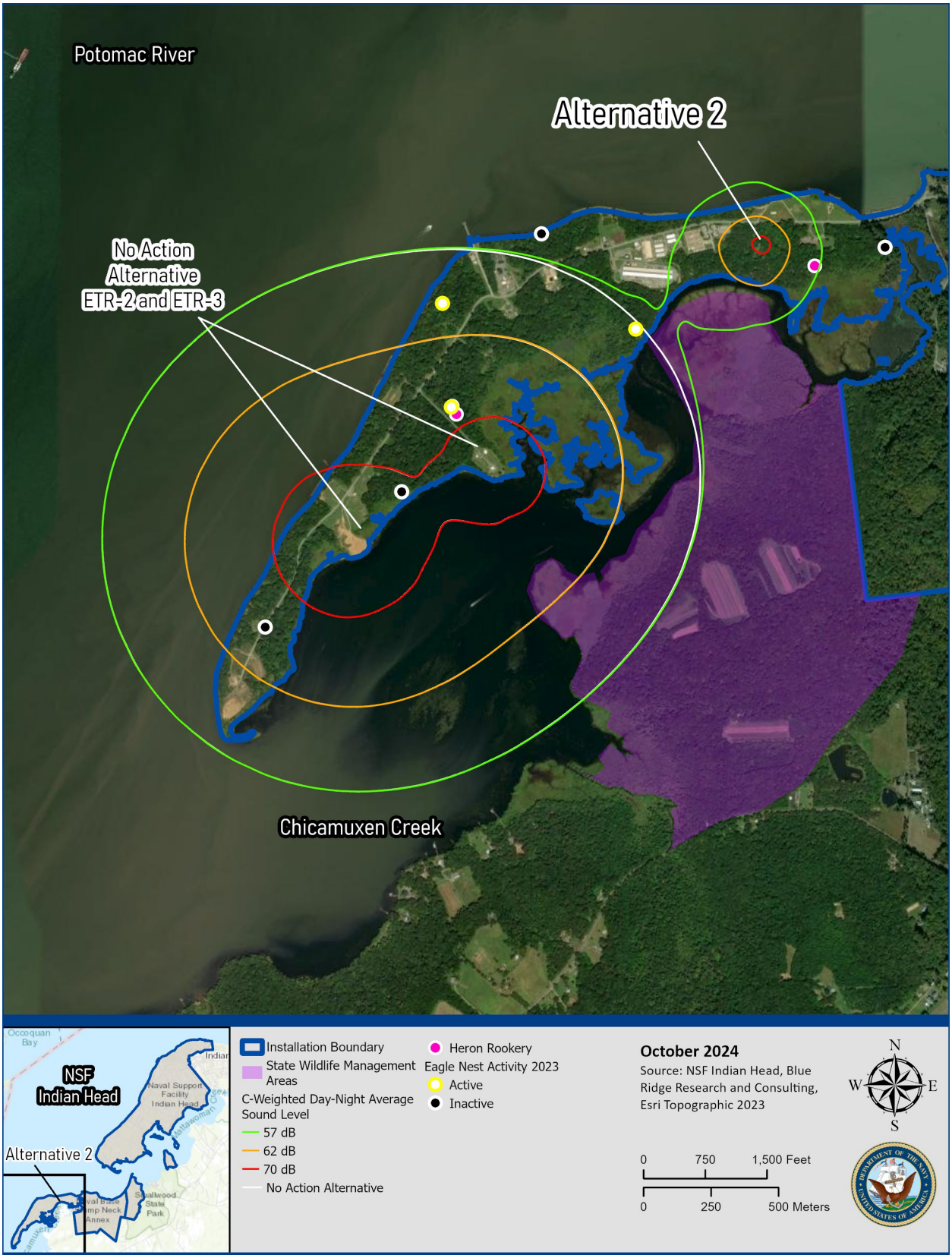

Figure 3-8 CDNL Contours for the No Action Alternative and Alternative 2

3.6 Biological Resources

For purposes of this discussion, biological resources include native or naturalized plant and animal species and their habitats. Plant associations are generally referred to as vegetation, and animal species as wildlife. Habitat can be defined as the resources and conditions present in an area that support a plant or animal. Within this EA, biological resources are divided into three main categories: (1) terrestrial and aquatic vegetation, (2) terrestrial wildlife, and (3) threatened, endangered, and special-status species.

For this analysis, the study area is defined as the alternative site boundary, the area within the explosive safety arcs, and the noise contours (generated by existing and proposed operations) to assess the effects on wildlife.

3.6.1 Affected Environment

The following discussion describes the existing biological resources within the study areas.

3.6.1.1 Terrestrial and Aquatic Vegetation

Terrestrial vegetation includes plants in upland environments and freshwater aquatic environments (e.g., wetlands, freshwater streams, and rivers).

The Alternative 1 study area is entirely forested–characterized as early successional Mixed Upland Hardwoods forest (U.S. Navy, 2020). Dominating the overstory (i.e., top foliage from trees), Mixed Upland Hardwoods species include white oak (*Quercus alba*), black oak (*Quercus velutina*), southern red oak (*Quercus falcata*), chestnut oak (*Quercus montana*), American beech (*Fagus grandifolia*), tulip poplar (*Liriodendron tulipifera*), and hickories (*Carya alba and Carya ovata*). Understories often include American holly (*Ilex opaca*), paw-paw (*Asimina triloba*), flowering dogwood (*Cornus florida*), sassafras (*Sassafras albidum*), and downy serviceberry (*Amelanchier arborea*). Common herbaceous species include Virginia creeper (*Parthenocissus quinquefolia*), partridge berry (*Mitchella repens*), blueberry (*Vaccinium* spp.), and ground pine (*Lycopodium* spp.). Trees are important in offsetting climate change effects, as they capture and store carbon dioxide from the atmosphere (in a process called carbon sequestration) (USGS, 2024b). The study area does not contain any other known ecological communities (U.S. Navy, 2020).

The Alternative 2 study area is mostly forested—also characterized as early successional Mixed Upland Hardwoods forest. However, a small portion is previously disturbed with grasses and an existing gravel roadway.

A small portion of a wetland buffer exists within the Alternative 2 study area. This wetland buffer is located outside of the proposed construction footprint but is within the safety arcs associated with Alternative 2. Such hydric forest communities would likely be dominated with red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*), and sycamore (*Platanus occidentalis*). Dominate shrubs would include spicebush (*Lindera benzoin*), common alder (*Alnus glutinosa*), and buttonbush (*Cephalanthus occidentalis*). Vegetation could include wild rice (*Zizania aquatica*), big cordgrass (*Spartina cynosuroides*), cattail (*Typha angistifolia*), rose mallow (*Hibiscus moscheutos*), pickerel-weed (*Pontedaria cordata)*, arrow arum (*Peltandra virginica*), and American three-square (*Scirpus pungens*) (U.S. Navy, 2020).

The Alternative 1 study area is adjacent to the Potomac River (Figure 3-9), and the Alternative 2 study area is adjacent to Chicamuxen Creek (Figure 3-10).

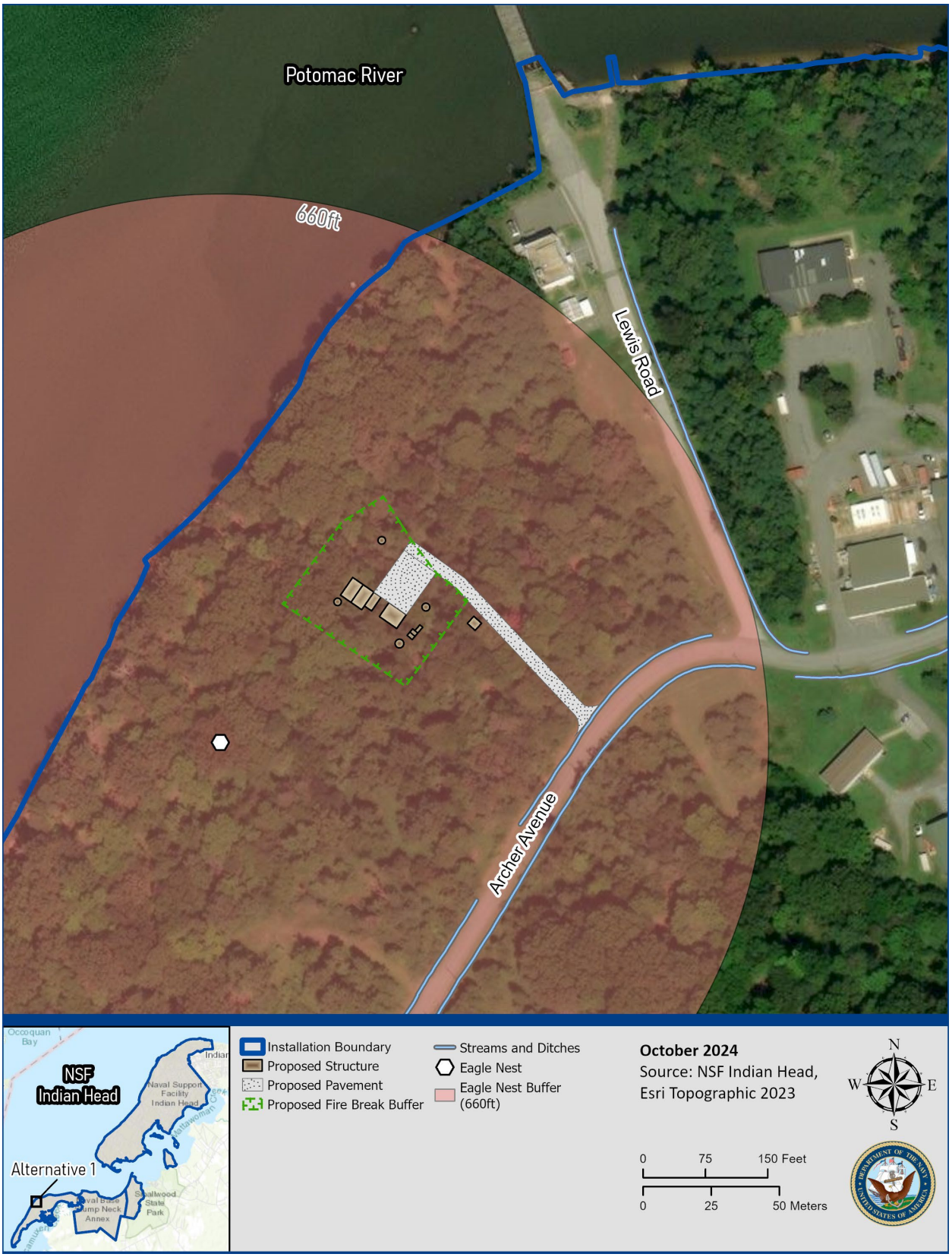

Figure 3-9 Biological Resources for the Alternative 1 Study Area

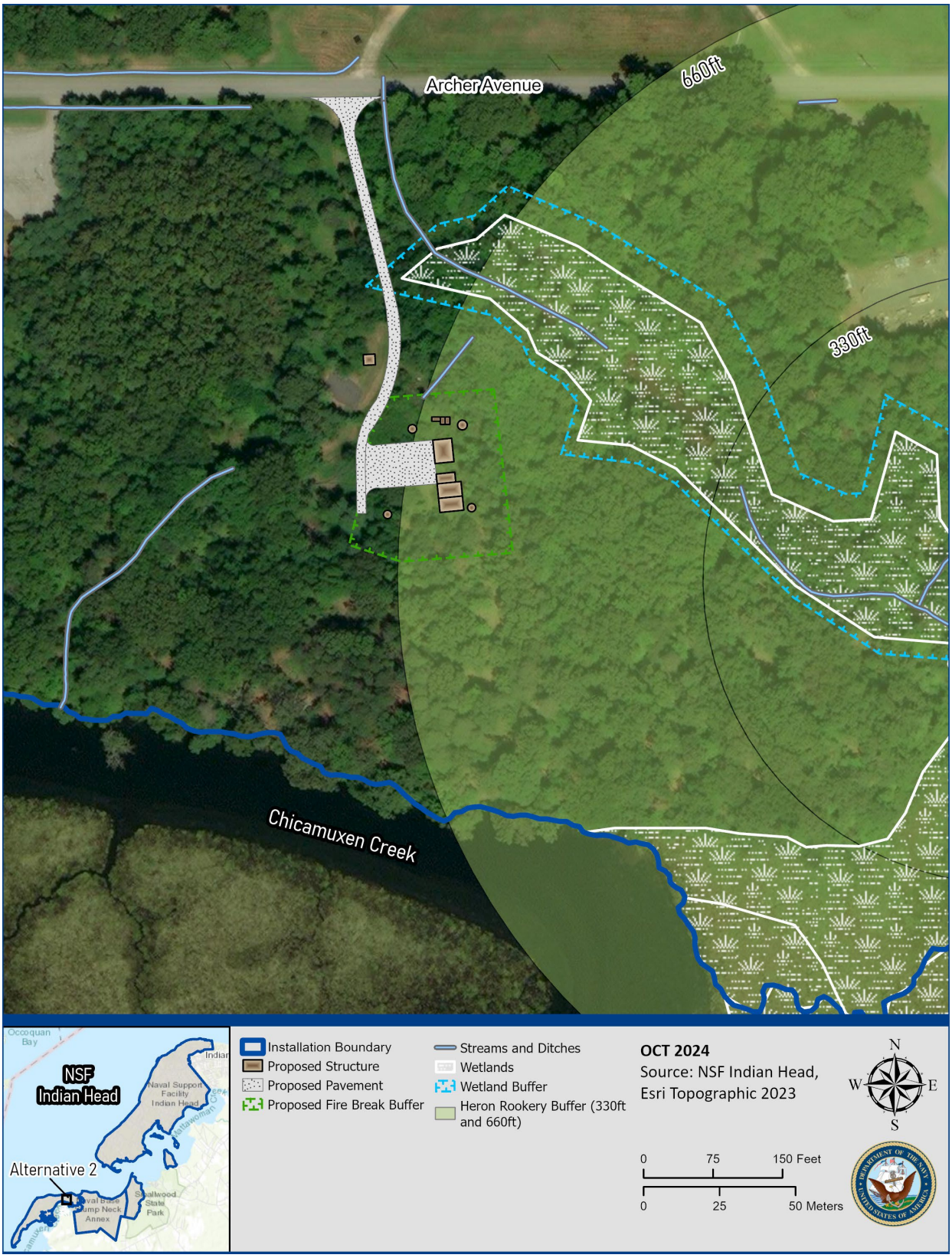

Figure 3-10 Biological Resources for the Alternative 2 Study Area

Submerged aquatic vegetation has been identified in the Potomac River and Chicamuxen Creek. Aquatic plant species include coontail (*Ceratophyllus demersum*), spiny naiad (*Najas marin*a), and hydrilla (*Hydrilla verticillata*) (U.S. Navy, 2020). Both study areas are within the Chesapeake Bay Critical Area (Charles County Maryland Government, 2024a). The Chesapeake Bay Critical Area is not designated on federal property; however, consistency with the Coastal Zone Management Act (CZMA) must be demonstrated for federal actions (U.S. Navy, 2020). The Critical Area Commission reviews submitted CZMA Federal Consistency Determinations, which could require tree mitigation. For this Proposed Action, the Navy will submit a Federal Consistency Determination to MDE. Section 3.6, Land Use details the CZMA further.

3.6.1.2 Terrestrial Wildlife

This discussion on terrestrial wildlife includes all animal species (i.e., fish, amphibians, reptiles, mammals, birds, insects, and other invertebrates) but focuses on the species relevant to the habitat found within the study areas. Wildlife inventories were conducted as part of the 1991–1992 Rare Species Surveys conducted by the Maryland Natural Heritage Program. Since then, NSF Indian Head has conducted flora/fauna, waterfowl, and amphibian surveys to ensure the installation species list remains current (U.S. Navy, 2020).

Fish

Because the Proposed Action does not include activities within the Potomac River or Chicamuxen Creek, freshwater fish existing in these nearby waterways were dismissed from analysis. BMPs implemented during construction, such as the use of silt fencing to prevent sediment runoff, would prevent indirect effects on fish within the Potomac River and Chicamuxen Creek.

Amphibians and Reptiles

NSF Indian Head supports 20 species of amphibians and 26 species of reptiles. A complete list of the salamanders, toads, frogs, turtles, snakes, and lizards that have been observed at NSF Indian Head can be found in Appendix 3B of the U.S. Navy's INRMP at NSF Indian Head (U.S. Navy, 2020). The spotted turtle (*Clemmys guttata*) has been observed at NSF Indian Head (U.S. Navy, 2020). Because the spotted turtle is currently under review for federal listing under the Endangered Species Act (ESA), it is discussed in Section 3.6.1.3 of this EA.

Mammals

NSF Indian Head supports 38 species of mammals. In the study areas, common mammals would likely include species known to exist on the installation, including the white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), eastern gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and gray fox (*Urocyon cinereoargenteus)*. A complete list of mammalian species observed at NSF Indian Head can be found in Appendix 3C of the INRMP (U.S. Navy, 2020).

At NSF Indian Head, passive acoustical monitoring surveys (called bat surveys hereinafter) have been conducted annually to assess the presence/absence of bat species and to determine which areas provide the most suitable habitat for foraging bats (U.S. Navy, 2020). During the most recent bat survey conducted in 2020 at NSF Indian Head, eight bat species were identified. The bat species identified were the silver-haired bat (*Lasionycteris noctivagans*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinerues*), southeastern myotis (*Myotis austroriparius)*, little brown bat (*Myotis lucifugus*), big brown bat

(*Eptesicus fuscus*), evening bat (*Nycticeius humeralis*), and tricolored bat (*Perimyotis subflavus*). The bat survey identified low numbers of the southeastern myotis bat (a species of concern), which was likely the result of a few individuals passing by NSF Indian Head (NAVFAC Washington, 2021). Thus, the southeastern myotis bat is not discussed further. However, Section 3.6.1.3 further discusses the seven other identified bat species.

Birds

At NSF Indian Head, 183 species of birds have been documented. Virtually all birds that occupy NSF Indian Head throughout the year are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (USFWS, 2023). Commonly observed birds at NSF Indian Head include the wild turkey (*Meleagris* Sp.), great blue heron (*Ardea herodias*), bald eagle (*Haliaeetus leucocephalus*), turkey vulture (*Cathartes aura*), osprey (*Pandion haliaetus*), white-breasted nuthatch (*Sitta carolinensis*), Carolina wren (*Thryothorus ludovivianus*), house wren (*Troglodytes aedon*), common grackle (*Quiscalus quiscula*), and house sparrow (*Passer domesticus*). Numerous other resident and migratory birds breed and/or utilize Stump Neck Annex as a stopover during migration. A complete list of the bird species observed at NSF Indian Head can be found in Appendix 3A of the INRMP (U.S. Navy, 2020).

A great blue heron rookery exists adjacent to Chicamuxen Creek near the Alternative 2 study area (see Figure 3-8). First identified in 2018, this rookery contained 12 nests. It increased to approximately 22 nests in 2020 (U.S. Navy, 2020). Great blue herons are protected under the MBTA (USFWS, 2023); thus, NSF Indian Head established protection zones in accordance with the MBTA. NSF Indian Head has established a 660-foot radius protection area around great blue heron rookery outer boundaries. Within this radius are two protection zones. Protection Zone 1 extends from the outer boundary of the colony to a radius of 330 feet. Human entry is prohibited in the Protection Zone 1 during the great blue heron breeding season (February 15 to July 31) unless unavoidable for support of the installation mission. No land use changes may occur within Protection Zone 1. Protection Zone 2 extends from 330 feet to 660 feet in radius. No construction or timber harvesting activities may occur within Protection Zones 1 and 2 from February 15 to July 31 during the great blue heron breeding season (U.S. Navy, 2020).

The bald eagle, which is delisted but still protected under the MBTA and the BGEPA, is present within NSF Indian Head (U.S. Navy, 2020). At NSF Indian Head, bald eagle nests predominantly occur near shoreline areas in the upper canopy of hardwoods. There are foraging areas along Stump Neck Annex. The 2023 Bald Eagle Management Plan outlines several management actions, including establishing and maintaining bald eagle nest protection zones (U.S. Navy, 2023). Protection Zone 1 extends from the nest tree to a radius of 660 feet and applies to all NSF Indian Head activities. Protection Zone 2 extends 660 to 1,000 feet from the nest tree and applies only to forestry and helicopter/aircraft activities. The protection zones must remain in place while the bald eagle nest is active and for three consecutive nesting seasons after the last season in which the nest was occupied (U.S. Navy, 2023). Bald eagle nesting season is December 15 through June 15.

Based on the 2023 NSF Indian Head's Bald Eagle Management Plan, one active bald eagle nest is within 660 feet of the Alternative 1 study area (see Figure 3-7). However, no bald eagle nests are present within the Alternative 2 study area (U.S. Navy, 2023).

In 2018, NSF Indian Head obtained a BGEPA 5-year Programmatic Permit from the USFWS, which requires the implementation of the NSF Indian Head's Bald Eagle Management Plan to ensure compliance. Under this permit, NSF Indian Head is authorized to disturb up to one bald eagle nest per calendar year during the 5-year duration of this permit. Additional incidental takes are also authorized

under this permit (U.S. Navy, 2023). The USFWS is currently reviewing the BGEPA permit for renewal, and USFWS is administratively continuing the 2018 permit until the new permit is issued.

NSF Indian Head developed a Raptor Electrocution Prevention Study in 2005, which identified Priority Zones 1–5 based on high-risk areas for bald eagle mortalities. High risk areas include those areas with a bald eagle nest, documented mortality, riparian forested habitat, and high use for forage/flight. Priority Zone 1 is the highest priority zone given to retrofitting the electrical distribution system at NSF Indian Head to mitigate adverse effects on the bald eagle (U.S. Navy, 2023).

Osprey nest sites are surveyed on an annual basis, and nesting platforms were installed at NSF Indian Head in 2000. There were more than 55 osprey nests at NSF Indian Head as of 2020. Ospreys nest on almost any man-made structure near water (U.S. Navy, 2020). Osprey nests are not known to exist within the study areas (NSFIH, 2024a).

Eighteen forest interior dwelling bird species (FIDS) have been observed at NSF Indian Head. To sustain viable breeding populations, FIDS require relatively large contiguous forest areas (greater than 100 acres) and areas greater than 328 feet from the forest edge within each forest tract (U.S. Navy, 2020). Due to the presence of suitable forested habitat, the Alternative 1 and 2 study areas contain FIDS that use these areas for migration stopover and breeding (NSFIH, 2024b).

Chicamuxen Marsh and Creek are important waterfowl staging and concentration areas with more than 20 documented waterfowl species. Typical waterfowl species include black ducks, gadwall, mallards, widgeon, wood duck, bufflehead, hooded merganser, ring-neck, lesser scaup, and canvasback. The Chicamuxen WMA is not within the Alternative 2 site but is partially within the noise contours generated by the proposed operations. The WMA is managed by MDNR and is now open to the public for hunting upland game and waterfowl. Hikers and birders also have access to numerous trails (U.S. Navy, 2020; MDNR, 2024b).

Invertebrates

Surveys have previously been conducted at NSF Indian Head for a variety of insects. Relevant surveys have included pollinator and native bee surveys including the American bumble bee (*Bombus pensylvanicus*). During surveys, more than 15 species of damselflies, 30 species of dragonflies, and 54 species of butterflies were documented, including the monarch butterfly (*Danaus plexippus*) (U.S. Navy, 2020). Section 3.6.1.3 discusses the American bumble bee and monarch butterfly.

The federally listed endangered rusty patched bumble bee (*Bombus affinis*) was not found at NSF Indian Head during a bee species survey conducted in 2021 (U.S. Navy, 2022). Previous 2013–2018 surveys and the USFWS Information for Planning and Consultation (IPaC) tool also support this conclusion that the rusty patched bumble bee does not exist at NSF Indian Head or within the study areas. Grasses or perennial herbaceous flowering plants, which would provide preferred habitat for this species, have not been planted within the study areas (U.S. Navy, 2020; USFWS, 2024a). For these reasons, the Proposed Action would not adversely affect the rusty patched bumble bee, and it was dismissed from further analysis.

3.6.1.3 Threatened, Endangered, and Special-Status Species

This section discusses the threatened, endangered, and other special-status species that could occur within the study areas. According to the USFWS IPaC, there are four potentially occurring ESA-listed and special-status species found at both Alternative 1 and Alternative 2 study areas: the northern long-eared

bat (*Myotis septentrionalis*), tricolored bat, monarch butterfly, and sensitive joint-vetch (*Aeschynomene virginica*) (USFWS, 2024a). Table 3-14 provides a list of all threatened, endangered, and special-status species with potential to occur in the study areas. These species are further discussed after Table 3-14.

Table 3-14 Threatened, Endangered, and Special-Status Species with Potential to Occur in the Study Areas

Common Name	*Scientific Name*	*Federal Listing Status*	*State Listing Status*	*State Conservation Status*	*Critical Habitat Present?*
Northern Long-eared Bat*	*Myotis septentrionalis*	FE	ST	A	No
Tricolored Bat*	*Perimyotis subflavus*	PE	S1	A	No
Little Brown Bat	*Myotis lucifugus*	C	S1	A	No
Silver-haired Bat	*Lasionycteris noctivagans*	NL	SGCN; SUB; SUN	D	No
Eastern Red Bat	*Lasiurus borealis*	NL	SGCN; SUB; SUN	D	No
Hoary Bat	*Lasiurus cinerues*	NL	SGCN; SUB; SUN	D	No
Big Brown Bat	*Eptesicus fuscus*	NL	SGCN; S5	C	No
Evening Bat	*Nycticeius humeralis*	NL	SGCN; SUB; SUN	D	No
Monarch Butterfly*	*Danaus plexippus*	C	G4	C	No
Spotted Turtle	*Clemmys guttata*	C	ST	C	No
Frosted Elfin	*Callophrys irus*	NL	SE	A	No
Sedge (or Dion) Skipper	*Euphyes dion*	NL	G4	C	No
Sensitive Joint-vetch*	*Aeschynomene virginica*	FT	SE	N/A	No

Sources: (USFWS, 2024a; MDNR, 2021; MDNR, 2024c; NAVFAC Washington, 2021; MDNR, 2016)
Key: C = candidate species for federal ESA listing, PE = proposed endangered for federal ESA listing, FE = federal endangered, FT = federal threatened, NL = not listed, SE = state endangered, ST = state threatened, S1 = highly state rare, SGCN = species of greatest conservation need in Maryland, SUB = status uncertain breeding, SUN = status uncertain nonbreeding, S5 = demonstrably secure, G4 = apparently secure, A = highest conservation status, C = moderate conservation status, D = conservation status is uncertain; insufficient data to assign a state conservation status rank.
*Species identified by the USFWS IPaC database as being potentially present in the study area.

The federally endangered northern long-eared bat has not been visually observed at NSF Indian Head nor has it been detected during bat surveys. Thus, it has little potential to occur within the study areas. Mature/late successional forested areas at NSF Indian Head provides excellent summer roosting habitat for the northern long-eared bat. The Alternative 1 study area is within a mature forest and provides suitable northern long-eared bat habitat. The Alternative 2 study area is not located within known mature/late successional forests.

The tricolored bat, which is proposed for federal listing as endangered, has been documented at NSF Indian Head (NAVFAC Washington, 2021). Tricolored bats are believed to only use NSF Indian Head during the summer when suitable roosting and foraging habitat exists (U.S. Navy, 2020). These bats feed

over forests, wetlands, and open water. The tricolored bat is ranked as highly state rare (S1) with a category A conservation status in the Maryland State Wildlife Action Plan, which indicates a very high risk of extinction given the highest conservation status (MDNR, 2016). During the summer, tricolored bats might roost in buildings but likely prefer roosting in tree foliage including dead leaf clusters (U.S. Navy, 2020; USFWS, 2024b). The Alternative 1 study area is within a mature forest that provides suitable tricolored bat habitat. Although the Alternative 2 study area does not contain mature forests or old buildings, they do contain early successional forests near water and the study area is surrounded by mature forests. According to the NSF Indian Head Natural Resources Manager, the tricolored bat is known to exist within the Alternative 1 and Alternative 2 study areas (NSFIH, 2024a).

The little brown bat, which is under review for ESA listing and is state listed as highly rare, has also been documented at NSF Indian Head (NAVFAC Washington, 2021). In the summer, little brown bats often roost in barns, outbuildings, under rocks, or in trees. They often prefer roosts close to water or wetlands where insects are abundant (USFWS, 2024c; U.S. Navy, 2020). It is not believed that little brown bats occur at NSF Indian Head during the winter. However, NSF Indian Head provides suitable summer habitat with its abundance of buildings, old structures, forest, and waterways (U.S. Navy, 2020).

The silver-haired bat, eastern red bat, hoary bat, big brown bat, and evening bat which have also been observed at NSF Indian Head, are listed as species of greatest conservation need in Maryland (U.S. Navy, 2020; MDNR, 2024d; NAVFAC Washington, 2021; MDNR, 2016). During the summer, silver-haired bats will often roost under loose tree bark, in rock crevices, in clumps of leaves, in woodpecker holes, and sometimes in buildings (MDNR, 2024d). Eastern red bats often roost among leaves in trees. Their preferred roosts are in deciduous trees, 4 to 10 feet off the ground (MDNR, 2024e). Hoary bats often roost 7 to 20 feet above the ground in coniferous trees (such as pine or cedar trees) near cleared areas (MDNR, 2024f). Big brown bats often roost in buildings, under bridges, in trees, or under loose bark (MDNR, 2024g). Evening bats may roost in large colonies in buildings or in small colonies under loose bark or within trees (MDNR, 2024h). Chicamuxen Creek Marsh, which is located near the Alternative 2 study area, is known to provide summer foraging habitat for these bat species (U.S. Navy, 2020). The Alternative 1 study area also provides habitat for these bat species.

The monarch butterfly and American bumble bee have been observed at NSF Indian Head (U.S. Navy, 2020; U.S. Navy, 2022). The monarch butterfly is currently a candidate species for federal listing, and the American bumble bee is under review for federal listing (USFWS, 2021; CBD, 2014). The Chicamuxen Creek Marsh is known to contain wingstem and tickseed sunflower, which provide an important nectar source for the monarch butterfly during fall migration (U.S. Navy, 2020). The 2021 native bee survey did not record the American bumble bee at the Alternative 1 and 2 study areas. During this survey, the American bumble bee was recorded mostly around the Atkins Road ponds on Mainside and the Watchable Wildlife Area at Stump Neck Annex (U.S. Navy, 2022).

NSF Indian Head contains suitable habitat for the spotted turtle, a reptile species that is currently under review for federal listing. The spotted turtle is found in wetland and forested habitats. The Alternative 2 study area is adjacent to Chicamuxen Creek Marsh and another identified wetland with associated streams (U.S. Navy, 2020). These wetlands and streams provide suitable habitat for the spotted turtle. According to the NSF Indian Head Natural Resources Manager, the spotted turtle does occur within the wetland adjacent to Alternative 2. The spotted turtle has not been observed nor would it be expected to exist at the Alternative 1 study area (NSFIH, 2024a).

State-listed bird species have been observed within the Chicamuxen Creek Marsh and on Stump Neck Annex. All of the 18 observed FIDS on Stump Neck Annex are listed as species of greatest conservation need in Maryland. These state-listed bird species are discussed in the INRMP, and FIDS observed at NSF Indian Head can be found Appendix 3A of the INRMP (U.S. Navy, 2020).

The state-endangered frosted elfin (*Callophrys irus*) and a state watch-listed species, the sedge skipper (*Euphyes dion*), are butterflies that have been observed at NSF Indian Head. The frosted elfin can be found in open areas of dry woodlands, fields, and roadsides. The primary food source of the frosted elfin is wild lupine (*Lupinus perennis*). The frosted elfin was last documented at NSF Indian Head in 1992 and 2004, where only single individuals were observed. The sedge skipper has been identified in Chicamuxen Creek Marsh (U.S. Navy, 2020).

Two state-listed species were considered for their potential existence within the study areas but were dismissed from further analysis—including the treetop emerald (*Somatochlora provocans*) and rainbow snake (*Farancia erytrogramma*). The state-endangered treetop emerald is a large dragonfly that was last documented at NSF Indian Head in 2006. The treetop emerald was observed at Stump Neck Annex along Roach Road and the firebreak along the Watchable Wildlife Area. The treetop emerald's breeding and foraging habitat is restricted to sand-bottomed forest seeps. The state-endangered rainbow snake was last observed at NSF Indian Head in 1937 at Stump Neck Annex along Roach Road and the Chicamuxen Creek Marsh. This species has not been observed at NSF Indian Head during any subsequent surveys. However, in 2011 and 2012 the rainbow snake was observed outside of NSF Indian Head property south of Stump Neck Annex in similar habitat to that of Chicamuxen Creek Marsh (U.S. Navy, 2020). Wetlands, seeps, or streams have not been identified within the Alternative 1 and 2 study areas; thus, no adverse effect on the treetop emerald and rainbow snake would likely occur.

Sensitive joint-vetch is a wetland plant considered to be highly state rare (S1) species and federally threatened (MDNR, 2021; U.S. Navy, 2020). Previous 2014 wetland plant surveys conducted generally at NSF Indian Head have not identified the sensitive joint-vetch. The sensitive joint-vetch occurs in highly incised habitat within or along adjacent shorelines of waterways. Since this habitat does not occur within the Alternative 1 and 2 study areas, the sensitive joint-vetch has no potential to occur within either Alternative site (U.S. Navy, 2020). For these reasons, the Proposed Action would not adversely affect the sensitive joint-vetch, and it was dismissed from further analysis.

3.6.2 Overview of Noise Effects on Wildlife

Loud sounds can induce stress in some animals (Gladwin, D.N., K.M. Manci, & Villella, R., 1988). This section provides a general overview of research analyzing the effects of noise on wildlife relevant to the study areas. Specifically, the literature presented below focuses on the effects of military noise (i.e., weapons-testing) and other impulsive noise (i.e., sonic booms) on wildlife—in order to remain consistent with the blasting noise associated with the Proposed Action.

Extensive literature reviews of military noise effects on wildlife extend more than fifty years (Dufour, P.A., 1980; Kull, R. & A. Fisher, 1986; Larkin, R.P, 1996; Gladwin, D.N., K.M. Manci, & Villella, R., 1988). The majority of research on noise stem from low altitude jet aircraft, weapons detonations, and sonic booms.

A study conducted at Aberdeen Proving Ground, Maryland, illustrated that weapons-testing noise did not influence bald eagle behavior and reproduction. This study's results also support the hypothesis that bald eagles habituate, or get accustomed to, recurring weapons-testing noise. This study did not address

physiological effects (i.e., increased heart rate) on the bald eagle (Brown, B.T., Mills, G.S., Powels, C., Russell, W.A., Therres, G.D., & J.J. Pottie, 1999).

Impulsive sounds include large weapons firing, sonic booms, thunder from lightning strikes, and explosions/detonations. A variety of studies have attempted to determine the effects of these impulsive sounds. While several early field studies have recorded that sonic booms may cause behavioral reactions (such as a startle response) in wild birds and mammals (Manci, K.M., D.N. Gladwin, R. Villella, & M.G. Cavendish, 1988), other studies have concluded that birds and mammals either quickly habituate to such sounds, or have only temporary, inconsequential responses (Kull, R. & A. Fisher, 1986; Larkin, R.P, 1996; Awbrey, F.T. & D. Hunsaker, 1998; Awbrey, F. T. & A.E. Bowles, 1990). Although not caused by impulsive sounds, previous research has illustrated that noise from low-level military flights on wading birds caused less than significant effects—ranging from no behavioral response to looking up or changing position. This research also found no effect on reproductive success (Black, B.B., M.W. Collopy, H.F. Percival, A.A. Tiller, & P.G. Bohall, 1984).

Bats may not be as sensitive to noise as compared to other species. A 2016 study conducted on bats showed that when exposed to noise their hearing was not diminished when the noise subsided. Individual bats can produce noise up to 100 to 110 dB and up to 140 dB among a group of bats. Thus, bats are naturally exposed to continuous intense sounds from their species. Researchers believe this exposure has allowed bats to adapt to louder environments (Simmons, A.M., Hom, K.N., Warnecke, M., and J.A. Simmons, 2016). The frequency distribution of impulse noise (1 to 10 Hz) described in this 2016 study is significantly different than the hearing thresholds of bats at 10 to 100 KiloHz (California Department of Transportation, 2016), which would also contribute to a lack of behavioral or physiological response in bats to impulsive noise.

3.6.3 Environmental Consequences

This analysis focuses on potential effects on wildlife and vegetation that are important to ecosystem function or are protected under federal or state law or statute. Potential short- and long-term effects are analyzed. The effects of noise on wildlife during the proposed UTT operations are analyzed in this section using a 2024 Noise Study (BRRC, 2024). Specifically, the noise effects on wildlife were assessed using the peak sound levels, which is a commonly used metric for describing impulsive noise events (Pater, L.L., T.G. Grubb, & D.K. Delaney, 2009). This Noise Study is provided in Appendix F. For further information on noise, see Section 3.5 of this EA.

3.6.3.1 No Action Alternative

Under the No Action Alternative, the construction of the UTT facility at NSF Indian Head would not occur, and there would be no direct effects on trees, vegetation, and wildlife. However, noise would still be generated from the ETR-2 and ETR-3, as shown on Figure 3-11. Three active bald eagle nests are located within the 140 dB peak noise contour (see Figure 3-11). For a closer view of these nests, refer to Figure 3-7 in Section 3.5. These three bald eagle nests would continue to be subjected to noise from ETR-2 and ETR-3. Two of these bald eagle nests have been occupied or active since 2023; whereas, the third bald eagle nest has been active since 2015 (U.S. Navy, 2023). In 2023, higher total NEW was used at ETR-2 than in previous years (2021 and earlier). Since these three bald eagle nests have been active while ETR operations have been producing noise, adverse behavioral effects from this noise on these nesting bald eagles appear to be negligible. Existing literature also supports this conclusion (Brown, B.T., Mills, G.S., Powels, C., Russell, W.A., Therres, G.D., & J.J. Pottie, 1999).

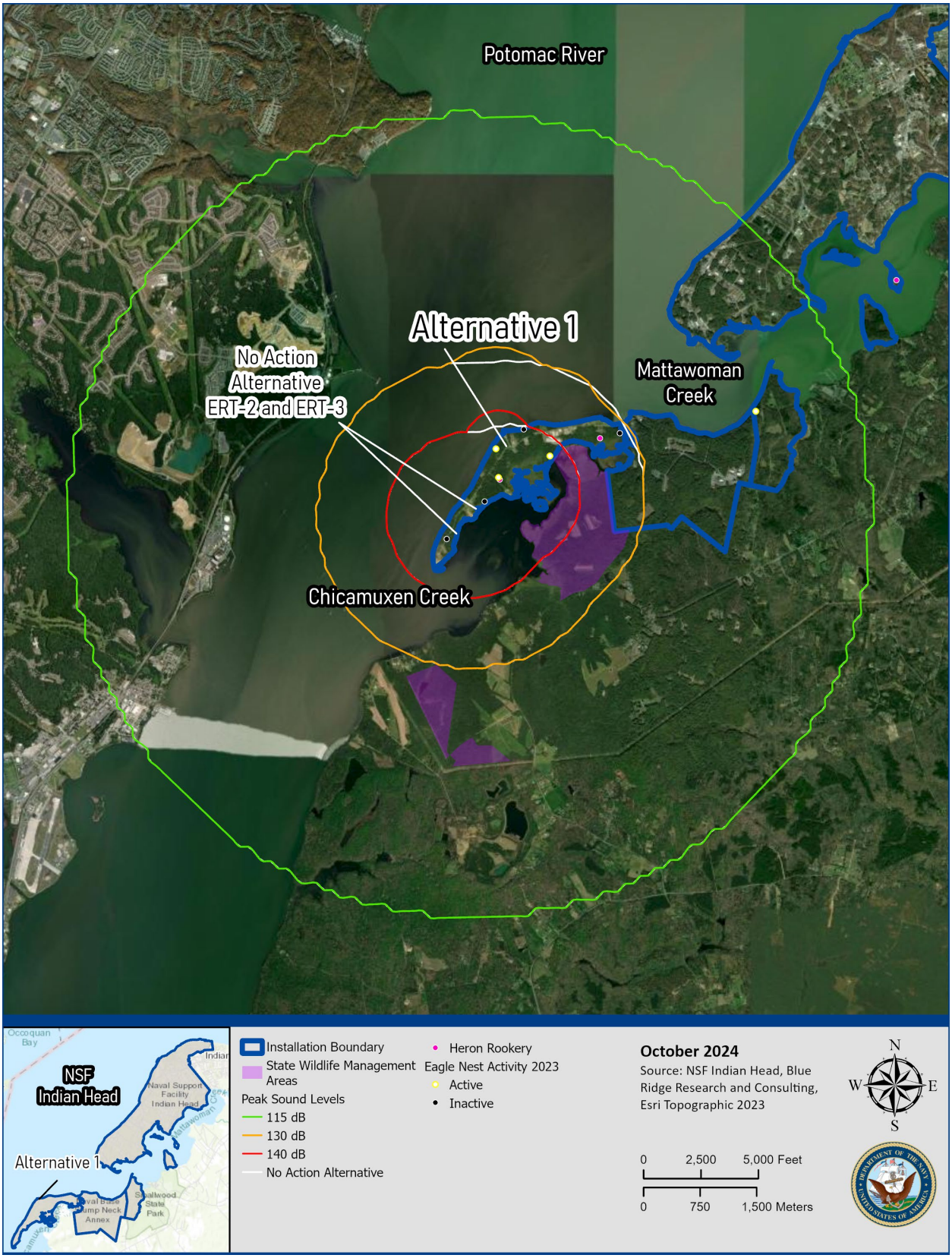

Figure 3-11 Peak Sound Levels for No Action Alternative and Alternative 1

Under the No Action Alternative, two great blue heron rookeries would continue to be subjected to noise from ETR-2 and ETR-3. One great blue heron rookery is located along Porter Road within the 140 dB peak noise contour (see Figure 3-11; for a closer view see Figure 3-7 in Section 3.5). This rookery was first identified in 2017 when approximately 10 nests were observed, and it increased to approximately 45 nests in 2020. Another great blue heron rookery is within the 130 dB peak noise contour. This rookery was first identified in 2018 when approximately 12 nests were observed, and it increased to about 22 nests in 2020 (U.S. Navy, 2020). Since both rookeries have illustrated increases in nesting, adverse behavioral effects to the great blue heron from existing operational noise appear to be negligible.

Bats and other wildlife would continue to be subjected to noise from ETR-2 and ETR-3. As previously discussed, bats may be adaptable to louder environments. However, this noise may cause other mammals to experience startle responses, but this is temporary and likely inconsequential. Mammals likely habituate to such sounds. In addition, noise-intolerant mobile species could disperse to adjacent suitable habitat outside of the noise contours. Thus, existing noise is not likely causing significant adverse effects on bats or other wildlife.

Therefore, the No Action Alternative would not result in significant effects to biological resources.

Biological Resources Potential Effects:

- **No Action:** No change to existing conditions. No significant effects.
- **Alternative 1:** Removal of 0.90 acres of trees. Negligible to minor, short- and long-term, effects on wildlife. Less than significant, short- and long-term effects on bald eagles from construction and operational noise. Effects on federal- or state-listed species are not likely to occur. USFWS and MDNR consultation is ongoing. No significant effects.
- **Alternative 2:** Removal of 0.79 acres of trees. Operational noise would affect greater territory and higher-quality habitat; thus, potentially more wildlife would be subjected to a minor increase in peak sound levels. Less than significant, short- and long-term effects on great blue heron rookery from construction and operational noise. No effects on nesting bald eagles. Same consultation is ongoing. Effects on federal- or state-listed species are not likely to occur. No significant effects.

3.6.3.2 Alternative 1 Potential Effects

Terrestrial and Aquatic Vegetation

Alternative 1 would result in approximately 43,560 sq ft (1 acre) of earth disturbance and would remove approximately 39,006 sq ft (0.90 acres) of existing trees. If required, tree mitigation would be implemented per the CZMA Federal Consistency Determination. Tree removal would cause a negligible loss of carbon sequestration capacity. Standard native grass seed mix approved by MDE in the Erosion and Sediment Control Plan would be planted. Vegetation within Alternative 1's 50-foot firebreak would be mowed to meet explosive safety requirements. Landscaping with lower maintenance native plants can reduce the use of fertilizer and irrigation, reduce the need for frequent mowing, and benefit pollinator species.

Under Alternative 1, the addition of impervious surfaces could result in additional stormwater runoff. Appropriate BMPs would be implemented during and after construction to manage and minimize this additional stormwater runoff. Since wetlands do not exist on-site or adjacent to Alternative 1, indirect effects on wetland vegetation would not occur. Due to the distance of Alternative 1 from the Potomac

River and considering BMP implementation, indirect effects on any aquatic vegetation within adjacent surface waters would be negligible.

Terrestrial Wildlife

During construction, most of the larger and more mobile wildlife would flee from the disturbance into adjacent forested habitat. This would include larger mammals and adult birds—including adult FIDS and migratory birds. The adverse effect on larger wildlife would be negligible.

Many of the smaller and less mobile wildlife would not be able to flee from the construction. This includes rodents, amphibians, reptiles, and young birds—including young FIDS and migratory birds. Construction would affect smaller wildlife including disturbance from noise, displacement, and mortality. However, tree clearing would only occur between October 1 and March 31, outside of the active breeding season for tricolored bats, birds, and other wildlife. Therefore, adverse effects to smaller wildlife would be negligible to minor.

In the long-term, Alternative 1 would result in permanent forest loss. This would adversely affect wildlife—including FIDS and migratory birds, but the effects would be minor because suitable forest exists adjacent to the Alternative 1 study area.

The Alternative 1 study area is within an active bald eagle nest Protection Zone 1 and within Priority Zone 2 for mitigating adverse bald eagle effects. Alternative 1 would not directly remove the bald eagle nest. All practicable efforts would be made for construction to occur outside of the bald eagle nesting season (December 15 through June 15), which would minimize effects (U.S. Navy, 2023). If construction must occur within the bald eagle nesting season to meet deadlines, the Navy would consult with USFWS and/or would consider using the one nest take per calendar year authorized in the BGEPA permit. Thus, short-term effects on the bald eagle would be less than significant under Alternative 1. A complete list of bald eagle management actions are available in the 2023 NSF Indian Head Bald Eagle Management Plan.

New powerlines would be installed underground to eliminate the potential to electrocute or injure bald eagles and other raptors. However, permanent changes to the landscape may occur within the Protection Zone 1 with the forest removal and building additions. For this reason, NSF Indian Head would consult with the USFWS as stated in the NSF Indian Head Bald Eagle Management Plan. An additional bald eagle nest is northeast and adjacent to the Alternative 1 study area, but according to NSF Indian Head Bald Eagle Management Plan, this nest has been inactive.

In the long term, Alternative 1's noise generating operations may cause adverse effects to nesting bald eagles. Figure 3-11 shows the noise generated from the proposed UTT operations in relation to bald eagle nests and great blue heron rookeries. As detailed in the No Action Alternative, all three active bald eagle nests are within the existing ETR-2 and ETR-3 noise 140 dB peak noise contour (see Figure 3-11). Thus, the nesting bald eagles seem acclimated, behaviorally, to blast noise disturbance. The nesting bald eagles are already experiencing a similar level of noise disturbance as they would experience under Alternative 1. However, it is not known if the bald eagles experience physiological stress from blast noise. Reproduction or hatchling success is not known for these specific nesting bald eagles, but existing literature suggests that reproduction success for nesting bald eagles may not be altered by blast noise (Brown, B.T., Mills, G.S., Powels, C., Russell, W.A., Therres, G.D., & J.J. Pottie, 1999). Bald eagles on NSF Indian Head located near ranges have not historically had issues with nesting success. NSF Indian Head is consulting with the USFWS. Thus, long-term effects on nesting bald eagles would be less than significant under Alternative 1.

Threatened, Endangered, and Special-Status Species

Within the Alternative 1 study area, potentially suitable habitat exists for the federally endangered northern long-eared bat, proposed federally endangered/state rare tricolored bat, the little brown bat (ESA listing under review), and other bat species listed as state species of greatest conservation need that have been identified at NSF Indian Head. Specifically, the tricolored bat is known to exist within the Alternative 1 study area (NSFIH, 2024a). These identified bat species are believed to only utilize NSF Indian Head during the summer.

It is expected that the tricolored bat will be listed under the ESA, and time of year restrictions will be required. Therefore, during the construction of Alternative 1, time of year restrictions for the tricolored bat would be implemented. Tree clearing/limbing, noise-generating activities, and exterior construction could be restricted during summer tricolored bat active season (April 1–September 30). If these anticipated time of year restrictions cannot be met, the Navy would consult with the USFWS. Construction activities could occur during the tricolored bat inactive season (October 1–March 31).

Although northern long-eared bat has not been observed on NSF Indian Head, its preferred habitat of mature forest with understory exists within the Alternative 1 study area. The time of year restriction for the tricolored bat is the same for the northern long-eared bat (April 1–September 30). Training, operations, and projects conducted from June 1–July 31 that require forest clearing would require the 4(d) Section 7 streamlined consultation with the USFWS. Under Alternative 1, tree clearing would be avoided from June 1–July 31; thus, any direct, adverse, effects on potentially occurring northern long-eared bats would not likely occur.

Through the USFWS IPaC tool, the Navy completed a Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key for Alternative 1. The analysis determined that Alternative 1 is not likely to adversely affect either bat species. The determination is included in Appendix B.

NSF Indian Head regularly monitors bat species on the installation and evaluates proposed tree clearings for the presence of bats. Mature/late successional forests, which would provide excellent bat habitat, would be removed under Alternative 1. As a result of habitat loss, displaced bats could relocate to nearby mature forests. For these reasons, effects on any potentially occurring federal- or state-listed bats are not likely to occur under Alternative 1.

In the long term, bats would not likely be adversely affected by operational noise, since the literature suggests that bats may be adaptable to louder environments and that their hearing thresholds are outside the frequency range of the proposed operations.

The Alternative 1 study area is forested, and it lacks milkweed and other native flowering plants that attract pollinator species. Therefore, the habitat is unlikely to support the monarch butterfly, American bumble bee, frosted elfin, and sedge skipper. Wild lupine is required for the frosted elfin, and this plant does not exist at Alternative 1 (U.S. Navy, 2020; NSFIH, 2024b). Thus, Alternative 1 would cause negligible effects to these pollinator species.

Summary

Alternative 1 would remove approximately 0.90 acres of existing trees. Effects on pollinator species would be negligible. Since wetlands do not exist on-site or adjacent to Alternative 1, no effects on wetland vegetation would occur. The slight increase in stormwater runoff would cause indirect, negligible, long-term effects on other adjacent vegetative communities. Negligible to minor, short- and long-term, effects would occur to wildlife from construction noise, displacement, tree removal, and

permanent habitat loss. No effects would occur to great blue heron rookeries with the implementation of time-of-year restrictions. Short- and long-term effects on nesting bald eagles from construction and operational noise would be less than significant, given ongoing USFWS consultation and minimization measures, including time-of-year restrictions. Adverse effects on potentially occurring federal- or state-listed species, including bats, are not likely to occur. Threatened and endangered species consultation with USFWS and MDNR is ongoing. Therefore, no significant effects on biological resources are expected under Alternative 1.

3.6.3.3 Alternative 2 Potential Effects

Terrestrial and Aquatic Vegetation

Alternative 2 would cause approximately 43,560 sq ft (1 acre) of earth disturbance, which is the same disturbance as expected under Alternative 1. Alternative 2 would remove approximately 34,394 sq ft (0.79 acres) of existing trees, which is 0.11 acres less than what would be removed under Alternative 1. Alternative 2 would cause slightly fewer adverse effects to trees and vegetation as compared to Alternative 1, but the intensity would still be minor. The loss of carbon sequestration benefits from the removed trees would be slightly less, but still minor, under Alternative 2.

The amount of additional impervious surfaces would be the same for Alternative 2 as it is for Alternative 1; thus, a similar increase in stormwater runoff would occur. Wetlands do exist adjacent to Alternative 2. Additional stormwater runoff into this wetland could cause indirect adverse effects to wetland vegetation. Appropriate BMPs would be implemented during and after construction to manage and minimize this additional stormwater runoff; thus, effects would be negligible. Indirect effects on adjacent terrestrial vegetation would be similar to Alternative 1.

Terrestrial Wildlife

Alternative 2 would affect wildlife and wildlife habitat in a similar manner as Alternative 1; however, greater territory, and thus potentially more wildlife, would be subjected to an increase in peak sound levels. Figure 3-12 illustrates the increase in peak sound levels in the study area from 130 dB to 140 dB. This noise increase would affect portions of high-quality marsh habitat and the Chicamuxen WMA. The Chicamuxen WMA is open to hunting and contains a diversity of wildlife including waterfowl.

The Alternative 2 study area is within a great blue heron rookery buffer zone. The proposed development partially occurs within the Protection Zone 2, and the outermost explosive safety arc slightly extends into the Protection Zone 1. The great blue heron rookery is approximately 290 feet from the outermost explosive safety arc and 590 feet from the proposed development (U.S. Navy, 2020). Construction noise could adversely affect the nearby great blue heron rookery. However, no human disturbance to the great blue heron colony, eggs, or chicks would occur. In addition, human entry into Protection Zone 1 would be avoided during the great blue heron breeding season from February 15 to July 31.

After construction, long-term operational noise could adversely affect the nearby great blue herons (see Figure 3-12). This rookery has illustrated a successful nesting increase from 12 nests (in year 2018) to 22 nests (in year 2020) despite being subjected to existing operational noise from ETR-2 and ETR-3 (peak sound of 130 dB). Compared to the No Action Alternative, noise at this rookery from Alternative 2 operations would increase by 10 dB to a peak sound of 140 dB (Figure 3-12).

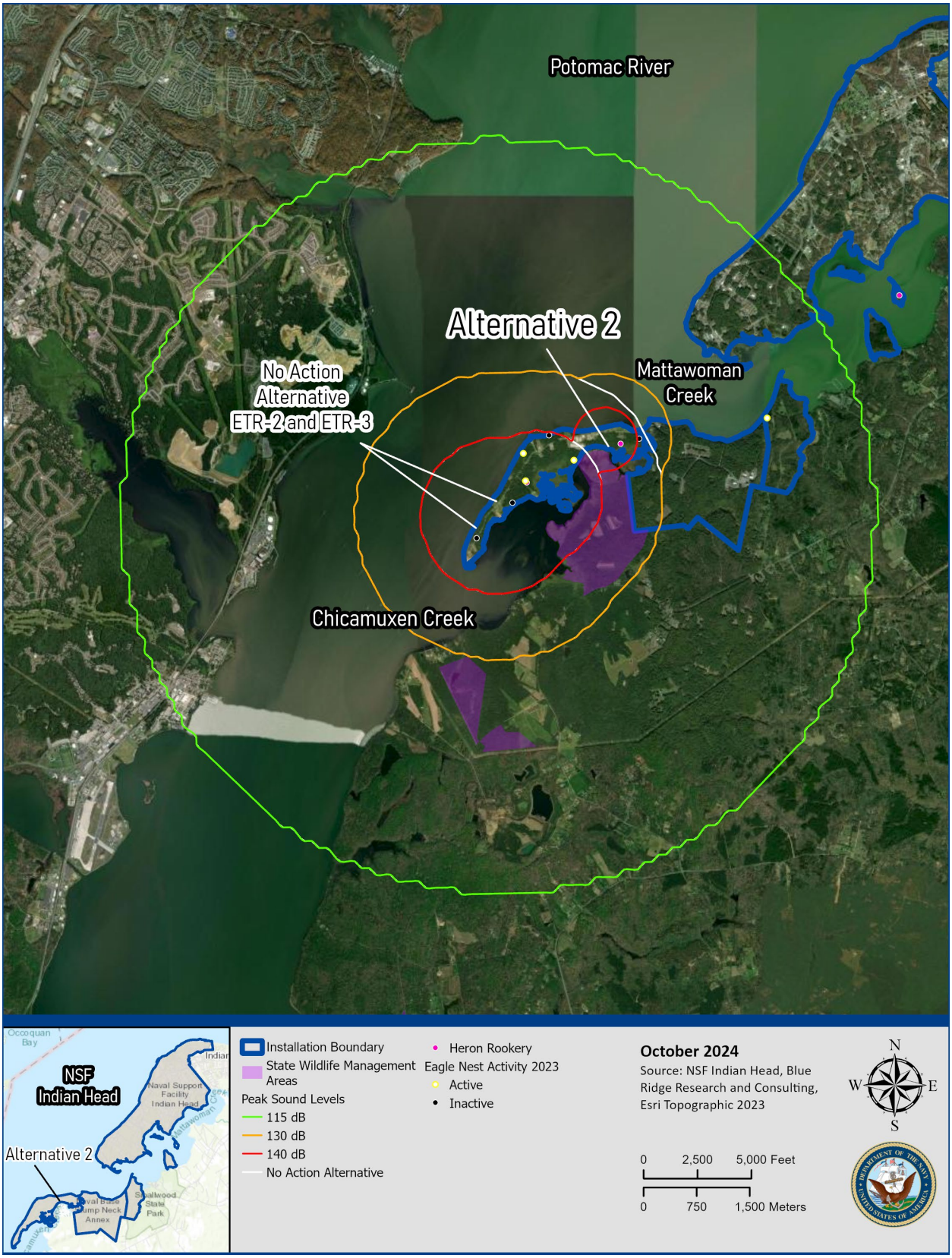

Figure 3-12 Peak Sound Levels for the No Action Alternative and Alternative 2 Study

Based on the successful nesting at the other great blue heron rookery located near Porter Road experiencing existing 140 dB peak levels, the noise increase from Alternative 2 would cause less than significant effects. These assumptions are supported by previous research that illustrated low-level military flight noise caused less than significant effects to wading birds (Black, B.B., M.W. Collopy, H.F. Percival, A.A. Tiller, & P.G. Bohall, 1984). The change in peak sound levels from Alternative 2 would also cause minor adverse effects to other wildlife, including other birds.

Under Alternative 2, no known bald eagle nests are within the study area; however, the area appears to be located within Priority Zone 1. New powerlines would be installed underground to eliminate injury to bald eagles and other raptors.

Threatened, Endangered, and Special-Status Species

Alternative 2 would affect threatened, endangered, and special-status species similar to what would be expected under Alternative 1. Alternative 2 is not likely to adversely affect federal- or state-listed species. The tricolored bat is known to exist within the Alternative 2 study area (NSFIH, 2024a). Thus, Alternative 2 would also implement the time of year restrictions for the tricolored bat—as detailed above in Alternative 1 (Section 3.6.3.2). The Navy also completed a Determination Key for the northern long-eared bat and tricolored bat and determined that Alternative 2 is not likely to adversely affect either bat species. The determination is included in Appendix B.

Alternative 2 would not likely affect the spotted turtle. The spotted turtle has been observed in the wetland adjacent to this site, but this wetland would not be disturbed. A species list request is pending from MDNR and will be incorporated into this EA once received. Threatened and endangered species consultation with USFWS is also ongoing. No significant effects on biological resources are expected under Alternative 2.

Summary

Alternative 2 would remove approximately 0.79 acres of existing trees, which is 0.11 acres less than what would be removed under Alternative 1. Unlike Alternative 1, Alternative 2 could cause additional stormwater runoff into an adjacent wetland but with BMPs this indirect effect would be negligible. Compared to Alternative 1, Alternative 2's operational noise would affect greater territory and higher-quality habitat; thus, potentially more wildlife would be subjected to a minor increase in peak sound levels. Alternative 2's construction and operational noise would cause short- and long-term, but less than significant, adverse effects to a great blue heron rookery. Alternative 2 would have no effect on nesting bald eagles.

3.7 Land Use

This discussion of land use includes current and planned uses and the regulations, policies, or zoning that control the proposed land use. The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

The CZMA sets national guidelines to protect coastal resources and requires federal agencies with the potential to affect land, water, or natural resources in coastal region to adhere to stipulations of federal-approved state Coastal Management Programs.

For this analysis, the study area is defined as the alternative site boundary and adjacent area that could be directly or indirectly affected by changes in land use.

3.7.1 Affected Environment

The following discussions provide a description of the existing conditions for land use resources at NSF Indian Head, including Stump Neck Annex, and the lands and waters adjacent to the installation.

The affected environment for land use is characterized within installation development plans, land use studies, INRMPs, site management plans, and other planning documents. The Installation Development Plan (IDP) at NSF Indian Head establishes Framework Plans to be utilized for future development and land use planning. Framework Plans are intended to represent optimal arrangement of land use areas, planning districts, and tenant focus areas that can accommodate both existing facility and program needs and long-range development requirements (NAVFAC Washington, 2019).

The Framework Plan for NSF Indian Head is divided into six planning districts: Administrative and Housing Support District, Base Support District, Technology Corridor, Explosives District, Production District, and the Research District, with a seventh planning district, EOD and Military Training, encompassing the Stump Neck Annex. Within these planning districts, land use designations at Stump Neck Annex include RDT&E (718 acres), open space (373 acres), base support (11 acres), training (9 acres), and sailor and family readiness (2 acres). These land uses support the mission of NSA South Potomac in research, development, and weapons/propellants testing (NAVFAC Washington, 2019).

Both alternative locations are sited within the EOD and Military Training District of Stump Neck Annex, at study areas with current land use designations of RDT&E. The EOD and Military Training District comprises the entirety of Stump Neck Annex, 65 percent of which has a current land use designation of RDT&E. These areas provide space for explosives ordinance testing and training (NAVFAC Washington, 2019).

Apart from Framework Planning districts and current land use designations, the IDP also includes an analysis of developable/non developable areas that provide a classification of existing site conditions based upon potential constraints. This classification provides development information for future project locations and sustainability planning including mitigation likely to be required and overall construction costs. The three developable area classifications within Stump Neck Annex are Developable Areas, Moderately Constrained Areas, and Highly Constrained Areas. Moderately constrained areas are typically characterized by existing development, wetlands and wetland buffer areas, Installation Restoration (IR) sites, historic districts, archeological resources, and sensitive flora/fauna habitats. Highly constrained areas generally include those with operational constraints that may pose health and safety risks including explosive safety arcs, live fire range danger zones, and clear zones/primary surfaces for aircraft operations (NAVFAC Washington, 2019). Alternative 1 would be sited within an area currently classified as Developable. The Alternative 2 area is currently classified as Highly Constrained.

Anti-terrorism and Force Protection (AT/FP) measures are a critical component of land use required by Navy regulations to establish minimum levels of protection against terrorist attacks for occupants of DOD facilities (Unified Facility Criteria 4-010-01). Physical security requirements for AT/FP can include a

secure perimeter, facility siting, constructing types, and setbacks from the installation perimeter, roadways, and parking areas (NAVFAC Washington, 2019).

NSF Indian Head is subject to the regulations established by the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (NAVFAC Washington, 2023b). There are 12 IR sites, 21 Munitions Response Program (MRP) sites, and 10 Areas of Concern located within the Stump Neck Annex. Many of these sites are associated with Land Use Controls (LUCs) that have the potential to affect future land use and development at NSF Indian Head (NAVFAC Washington, 2023b). The Environmental Restoration Program is discussed further in Section 3.10, *Hazardous Materials and Waste*.

The *Naval Support Facility Indian Head Joint Land Use Study, 2016*, a collaborative effort between NSF Indian Head, Charles County, MD, and the Town of Indian Head, identifies the land use conditions that exist beyond the boundary of the installation and provides recommendations for compatible land uses. The goal of this planning effort is to protect and preserve the installation mission at NSF Indian Head while promoting the health, safety, and welfare of the surrounding communities (Charles County, 2016). The dominant land uses for lands bordering Stump Neck Annex immediately to the south and east include protected state-owned forests of Smallwood State Park and Chicamuxen WMA, with a few small residential and agricultural parcels mixed in. Much of the land in this area is zoned as rural conservation/deferred development by the Charles County Planning Commission. The 2016 land use study concluded existing operations at Stump Neck Annex were compatible with existing land uses in the area (Charles County, Maryland, 2016).

The waterways surrounding Stump Neck Annex, including the Potomac River and Mattawoman Creek to the west and north, and Chicamuxen Creek to the east and south, are publicly accessible with multiple boat landings and marinas nearby. These waters are used for a variety of recreational and commercial purposes. In accordance with 33 CFR 334.240, access to portions of these waters may be restricted in response to military activities that pose safety hazards to non-participating personnel. As a result, Danger Zones are activated for portions of the Potomac River/Mattawoman Creek/Chicamuxen. Activation of the Danger Zone includes a notice to boaters in the vicinity via flashing red lights and horns (Charles County, Maryland, 2016).

NSF Indian Head, including the Stump Neck Annex, is located entirely within the Maryland Coastal Zone Management Program boundary and the Chesapeake Bay Watershed (Charles County, Maryland, 2016). Activities conducted along shorelines could affect use of lands, waters, or natural resources of the coastal zone beyond the boundaries of federal property. Activities must be consistent to the maximum extent practicable with the enforceable policies of Maryland's Coastal Zone Management Program in accordance with the federal CZMA. Maryland's Coastal Zone Management Program addresses coastal hazards, growth management, habitat and living resources, non-point source pollution, non-tidal wetlands, provision of public access, and tidal wetlands. This program encompasses several state laws and regulatory programs, of which the Clean Water Act is specifically applicable to the Proposed Action. The MDNR is the lead agency for coastal management and is responsible for enforcing the state's federally approved coastal management plan.

A Memorandum of Understanding between the State of Maryland and the DOD, signed May 2013, outlines the application and implementation of certain enforceable policies of Maryland's Coastal Zone Management Program as they relate to federal actions (State of Maryland and Department of Defense, 2013). In accordance with Section 307 of the CZMA, a Federal Consistency Determination will be

submitted to MDE. All correspondence received concerning the determination will be included in Appendix B of this EA.

3.7.2 Environmental Consequences

To evaluate each alternative's potential to affect land use, several factors were identified for assessment and determination. These factors include compatibility with on-site and adjacent land uses, restrictions on public access to adjacent land and waterways, changes in existing land uses that may be valued by local communities, AT/FP requirements, compliance with the CZMA, and the duration/permanency of the Proposed Action.

Land Use Potential Effects:

- **No Action:** No changes to existing conditions. No significant effects.
- **Alternative 1:** Minor, long-term effects on current and future land use at Stump Neck; no effects on land use compatibility within the navigable waters or adjacent communities. No significant effects.
- **Alternative 2:** No effects on current land use at Stump Neck; no effects on land use compatibility within the navigable waters or adjacent communities. No significant effects.

3.7.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to existing land use. Therefore, no significant effects would occur to land use with implementation of the No Action Alternative.

3.7.2.2 Alternative 1 Potential Effects

The Alternative 1 study area is within the EOD and Military Training District as defined in the IDP. The construction and operation of the UTT facility would be consistent with the existing RDT&E land use. The lands within and adjacent to this study area are categorized as "Developable Area" (NAVFAC Washington, 2019). Accordingly, the UTT facility with its associated explosive safety arcs would increase land use constraints and decrease the total "Developable Area" at Stump Neck Annex by a minor amount. However, this would be consistent with development plans associated with this area.

Construction and operation of the UTT facility would not affect existing or future AT/FP requirements at the study area, nor have any effects on AT/FP requirements at adjacent facilities. Design of the UTT facility would incorporate guidelines from the Defense Threat Reduction Agency's Designing for Mission Survivability and Force Protection manual (2012) to ensure compliance with applicable AT/FP requirements (NAVFAC Washington, 2022). AT/FP elements would include mass notification systems, emergency shutoffs for ventilation systems, laminated windows, blast resistant window and door frames, emergency lighting and signage, and an access gate at the road entrance.

The UTT facility would comply with explosive siting requirements including explosive safety arcs. One explosive safety arc associated with this alternative would encumber Building 2106. Alternative 1 would not affect the current use of Building 2106.

The Alternative 1 site is within MRP Site UXO 26, which includes the majority of the western portion of the Stump Neck Annex. See Section 3.10 for details. No known LUCs are associated with this site; however, an explosive safety submission would be required prior to ground disturbing activities (U.S. Navy, 2021). Alternative 1 is not expected to have any effect on ongoing or future remediation activities associated with MRP Site UXO 26.

The UTT facility is not expected to have an effect on adjacent land uses outside the installation's boundary. Much of the land to the south and east of Stump Neck Annex are state-owned forests and agriculture, which are generally compatible with installation activities.

Implementation of Alternative 1 would have minor, long-term effects on existing and future land use at the Stump Neck Annex; however, it would have no effects on land use outside the installation boundary or within the publicly accessible waters adjacent to Stump Neck Annex. Therefore, Alternative 1 would not result in significant effects on land use.

3.7.2.3 Alternative 2 Potential Effects

The Alternative 2 study area is within the EOD and Military Training District. The construction and operation of the UTT facility would be consistent with the existing land use. The majority of the EOD and Military Training District is categorized as Highly Constrained, including the Alternative 2 study area. The UTT facility at this location would not increase the level of constraint associated with the study area or adjacent lands.

Approximately 600 feet to the north of the Alternative 2 study area is a helicopter LZ. The UTT facility would likely be constructed within portions of the transitional surface zone associated with the LZ. A transitional surface is one of the imaginary surfaces that are established around runways and helipads to regulate (i.e., restrict) tall structures. Under Alternative 2, the utilities would be constructed underground and connected to the existing power pole that is adjacent to the main road. The final UTT design would determine exactly where the proposed facilities would lie within the helicopter imaginary surfaces and if, based on the design and existing helicopter operations, site adjustments would be necessary. Therefore, construction and operation of the UTT facility at the Alternative 2 study area is not expected to effect the LZ operations.

Similarly to Alternative 1, the UTT facility under Alternative 2 is not expected to affect existing or future AT/FP requirements at the study area, nor have an effect on AT/FP requirements at adjacent facilities.

There are no buildings or structures within the explosive safety arcs under Alternative 2, or any known plans for future development in the vicinity of the study area. Therefore, no adverse effects on adjacent buildings would occur. The explosive safety arcs would not encumber any portions of the Potomac River or Chicamuxen Creek and would have no effects on public access, existing land uses, or navigability of these waters.

At the Alternative 2 study area, operations from two former facilities resulted in soil contamination. These sites are referred to as MRP Site UXO 14 and IR Site 62/MRP Site UXO 1; there are no current operations conducted at these locations. These two sites and remediation efforts are discussed in detail in Section 3.10. Alternative 2 would be compatible with current and future remediation activities associated with these sites. Thus, Alternative 2 would not be expected to affect remediation activities.

Implementation of Alternative 2 would not result in significant effects on adjacent land uses within the installation, outside the installation boundary, or within the publicly accessible waters adjacent to Stump Neck Annex. Therefore, Alternative 2 would not result in significant effects on land use.

3.8 Infrastructure

This section discusses infrastructure such as utilities including potable water, wastewater, stormwater electricity, solid waste management, and communications. For this analysis, the study area is defined as the alternative site boundary and ground disturbance.

3.8.1 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories of infrastructure at NSF Indian Head. The overall capacity of utilities is adequate at NSF Indian Head and Stump Neck Annex. However, the utility infrastructure network is in poor or failing condition, particularly at Cornwallis Neck, which is being addressed through the installation development plan and a substantial recapitalization program. Utilities at Stump Neck Annex are reported to be in generally good condition (NAVFAC Washington, 2019).

3.8.1.1 Potable and Non-Potable Water

Potable water at Stump Neck Annex is sourced from two ground water wells that draw from the Patuxent and Patapsco aquifers (NAVFAC Washington, 2019). One of the wells draws water from the Patuxent aquifer at a rate of 100 gallons per minute and is approximately 500 feet deep. The other well draws water from the Patapsco aquifer at a rate of 80 gallons per minute and is approximately 290 feet deep (Charles County, Maryland, 2023). These wells provide potable water to a service population of 495 on Stump Neck Annex, which consumes 26,000 gallons per day (gpd). This represents approximately 43 percent of the 60,000 gpd total ground water appropriation for Stump Neck Annex (Charles County, Maryland, 2023). Water from the two wells is pumped and stored in an elevated water tank to supply the Stump Neck Annex water distribution system. The storage tank is aging, and repairs are planned in the future (NAVFAC Washington, 2019).

Saltwater intrusion into drinking water aquifers is a concern in the area and has occurred at the NSF Indian Head wells (Charles County, Maryland, 2023). Due to changes in the State Water Appropriation and Use permits, NSF Indian Head is also facing new mandated limitations with respect to mission-critical groundwater withdrawal for manufacturing operations. NSF Indian Head must justify potable water use to obtain permit renewal (NAVFAC Washington, 2019).

3.8.1.2 Wastewater

Wastewater systems at Stump Neck Annex include gravity sanitary sewers, force mains, and 11 pump stations that feed into the NSF Indian Head wastewater system via a pressure main that crosses under Mattawoman Creek. The centralized sewage treatment plant at NSF Indian Head treats both sanitary sewage and industrial process wastewater at a capacity of 500,000 gpd, with a peak capacity of 750,000 gpd (NAVFAC Washington, 2019). Infiltration/inflow of storm water and ground water is an ongoing issue with the current wastewater collection system; rehabilitation projects are planned to address extraneous flows within the system (Charles County, Maryland, 2023). The IDP identified a capability gap for wastewater infrastructure at NSF Indian Head; additional studies are required to support a course of action to address the gap (NAVFAC Washington, 2019). Municipal wastewater (sanitary sewer) is discharged into the Potomac River via one outfall permit issued by MDE (NAVFAC Washington, 2019).

3.8.1.3 Stormwater

Stormwater infrastructure at Stump Neck Annex is managed through a system of grass swales, culverts, drainage ditches, and drop inlets (NAVFAC Washington, 2019).

3.8.1.4 Electricity

Electricity for Stump Neck Annex is purchased from Southern Maryland Electric Cooperative and distributed through limited distribution infrastructure (NAVFAC Washington, 2019) including approximately 350 overhead utility poles (U.S. Navy, 2020).

3.8.1.5 Solid Waste Management

Solid waste is collected by facilities personnel and transported and disposed of off-site by licensed private contractors. In addition, there is an incinerator on Cornwallis Neck that processes approximately one ton of material annually (Charles County, Maryland, 2021).

3.8.1.6 Communications

NSF Indian Head telecommunication infrastructure consists of fiber optic and twisted pair cables, which provide telephone and internet capability to installation facilities (NAVFAC Washington, 2019). Six internet service providers, four cable television providers, and one landline service provider serve the Indian Head zip code area, including NSF Indian Head. There are no known issues with communications infrastructure or capacity at the Stump Neck Annex.

3.8.2 Environmental Consequences

This section analyzes the anticipated increases or decreases in public works infrastructure demands considering existing management practices and storage capacity, and it evaluates potential effects on infrastructure associated with implementation of the alternatives. Effects are evaluated by whether they would result in the use of a substantial proportion of the remaining system capacity, reach or exceed the current capacity of the system, or require development of facilities and sources beyond those existing or currently planned.

Infrastructure Potential Effects:

- **No Action:** No changes to existing conditions. No significant effects.
- **Alternative 1:** Minor, short-term effects on utility infrastructure capacity. Minor, long-term effect on potable water usage. No significant effects.
- **Alternative 2:** Effects on infrastructure would be similar to Alternative 1. No significant effects.

3.8.2.1 No Action Alternative

The Proposed Action would not occur under the No Action Alternative and infrastructure demand and capacity levels would remain unchanged from existing conditions. Therefore, no significant effects on infrastructure would occur with implementation of the No Action Alternative.

3.8.2.2 Alternative 1 Potential Effects

Under Alternative 1, potable water, sanitary sewer, electrical, and telecommunications infrastructure would be extended approximately 400 feet from Lewis Road.

Potable and Non-Potable Water

Under Alternative 1, potable water would be required for on-site drinking water supply, restroom facilities, fire suppression (hydrant), and UTT operations. New potable water infrastructure would be designed and installed in a manner that avoids cross connections to wastewater systems and backflow preventers would be utilized as required. Additionally, a water meter would be installed with capabilities to transmit usage data to the base meter reader system (NAVFAC Washington, 2022). An underground potable water connection would be installed to ensure adequate flows to the on-site hydrant for fire suppression. Possible outages in water supply may be required during construction activities but would be short in duration and closely coordinated to avoid affecting mission critical requirements.

Operation of the UTT facility would require filling the 10,000-gallon test tank from potable water supplies prior to testing activities. The tank would be completely emptied and filled about once a year.

As previously discussed, Stump Neck Annex has a daily water appropriation of 60,000 gpd, with an average demand of 26,000 gpd, a 43 percent utilization rate (Charles County, Maryland, 2023). Filling the 10,000-gallon tank would require 16 percent of the daily potable water appropriation, increasing total utilization to approximately 60 percent for a given day. This water usage would be consistent with sustaining the RDT&E mission at the installation. Operational activities at NSF Indian Head currently face mandated limitations to groundwater usage for manufacturing processes, and increased usage must be justified in order to obtain permit renewals (Charles County, 2016; NAVFAC Washington, 2019).

Construction activities under Alternative 1 could result in minor, short term effects on potable water supplies due to planned disruptions while installing new infrastructure. In the long term, operation of the UTT facility may result in minor effects on potable water usage. Therefore, Alternative 1 would not result in significant effects on potable or non-potable water supply.

Wastewater

Under Alternative 1, new wastewater infrastructure would be extended to connect facilities to the proposed control room. Wastewater lines would be gravity or forced mains, depending on the final grade and elevation of the study area. Wastewater from the control room building would discharge into a blackwater sump; DOD Unified Facility Criteria guidelines would be followed when connecting to the force main. Wastewater from the test tank itself would not be disposed of within the wastewater system. Contaminated water would be stored in a central holding tank that would have 110 percent storage capacity and a barrier around the tank to prevent spills. Contaminated water would then be removed off-site. NSF Indian Head currently utilizes holding tanks for contaminated wastewater and would follow the current procedures that are in place. No disruptions in service would be expected during construction activities and there would not be a significant increase in wastewater treatment demand from operation of the UTT facility.

Stormwater

Stormwater capacity disruptions in the region may occur during the replacement of the existing culvert under the driveway entrance to the study area (NAVFAC Washington, 2022). Under Alternative 1, construction activities would include the implementation of MDE-approved erosion and sediment control/storm water management plans; therefore, effects on stormwater capacity during construction would be minimized (NAVFAC Washington, 2022).

The proposed UTT facility would incorporate Low Impact Development features in accordance with Department of the Navy 2007 Low Impact Development Policy for Stormwater Management, MDE Stormwater Design Manual, and the USEPA's Energy Independence and Security Act 438 Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects (NAVFAC Washington, 2022). These design standards would limit the potential for long-term effects on stormwater infrastructure and stormwater capacity at the proposed UTT facility and adjacent areas.

Electricity

Under Alternative 1, new electrical infrastructure would be installed to accommodate UTT operations. Existing utility lines would be marked at the study area prior to earth disturbance to avoid inadvertent damage to unmapped lines and ensure worker safety (NAVFAC Washington, 2022).

Infrastructure would include three conductors running underground from existing electrical lines along Archer Avenue, an aboveground transformer vault, and an electrical rack to support the main distribution panel and surge protectors. Both the transformer and electrical rack would be constructed

with a minimum 50-foot setback from explosive hazards. Mechanical systems with large electrical demands associated with the UTT would include a heating, ventilation, and air conditioning unit, two 2-ton hoists, two drive pumps, and a single motor to operate the entrance gate (NAVFAC Washington, 2022). Current capacity analysis for utility service at the installation indicates there are no concerns with adequate electrical capacity (NAVFAC Washington, 2019). Accordingly, these mechanical systems would not represent a large increase in electricity demand at Stump Neck Annex and would not have significant effects on existing electrical infrastructure or distribution capacity.

Construction activities under Alternative 1 would have minor, short term, and localized effects on electrical infrastructure, with brief, planned power outages during installation. Operation of the UTT facility under Alternative 1 is not expected to have long-term effects on electrical infrastructure or capacity.

Solid Waste Management

Construction waste would be disposed of off-site by a construction contractor. Operations are not expected to generate large quantities of solid waste; the small quantities generated within the study area would be collected by facilities personnel and transported and disposed of off-site by licensed private contractors. Construction and operation of the UTT facility under Alternative 1 is not expected to affect solid waste management at Stump Neck Annex.

Communications

During construction activities, expected communication outages would be coordinated with installation partners to ensure no disruptions to critical mission activities. Alternative 1 would result in minor, short-term effects on communications infrastructure serving Stump Neck Annex. Operation of the UTT facility would not be expected to have long-term effects on communications infrastructure or capacity.

3.8.2.3 Alternative 2 Potential Effects

Similar to Alternative 1, the Alternative 2 study area does not have existing utility infrastructure. Potable water, sanitary sewer, electrical, and telecommunications infrastructure would need to be extended approximately 450 feet from Archer Avenue to the study area. Existing utility lines would be marked prior to earth disturbance (NAVFAC Washington, 2022).

Effects on utility infrastructure and capacity for Alternative 2 would be similar to those discussed for Alternative 1. Construction activities would likely cause limited disruptions to potable water, electricity, and communications services during installation of new infrastructure. These interruptions would be minor and closely coordinated with installation partners to ensure no effects on mission critical operations.

Minor, short-term effects on stormwater capacity would likely result from construction activities within the study area, but MDE-approved erosion and sediment control/stormwater management plans would limit these effects. Operation of the UTT facility under Alternative 2 would not be expected to have long-term effects on electrical, solid waste management, or communications infrastructure or capacity.

3.9 Public Health and Safety

This discussion of public health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily

injury or illness, or property damage. The primary goal is to identify and prevent potential accidents or effects on the general public. Public health and safety within this EA pertain to community emergency services, construction activities, operations, and environmental health and safety risks. For this analysis, the study area for public health and safety includes the alternative site boundary and the area within the explosive safety arcs.

3.9.1 Affected Environment

Community emergency services are organizations that ensure public safety and health by addressing different emergencies. Police, fire, and rescue services; and emergency medical services are the primary emergency service functions. NSF Indian Head has its own Fire and Emergency Service Division. The Division's activities include fire protection, suppression, and prevention; public safety education; hazardous material handling; and emergency medical responses. The Branch Medical Clinic provides outpatient services on the installation, and there is one hospital in Charles County: University of Maryland Charles Regional Medical Center in La Plata.

Operational safety refers to the actual use of facilities, training and testing activities, and potential risks to inhabitants of adjacent land and water parcels. Every DOD industrial facility must operate under a System Safety Program (SSP) developed in accordance with military standards. The main objective of the SSP is to ensure that safety, consistent with mission requirements, is included in technology development and the design of systems, subsystems, equipment, facilities, and their interfaces and operation. The program stresses early hazard identification and analysis, which is performed at multiple stages in the lifecycle of an industrial facility, including design, start-up, and operation. In accordance with the SSP, potential hazards at NSF Indian Head are eliminated or reduced below the lowest level of human risk wherever possible through changes in facility or equipment design, the development of SOPs, or other related safety documentation. Hazards that cannot be reduced below this level are given a risk level. Depending on the final level, operations are reviewed and approved by management, with the highest risks requiring review and approval by the Commanding Officer.

3.9.2 Environmental Consequences

The safety and environmental health analysis contained in the respective sections addresses issues related to the health and well-being of military personnel and civilians living on or in the vicinity of NSF Indian Head, as well as possible effects on the overall environment. Activities associated with the Proposed Action would be conducted in accordance with applicable federal, state, and local regulations. Secondary effects on public health, such as air quality and noise, are discussed in more detail in those resource sections.

Public Health and Safety Potential Effects:

- **No Action:** No change to existing conditions. No significant effects.
- **Alternative 1:** Minor, short-term public health and safety effects from construction activities. Minor, long-term effects due to potential accidental risks associated with handling explosives. No significant effects.
- **Alternative 2:** Public health and safety effects would be similar to Alternative 1. No significant effects.

3.9.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. Testing would continue to occur in its current location, in accordance with existing practices and requirements. The lack of a permanent UTT testing facility would not result in any effects on public health and safety.

3.9.2.2 Alternative 1 Potential Effects

An analysis of public health and safety involves consideration to the safety of personnel within or adjacent to construction zones. Because Alternative 1 would be located in an area with the potential for UXO, an explosive safety submission would be prepared, submitted, and approved by the Naval Ordnance Safety and Security Activity and to the DOD Explosives Safety Board prior to the construction of the UTT facility (U.S. Navy, 2013b). Contractors performing construction activities would be required to follow safety protocols appropriate for specific tasks, including explosives decontamination and the disposal of hazardous materials. They would also comply with applicable worker safety laws, to include the use of required personnel protective equipment. The construction site would be clearly marked, and a gate would be installed by the Access Road entrance to discourage other personnel from accessing the area. The construction site would be entirely on installation property; although the public does visit the installation occasionally, members of the public do not routinely walk through the installation. Further, Alternative 1 would be within the Restricted Area of the installation, where only cleared personnel are permitted access, to further limit effects on public safety.

As appropriate, the UTT facility would incorporate AT/FP measures (i.e., blast-resistant windows, emergency shutoffs for ventilation systems). These measures would be in place to protect the health and safety of those working on-site, as well as those across the installation and in the community at-large. There would be splash guards and a containment dike around the UTT to address overspill. As described in Section 2.3.1, the UTT facility would comply with explosive siting requirements including explosive safety arcs. These arcs would not encompass the Potomac River or inhabited buildings.

Implementation of Alternative 1 would result in minor, short-term effects on public health and safety during construction, and minor, long-term effects due to potential accidental risks associated with handling explosives.

3.9.2.3 Alternative 2 Potential Effects

Similar to Alternative 1, the construction site under Alternative 2 would be clearly marked to discourage unauthorized access. Contractors performing these activities would be required to prepare and follow safety protocols appropriate for specific construction tasks, to include an explosive safety submission and the use of UXO Support for potential UXO removal, and to comply with applicable worker safety laws.

Under Alternative 2, the UTT facility would comply with explosive siting requirements. The explosive safety arcs would not encompass any inhabited buildings, therefore, effects on public health and safety would be minor.

Implementation of Alternative 2 would result in minor, short-term effects on public health and safety during construction and minor, long-term effects due to potential accidental risks associated with handling explosives.

3.10 Hazardous Materials and Waste

This section discusses hazardous materials, hazardous waste, toxic substances, and contaminated sites.

For this analysis, study area refers to the alternative site boundary and adjacent area that could be affected by the use, storage, transportation, disturbance, or disposal of hazardous materials and waste.

3.10.1 Regulatory Setting

Under the Resource Conservation and Recovery Act (RCRA) (42 United States Code [U.S.C.] 6901 et seq.), USEPA has the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste through USEPA-developed regulations, guidance and policies that ensure safe management and cleanup of solid and hazardous waste, and programs that encourage source reduction and beneficial reuse. RCRA creates the framework for the management of hazardous and nonhazardous solid waste and describes the waste-management program mandated by Congress that gave USEPA the authority to develop the RCRA program.

The Toxic Substances Control Act (TSCA) of 1976 (15 U.S.C. 2601 et seq.) provides the USEPA with the authority to require reporting, record-keeping and testing, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics, and pesticides. TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos-containing material (ACM), radon, and lead-based paint (LBP).

3.10.2 Affected Environment

The Navy has a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for these activities. These programs are governed Navy-wide by applicable Office of the Chief of Naval Operations Instruction (OPNAVINST) and at the installation by specific instructions issued by the Base Commander. The Navy continuously monitors its operations to find ways to minimize hazardous materials use and hazardous waste generation.

3.10.2.1 Hazardous Materials and Wastes

NSF Indian Head has a Consolidated Hazardous Material Reutilization and Inventory Management Program to reduce the quantity of hazardous materials entering the region and ultimately the waste stream. There are numerous inert and hazardous and flammable storage warehouses on the installation that include hazardous waste material storage and transfer facilities, a hazardous waste materials storage box, and a scrap storage shed. The NSF Indian Head Environmental Office coordinates disposal of hazardous materials and wastes via a Defense Logistics Agency-Disposition Services contract.

Energetic hazardous waste and military munitions are prohibited from being transported off the installation for treatment due to the hazard that it presents to the public. Once treated, energetic hazardous waste and military munitions are transported off-site to an approved disposal facility.

3.10.2.2 Special Hazards (Asbestos-Containing Materials, Lead-Based Paint, Polychlorinated Biphenyls)

There are numerous facilities on the installation that were constructed before the 1950s. LBP was widely used prior to its ban in 1978. PCBs were widely used in paint, caulk, and sealants prior to their ban in 1979. Similarly, ACMs were commonly used in pipe insulation, sprayed concrete, gaskets around electrical components, and epoxy coatings.

3.10.2.3 Environmental Restoration Program

The CERCLA of 1980, also known as Superfund, provides for the remediation of sites contaminated through past waste management practices that do not meet current standards for protection of human

health and the environment. The Navy's Environmental Restoration Program provides funding for the investigation and remediation of contaminated sites, identified as IR sites. Identification, investigation, and cleanup of hazardous materials, pollutants, and contaminants are conducted in accordance with CERCLA regulations and BMPs. IR sites can be developable for noninhibited uses that do not require excavation such as parking lots or laydown areas; although, using an IR site that has not been fully remediated for the construction of a facility would likely require future remediation (NAVFAC Washington, 2019).

There are 12 IR sites, 21 MRP sites, and 10 Areas of Concern on Stump Neck Annex (NAVFAC Washington, 2023b). Most of these sites are far away from the alternative study areas; only those that are within or adjacent to the alternative study areas are discussed in this EA. Table 3-15 summarizes Environmental Restoration Program (ERP) sites within the study areas that are currently being addressed under varied scheduled steps for addressing contaminated sites under CERCLA or have been designated as No Further Action.

Additional information about the ERP sites within the Alternative 1 and 2 study areas is described in the proceeding sections.

Table 3-15 Summary of ERP Sites Within the Study Areas

Site Name	*Proximity to Project*	*Current Regulatory Status*
MRP Site UXO 26 — The Valley Impact Area	Within entire Alternative 1 study area; within small portion of fire break buffer at Alternative 2 study area	Site Inspection in September 2010 recommended Remedial Investigation for munitions and explosives of concern. Remedial Investigation Report to be submitted in 2024.
IR Site 62/SWMU 6/MRP Site UXO 1 — Air Blast Pond	Within Alternative 2 study area, adjacent to Chicamuxen Creek	Site Inspection Report was completed in September 2010. Initial Remedial Investigation Report was completed in May 2020. Revised Remedial Investigation Report to be submitted in 2024.
MRP Site UXO 14 — Marine Rifle Range	Within northern region of Alternative 2 study area	Removal Action Completion Report and no further action Site-Specific Plan Closeout document were finalized in September 2021.

Source: (NAVFAC Washington, 2023b)
Key: IR = Installation Restoration; MRP = Munitions Response Program; SWMU = Solid Waste Management Unit; UXO = Unexploded ordnance

3.10.3 Environmental Consequences

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes and the presence and management of specific clean-up sites at NSF Indian Head.

3.10.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change associated with hazardous materials and wastes. UTT testing would continue to occur in its current location, in accordance with current practices and requirements. Therefore, no significant effects on hazardous materials and wastes would result from implementation of the No Action Alternative.

3.10.3.2 Alternative 1 Potential Effects

Hazardous Materials and Wastes

Construction activities would use hazardous materials and generate hazardous wastes in small quantities. Common hazardous materials include diesel fuel, gasoline, propane, hydraulic fluids, oils, lubricants, and batteries. Common hazardous wastes include empty containers from hazardous materials, spent solvents, waste oil, lead-acid batteries, and spill clean-up materials for abatement of solvents and corrosive agents. Construction contractors are responsible for ensuring that the transport, use, storage, and disposal of hazardous materials and wastes comply with applicable federal and state regulations. Adherence to policies, procedures, and regulations would minimize the potential effects from exposure and accidental releases during construction. In the event of an accidental release, contaminated media would be treated on-site or would be promptly removed and disposed of in accordance with applicable Navy spill contingency plans and federal and state regulations. Construction and demolition activities would result in short-term, minor effects.

Hazardous Materials and Waste Potential Effects:

- **No Action:** No change to existing conditions. No significant effects.
- **Alternative 1:** Minor, short-term effects from construction, and the ground disturbance associated with the ERP sites. Minor, long-term effects from the handling of hazardous materials and wastes. No significant effects.
- **Alternative 2:** Similar to Alternative 1. No significant effects.

The UTT facility would be built in accordance with NSF Indian Head and federal regulations. Hazardous materials are not likely to be released outside of the UTT's confinement. Explosive safety arcs would be incorporated into the design to protect people in a worst-case scenario event. Prior to beginning work, a signed Work Permit would be obtained from NSWC Indian Head Division Safety or Naval Support Activity South Potomac Safety (as applicable) and the Fire Department. Two approval letters, one providing Explosive Safety Site Approval and one providing Explosive Safety Submission approval, would be required from Naval Ordnance Safety and Security Activity or Department of Defense Explosives Safety Board. During operations, materials would be stored, handled, and transported in strict compliance with applicable federal standards. An unexpected situation involving hazardous materials would be managed in accordance with the Navy's hazardous materials and hazardous waste management plans. Effects on hazardous materials and waste would not be significant under Alternative 1.

Special Hazards

Under Alternative 1, no existing buildings or structures would be demolished; therefore, it is not likely that ACMs, PCBs, or LBPs would be encountered (NAVFAC Washington, 2022). If special hazards were unexpectedly encountered, their removal would be handled in accordance with federal, state, and local regulations. Contractors would wear appropriate personal protection equipment and adhere to applicable regulations and the installation's management plans for toxic substances. New construction would not include the use of special hazards because federal policies and laws limit their use in building construction applications.

Environmental Restoration Program

On Stump Neck Annex, two IR sites are in the Site Screening Investigation phase. One open IR site and thirteen MRP sites are currently undergoing a Remedial Investigation/Feasibility Study (NAVFAC Washington, 2023b).

The Alternative 1 study area overlaps entirely with MRP Site UXO 26 (see Figure 3-13). MRP Site UXO 26 is known as the Valley Impact Area and covers the majority of the western portion of Stump Neck Annex, extending all the way down the peninsula adjacent to Archer Avenue. This region was used as a munitions impact area from 1891 to 1921. The site's Remedial Investigation is ongoing, with the delineation of metals in soil and groundwater. No future UXO work is planned currently but future work is anticipated. Due to its proximity to MRP Site UXO 26, an Explosive Safety Submission would be required prior to any ground disturbance. UXO Support would be on-site throughout the planning and construction phase to assist with potential UXO removal. No known LUCs are associated with the study area. Given these protocols and the absence of LUCs, effects on hazardous materials and waste under Alternative 1 would not be significant.

Implementation of Alternative 1 would result in short-term, minor effects from construction, and the ground disturbance associated with the ERP sites. Long-term minor effects from the handling of hazardous materials and wastes. No significant effects.

3.10.3.3 Alternative 2 Potential Effects

Hazardous Materials and Wastes

Under Alternative 2, effects on hazardous materials and wastes would be similar to those expected from Alternative 1. Construction activities would use hazardous materials and generate hazardous wastes in small quantities. Adherence to policies, procedures, and regulations would minimize the potential effects from exposure and accidental releases during construction. In the event of an accidental release, contaminated media would be treated on-site or would be promptly removed and disposed of in accordance with applicable Navy spill contingency plans and federal and state regulations. A signed Work Permit and two approval letters, one providing Explosive Safety Site Approval and one providing Explosive Safety Submission approval, would be required prior to construction. During operations, materials would be stored, handled, and transported in strict compliance with applicable federal standards.

Special Hazards

Effects on special hazards would be the same as under Alternative 1. No adverse effects on special hazards are expected from construction or operation of the UTT facility under Alternative 2.

Environmental Restoration Program

The Alternative 2 study area largely overlaps with MRP Site UXO 14 and IR Site 62/MRP Site UXO 1. A very small portion of the project's fire break buffer would overlap MRP Site UXO 26. MRP Site UXO 14 is associated with the Marine Rifle Range utilized between 1911 and 1918, resulting in soil contamination from small arms firing. A removal action for soil contamination was completed in June 2021; the site screening closeout document (September 2021) stated no further action required (NAVFAC Washington, 2023b). IR Site 62/MRP Site UXO 1 is associated with historical explosives testing at the Air Blast Pond from 1955 to 1975 (see Figure 3-14). This resulted in soil contamination from energetic chemicals including Pentolite, HBX1, HBX2, H6, and C4.

1

Figure 3-13 ERP Sites Within Alternative 1 Study Area

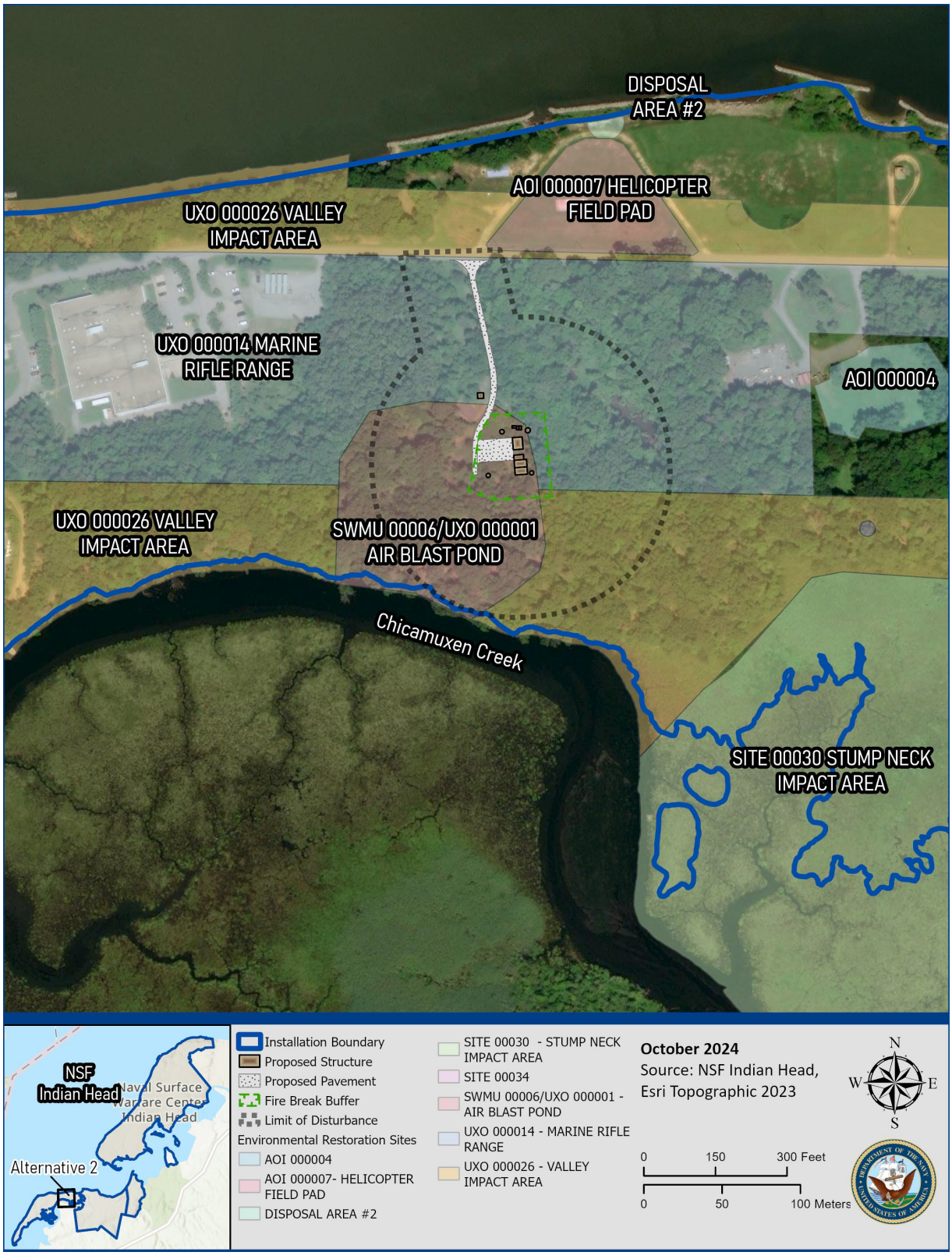

Figure 3-14 ERP Sites Within Alternative 2 Study Area

Preliminary investigations and assessments have been completed at the IR Site 62/MRP Site UXO 1 with recommendations of additional fieldwork to evaluate metals and complete chromium speciation. The site's Remedial Investigation is still ongoing, with the delineation of metals in soil and groundwater. No future UXO work is planned currently but future work is anticipated. No known LUCs are associated with MRP Site UXO 14, IR Site 62/MRP Site UXO 1, or MRP Site UXO 26; however, an Explosive Safety Submission would be required prior to any ground disturbance at the Alternative 2 study area (U.S. Navy, 2021). UXO Support would be on-site throughout the planning and construction phase to assist with potential UXO removal.

Implementation of Alternative 2 would result in short-term, minor effects from construction, and the ground disturbance associated with the ERP sites. Long-term minor effects from the handling of hazardous materials and wastes. No significant effects.

3.11 Environmental Justice

Environmental justice, as defined by the CEQ's NEPA Implementing Regulations is the, "just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision making and other federal activities that affect human health and the environment so that people are fully protected from disproportionate and adverse human health and environmental effects (including risks) and hazards, including those related to climate change, the cumulative effects of environmental and other burdens, and the legacy of racism or other structural or systemic barriers; and have equitable access to a healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices" (CEQ, 2024).

In addition, EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, orders federal agencies to identify and address actions with "disproportionately high and adverse human health or environmental effects on low-income and minority populations" (FEMA, 2023). This includes climate-related actions, cumulative effects, and structural or systemic barriers like racism. Federal programs must also provide public information and participation to such populations.

The demographic study area for environmental justice includes Census Tracts (CTs) 8502.01, 8503, and 8504. Most of NSF Indian Head is within CT 8502.01 while a small portion is within CT 8503 (U.S. Census Bureau, 2020). The alternative study areas would be within CT 8502.01. This tract, and those south and east of the alternative study areas (CTs 8503 and 8504) are also included in the demographic study area for this analysis. These CTs could experience effects from installation activities on Stump Neck Annex such as noise, air quality, and public health and safety.

3.11.1 Affected Environment

An area affected by an action, or actions, where the percentage of minorities exceeds 50 percent or is "meaningfully greater" than the general population is a minority population (USEPA, 2016). The U.S. Census Bureau uses a statistical poverty threshold that factors family size and composition, including each individual's age and number of dependents, to identify low-income populations (USEPA, 2016). For example, the poverty threshold for an individual under the age of 65 in 2023 was $15,852 whereas the poverty threshold for a family of four was $31,428 (U.S. Census Bureau, 2024).

Table 3-16 lists the race and ethnicity of the populations within the CTs in the vicinity of the study areas, according to the U.S. Census Bureau. Table 3-17 lists the percentage of individuals living below the poverty level, according to the U.S. Census Bureau that were included in this analysis.

The U.S. Census Bureau decennial census and 5-year estimates from the Census American Community Survey conducted in 2022 were used in this analysis. The most recent data were used to ensure that current conditions within the study area were assessed.

As exemplified in Table 3-16, each CT has a heterogeneous general population. CTs 8503 and 8504 have mostly White residents, similar to national levels, but also have over double the national level of Black residents. CT 8502.01 has mostly Black residents, with over three times the national level. The percentage of White residents in CT 8502.01 is slightly lower than that of Black residents. Meanwhile, each CT has fewer Hispanic or Latino residents than the national level (U.S. Census Bureau, 2020).

As shown in Table 3-17, the study area CTs do not qualify as poverty areas since the percentage of residents below the poverty threshold is less than 20 percent. However, CT 8504 has a slightly higher percentage of residents below the poverty level than the national level (U.S. Census Bureau, 2020).

Table 3-16 Population Characteristics: Race and Ethnicity (2020)

Geographic Area	*Percent White[1]*	*Percent Black[1]*	*Percent Hispanic or Latino[2]*
CT 8502.01	39.6%	41%	15.1%
CT 8503	53.6%	33.3%	4.9%
CT 8504	61.2%	28.4%	3.2%
United States	61.6%	12.4%	18.7%

(U.S. Census Bureau, 2020)
Key: CT = Census Tract
Notes: [1] non-Hispanic; [2] of any race

Table 3-17 Percent of Individuals Below Poverty Level (2012-2022)

Geographic Area	*2012*	*2022*
CT 8502.01	0%	3%
CT 8503	6%	5.4%
CT 8504	11.9%	16.2%
United States	15.9%	12.6%

Key: CT = Census Tract

The USEPA Environmental Justice Screening and Mapping Tool was also used to identify specific concerns that may affect the populations in proximity to the study areas. The Environmental Justice Screening and Mapping Tool showed that the CTs have existing environmental justice index burdens, including proximity to superfund sites, air pollution, and proximity to hazardous waste facilities (USEPA, 2023d). Figure 3-15 and Figure 3-16 illustrate the demographic distribution of the minority populations in and around NSF Indian Head and the persons living below poverty level in and around NSF Indian Head, respectively.

3.11.2 Environmental Consequences

This analysis focuses on the potential for disproportionate and adverse exposure of minority and low-income populations to adverse effects from the implementation of the alternatives.

3.11.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to existing conditions. The No Action Alternative would not disproportionately affect minority or low-income populations. Therefore, the No Action Alternative would result in no significant effects under environmental justice.

Environmental Justice Potential Effects:

- **No Action:** No change to existing conditions. No significant effects.
- **Alternative 1:** No disproportionately adverse human health of environmental effects on minority or low-income populations. No significant effects.
- **Alternative 2:** Effects similar to Alternative 1. No significant effects.

3.11.2.2 Alternative 1 Potential Effects

As described in the beginning of Chapter 3, the Proposed Action would have negligible effects on transportation and visual resources. Resources that could affect surrounding low-income or minority populations include noise, air quality, and public health and safety.

Noise effects from Alternative 1 are discussed in more detail in Section 3.5.4.2. Construction noise would occur intermittently and affect areas directly adjacent to the construction sites. Noise from UTT operations would also affect areas surrounding the study area, as depicted in Figure 3-7. Although Alternative 1 is located within CT 8502.01, which contains a higher percentage of minority population, there are no residences or other noise sensitive land uses located near Alternative 1 that would be exposed to noise from construction or UTT operation. Noise effects would not be heard outside of CT 8502.01, and there are no low-income populations in the study area. Therefore, noise effects would not significantly or disproportionately affect low-income and minority populations under Alternative 1.

Air quality effects, discussed in Section 3.1.2.2, would occur during construction activities. Emissions from construction would be short-term and concentrated near the site. Alternative 1 is expected to have no long-term emissions from operation of the UTT facility. Emissions would remain well below NSR Synthetic Minor thresholds and would be insignificant relative to *de minimis* levels. Therefore, the increase in short-term emissions would not significantly or disproportionately affect low-income or minority populations.

As discussed in Section 3.9.2.2, Alternative 1 would be sited within the secure perimeter, where public access is restricted. The UTT facility would comply with explosive siting requirements including explosive safety arcs; therefore, local populations would not experience any public health and safety effects.

Overall, the implementation of Alternative 1 would not result in disproportionately adverse or significant human health or environmental effects on minority or low-income populations. Therefore, Alternative 1 would not result in significant effects on environmental justice.

3.11.2.3 Alternative 2 Potential Effects

Effects on environmental justice under Alternative 2 would be the same as Alternative 1. Overall, the implementation of Alternative 2 would not result in disproportionately adverse and significant human health or environmental effects on minority or low-income populations. Therefore, Alternative 2 would not result in significant effects on environmental justice.

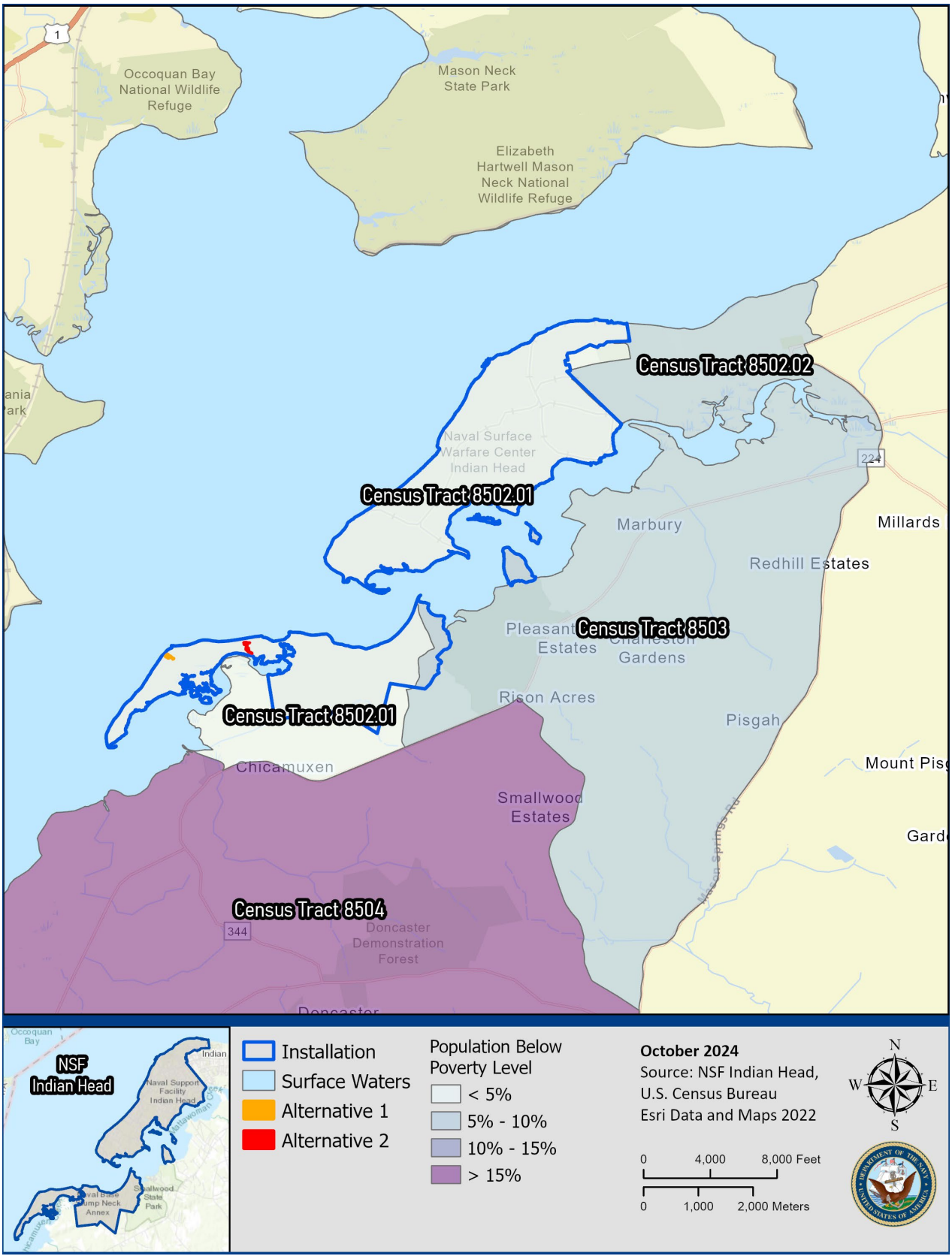

Figure 3-15 Minority Demographics within Environmental Justice Study Area

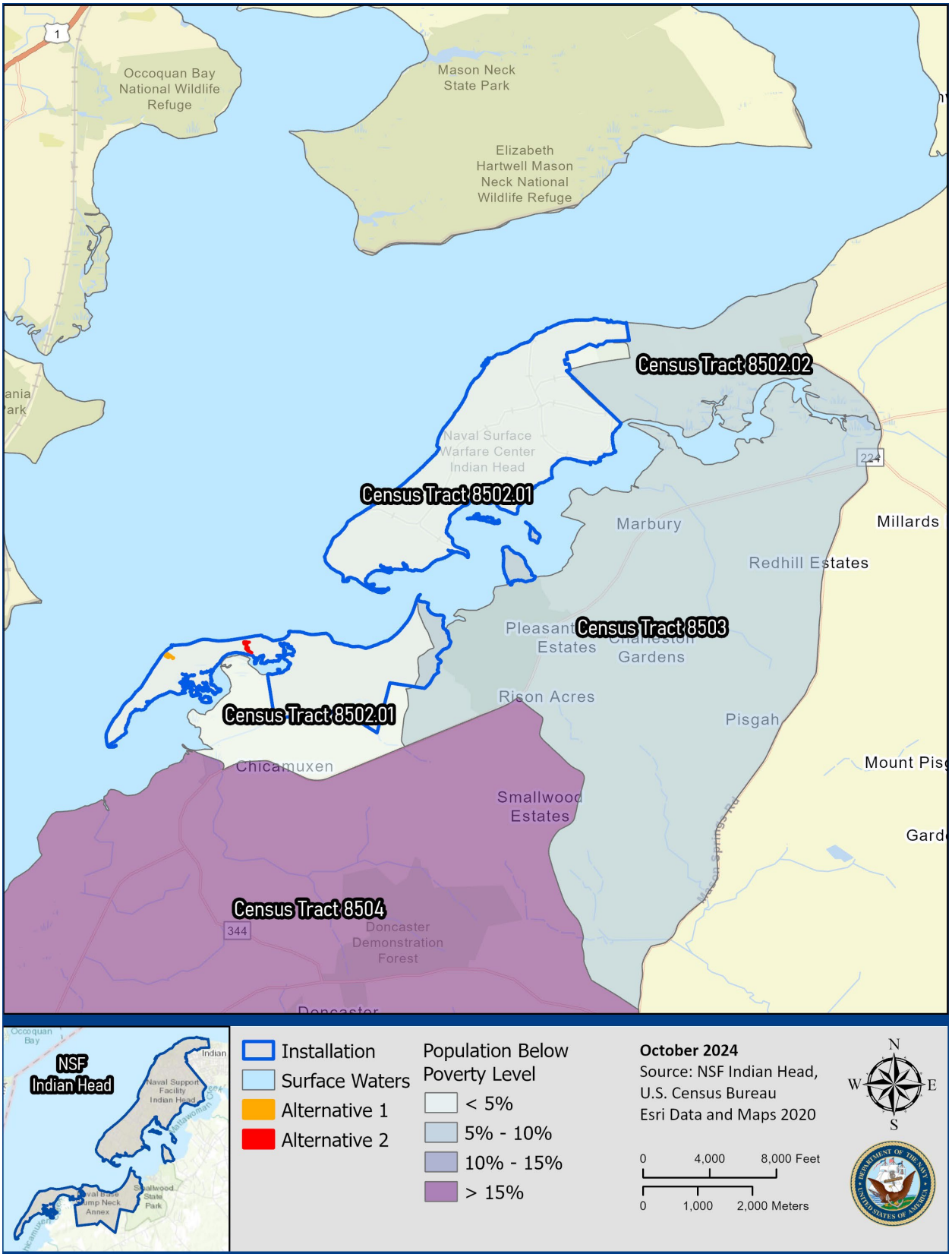

Figure 3-16 Persons Below Poverty Level within Environmental Justice Study Area

4 Cumulative Effects

Cumulative effects are those effects on the environment that result from the incremental effects of the Proposed Action when added to the effects of other past, present, and reasonably foreseeable actions. Cumulative actions include those taken by federal or non-federal agencies or individuals. Cumulative effects can result from actions with individually minor but collectively significant effects taking place over a period of time (CEQ, 2024). The scope of the cumulative analysis involves both the geographic extent of the effects and the time frame in which they could be expected to occur. The cumulative effects analysis qualitatively considers other reasonably foreseeable actions occurring within a similar time frame and geographic extent as the Proposed Action. This EA does not consider future actions that are speculative.

4.1 Past, Present, and Reasonably Foreseeable Actions

This section focuses on past, present, and reasonably foreseeable future projects at, and near, the Proposed Action. All projects listed in this section could contribute to effects on the resource areas considered in this EA.

4.1.1 Past Actions

Table 4-1 lists the past actions or projects included in this cumulative effects analysis.

Table 4-1 Past Actions

Project Name	*Project Description*
College of Southern Maryland Velocity Center	The Velocity Center is an off-base facility for NSWC. Construction began in 2018 and was completed in summer 2020. The Velocity Center is located on the College of Southern Maryland campus in the Town of Indian Head.
U.S. Bomb Technician Association	The United States Bomb Technician Association established a multi-use site in November 2020 in the Town of Indian Head. The site will be used for applied research, training, and beginning work on projects previously agreed upon with the Navy. The U.S. Bomb Technician Association is located just outside of NSWC and plans to develop education and technology in accordance with the NSWC and the Town of Indian Head regarding bomb disposal and technology training.

4.1.2 Present and Reasonably Foreseeable Actions

Table 4-2 lists the present and reasonably foreseeable actions or projects included in this cumulative effect analysis.

Table 4-2 Present and Reasonably Foreseeable Actions

Project Name	*Project Description*
NSF Indian Head Potable Water System Updates	Two potable water system projects would remove existing potable water distribution systems at NSF Indian Head and replace 46,934 linear feet with a new pipe system, including fire protection lines. This project will provide clean and adequate potable water for tenants and residents on the installation and river water for installation fire protection systems (NAVFAC Washington, 2019).
NSF Indian Head Demolition of Two Buildings	Two underutilized and deteriorating facilities would be demolished, removing 18,400 sq ft. Buildings would be decontaminated before demolition (NAVFAC Washington, 2019).

Project Name	*Project Description*
NSF Indian Head P244 Contained Burn Facility	This project would construct a Contained Burn Facility at NSF Indian Head. The Contained Burn Facility would treat energetic hazardous waste, military munitions, and other waste materials contaminated with energetics that are currently processed at Strauss Avenue Thermal Treatment Point. The Facility would include one equipment pad to support the contained burn system, one supporting facility (Staging Building), one Control Building and associated parking, and a storage lot for material potentially presenting an explosive hazard/material documented as safe.
NSF Indian Head Flammable and Hazardous Storage Relocations	This project would involve construction of a new 10,000-square-foot flammable storage facility. The current building that houses flammable storage would be renovated and hazardous storage would move into the renovated building. This would reduce truck traffic within the NSF Indian Head restricted area (NAVFAC Washington, 2019).
NSF Indian Head Decommission of Building	This project would decommission a building on the installation Research and Technology Park to reduce an explosive arc cast. The building is no longer in use and must be decommissioned to remove the arc and allow for future development projects within the installation tech campus (NAVFAC Washington, 2019).
NSF Indian Head Thomas Road Improvements	Improvements along Thomas Road from Fowler Road to Bailey Road would allow for better access to several buildings. The project would widen and pave the existing road to a two-lane road to accommodate future growth in eastern areas of NSF Indian Head (NAVFAC Washington, 2019).
NSF Indian Head CBR Relocation	Multiple buildings on NSF Indian Head would be renovated to accommodate the relocation of the Chemical Biological Radiological Defense Division to the installation. Buildings would be renovated and configured to meet the needs of the new Division. Additional parking would also be constructed on-site (NAVFAC Washington, 2019).
Military Construction P246	This project is still in the early conceptual design phase and a year and a half away from certification. If proposed, it would include the construction of a production plant and would be built on a fairly large portion of undeveloped land on Cornwallis Neck.
Explosive Test Range (ETR)-6	ETR-6 was a previously active range at the end of Archer Avenue, at the southern end of the Stump Neck Annex peninsula. It has been deactivated for a number of years. It is possible that this range could be reactivated; however, this would require planning, funding, design, and site approval before construction could begin. To date, this process has not started.
Maryland Airport	The Maryland Airport is located 4 miles east of the Town of Indian Head. Improvements to the airport facilities include a runway extension, a taxiway for aircraft, a new terminal building, and other improvements that have been approved by the Federal Aviation Administration. Along with the slated improvements to the airport facilities, 558 acres of surrounding land are subject to rezoning for expanding the airport.
Inert Mid-size Test Tank	A test pool, approximately 25 feet wide and 16 feet tall, would be constructed at NSF Indian Head for demonstrating unmanned underwater and remotely operated vehicles.
Underwater Explosive Test Range (Pond)	A test pond would be constructed on NSF Indian Head. The pond will be used to develop and test EOD underwater energetic tools and unmanned underwater and remotely operated vehicle payloads.

4.2 Cumulative Effect Analysis

Where feasible, the cumulative effects were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data are not available, and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative effects related to this EA where possible. The analytical methodology presented in Chapter 3, which was used to determine potential

effects on the various resources analyzed in this document, was also used to determine cumulative effects.

4.2.1 Air Quality

4.2.1.1 Description of Geographic Study Area

Cumulative effects of air quality include the collective effects of criteria pollutant and GHG emissions through time that can lead to incremental environmental and health issues. These effects are assessed at different scales. Local assessment focuses on immediate areas where emissions occur, assessing the direct effects on local communities and ecosystems of Stump Neck Annex and adjacent areas. Regional assessment expands the analysis to a broader area, considering the combined effects of multiple sources and how they contribute to regional air quality issues like smog, acid rain, and NAAQS for criteria pollutants within Charles County, Maryland and the Southern Maryland Air Quality Control Region. Global assessment addresses the cumulative effect of GHG emissions on a global scale, including how they contribute to climate change and affect global atmospheric conditions.

4.2.1.2 Relevant Past, Present, and Future Actions

Past, present, and future actions listed in Section 4.1 could directly or indirectly affect air quality in conjunction with the Proposed Action at the local scale. Regulated point source emissions, to include Title V and minor source permits, could contribute to local cumulative effects. For a regional characterization, the National Emissions Inventory database provides insights into how criteria pollutant emissions from the Proposed Action might contribute to air quality effects for Charles County and the Southern Maryland Air Quality Control Region (USEPA, 2020). Past, present, and global GHG emission estimates are considered to address the Proposed Action's effects in the broadest context (Center for Climate And Energy Solutions, 2024).

4.2.1.3 Cumulative Effect Analysis

Cumulative air quality effects within the study area would occur from demolition and construction activities. However, these emissions would be less than significant. All present and reasonably foreseeable future actions could increase criteria pollutants around the Proposed Action location; however, the differing project timelines would distribute emissions temporally. Estimated emissions from the Proposed Action would be well below *de minimis* thresholds for criteria pollutants and would not affect state implementation plans for air quality attainment. GHG emissions associated with the Proposed Action would be temporary and would represent a negligible portion of yearly global GHG emissions. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future emissions, would not result in significant effects on air quality within the study area.

4.2.2 Water Resources

4.2.2.1 Description of Geographic Study Area

The study area for assessment of cumulative effects on water resources includes Chicamuxen Creek, Mattawoman Creek, the Potomac River, groundwater, and wetlands.

4.2.2.2 Relevant Past, Present, and Future Actions

All past, present, and future actions listed in Section 4.1 could directly or indirectly affect water resources.

4.2.2.3 Cumulative Effect Analysis

Cumulative water resource effects within the study area would occur from ground disturbance from construction activities and increases in impervious surfaces. These actions would increase surface runoff and sedimentation of surface waters and wetlands and increase flooding risk. However, most of the cumulative projects would not involve major increases in impervious surface and the Navy would use BMPs and adhere to permit requirements. Individual projects that disturb more than one acre require a NPDES permit and the associated Erosion and Sediment Control and stormwater management plans, which minimize potentially adverse cumulative effects during ground-disturbing activities. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant effects on water resources within the study area.

4.2.3 Geological Resources

4.2.3.1 Description of Geographic Study Area

The study area for assessment of cumulative effects on geological resources includes the alternative site locations and adjacent areas.

4.2.3.2 Relevant Past, Present, and Future Actions

All past, present, and future actions listed in Section 4.1 that could directly or indirectly affect geological resources within or adjacent to the study area.

4.2.3.3 Cumulative Effect Analysis

Cumulative effects on geological resources within the study area would occur from ground disturbance such as grading, utility trenching, and tree clearing. These actions would increase exposed soil and cause soil compaction, increase sedimentation, and increase soil erosion. However, effects would be less than significant because the Navy would use BMPs to minimize effects. The Proposed Action would not cause long-term effects on geological resources. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant effects within the study area.

4.2.4 Cultural Resources

4.2.4.1 Description of Geographic Study Area

The study area of cumulative effects on cultural resources is NSF Indian Head.

4.2.4.2 Relevant Past, Present, and Future Actions

All projects listed in Section 4.1 have the potential to affect cultural resources.

4.2.4.3 Cumulative Effect Analysis

The Navy meets its stewardship requirements for cultural resources under Sections 106 and 110 of the NHPA. The installation has an ICRMP that is a reference and a planning tool for management and

preservation of cultural resources while maintaining mission readiness. Any alterations of a resource eligible for the NRHP must be done to meet the Secretary of the Interior's Standards for Rehabilitation (36 CFR part 68). Consultation with MHT (and/or other appropriate parties) must be undertaken prior to a project's commencement. In this way, the Navy works to identify, avoid, minimize, and/or mitigate any potential effects on cultural resources when implementing individual projects. Therefore, implementation of the Proposed Action, when combined with past, present, and reasonably foreseeable future projects, would not result in significant effects within the study area.

4.2.5 Biological Resources

4.2.5.1 Description of Geographic Study Area

NSF Indian Head is the study area used for assessing cumulative effects on biological resources.

4.2.5.2 Relevant Past, Present, and Future Actions

All past, present, and future actions listed in Section 4.1 could directly or indirectly affect biological resources.

4.2.5.3 Cumulative Effect Analysis

Past development on NSF Indian Head has reduced native vegetation, trees, and wildlife habitat. The Proposed Action would not result in a significant loss of forest (wildlife habitat). Considering the proposed minimization measures and agency coordination, no adverse effects on threatened or endangered species are anticipated. Current and future projects planned on Stump Neck Annex are minimal.

Future projects (including the Inert Mid-size Test Tank and Underwater Explosive Test Range) could further reduce vegetation, trees, forests, wildlife habitat, and habitat for threatened or endangered species. These two projects would also generate a minimal amount of construction noise in the short term. In the long term, these projects could generate an unknown amount of operational noise that could adversely affect wildlife.

For present and future projects, the Navy would adhere to all applicable time-of-year restrictions for threatened or endangered species and the bald eagle. The Navy would consult with the USFWS and MDNR as needed. Therefore, the Proposed Action, when combined with other past, present, or reasonably foreseeable projects, would contribute cumulatively to the adverse effects on biological resources; however, this cumulative effect is not anticipated to be significant.

4.2.6 Land Use

4.2.6.1 Description of Geographic Study Area

The study area for assessment of cumulative effects on land use includes NSF Indian Head, the adjacent navigable waters of Chicamuxen Creek and the Potomac River, and the unincorporated areas of Charles County to the east of Stump Neck Annex.

4.2.6.2 Relevant Past, Present, and Future Actions

All past, present, and future actions listed in Section 4.1 could directly or indirectly affect land use in conjunction with the Proposed Action.

4.2.6.3 Cumulative Effect Analysis

Cumulative land use effects within the study area would occur due to demolition, construction, and operational activities. Federal Consistency Determinations would be submitted to the MDNR in accordance with Section 307 of the CZMA for projects within Maryland's Coastal Zone Management Areas. Planning would occur to ensure the demolition, construction, and operation of facilities would be consistent with existing land use and would not create additional constraints on adjacent land use. The Proposed Action would not represent a significant change in existing land use or a significant expansion of existing capabilities. Current operational activities at Stump Neck Annex are generally compatible with adjacent land uses within unincorporated Charles County to the east of the Proposed Action. There would be no effects on the navigability or public use of Chicamuxen Creek or the Potomac River. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant effects within the study area.

4.2.7 Noise

4.2.7.1 Description of Geographic Study Area

The study area of cumulative effects for noise is the alternative project sites and the adjacent areas.

4.2.7.2 Relevant Past, Present, and Future Actions

All projects presented in Section 4.1 have the potential to affect noise.

4.2.7.3 Cumulative Effect Analysis

Cumulative noise effects could occur from construction, renovation, and demolition activities that occur within the same timeframe and at adjacent locations to the Proposed Action. Although projects may occur at the same time as the Proposed Action, none of the projects would occur in or near the same location as the Proposed Action.

Cumulative projects that could affect the ambient environment in the long term include the ETR-6 and Underwater Explosive Test Range (Pond). However, before either of these projects were constructed, NEPA documentation would be completed to assess environmental impacts, including noise. The proposed UTT alternative sites are already exposed to noise from existing EOD ranges at NSF Indian Head; specifically, ETR-2 and ETR-3. The Proposed Action would add to the existing noise environment; however, as shown in Figure 3-7, this addition is minor in comparison to the extent of the existing ETR noise contours. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant noise effects within the study area.

4.2.8 Infrastructure

4.2.8.1 Description of Geographic Study Area

The study area for assessment of cumulative effects on infrastructure includes NSF Indian Head and the ground water wells that draw from the Patuxent and Patapsco aquifers for potable water at Stump Neck Annex.

4.2.8.2 Relevant Past, Present, and Future Actions

All past, present, and future actions listed in Section 4.1 could directly or indirectly affect infrastructure. In addition, past, present, and future changes to ground water allocation and utilization at the state and county levels could potentially contribute to the cumulative effects of the proposed action.

4.2.8.3 Cumulative Effect Analysis

Overall, utility capacity at the installation is currently adequate. However, both potable and non-potable water distribution systems at NSF Indian Head, including Stump Neck Annex, are in poor condition. In addition, due to changes in the State Water Appropriation and Use permits, NSF Indian Head is facing new mandated limitations with respect to mission-critical groundwater withdrawal for mission activities. Under the Proposed Action, there would be an increase in potable water utilization for mission activities, reducing the overall capacity of available potable water supplies. Although the increase would be minor and less than significant, it would add to incremental growth in future water demands for the installation and potentially limit allocations for other uses. Filling the 10,000-gallon tank once would represent approximately 16 percent and 0.0457 percent, respectively, of the daily and yearly water appropriations for Stump Neck Annex. Given the current 43 percent daily water utilization, filling the tank on any given day would not cumulatively effect current operations. While mission related potable water demands are likely to increase into the future, it is also anticipated that installation wide efficiency standards, infrastructure modernization, and water conservation efforts would allow for sustainable mission growth and utilization. Therefore, the projected increase in water demands can be managed effectively without effect on current or future operations, ensuring that mission growth remains sustainable within the available resource allocations. Implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant effects within the study area.

4.2.9 Public Health and Safety

4.2.9.1 Description of Geographic Study Area

The study area for assessment of cumulative effects on public health and safety includes NSF Indian Head.

4.2.9.2 Relevant Past, Present, and Future Actions

All past, present, and future actions listed in Section 4.1 have the potential to directly or indirectly affect public health and safety.

4.2.9.3 Cumulative Effect Analysis

Cumulative effects on public health and safety within the study area would occur from ground disturbance, such as clearing and grading, particularly in areas with potential for UXO, as well as the demolition of buildings that may contain hazardous materials. These actions would increase the chances of populations exposed to airborne sediment and other particulate matter that can cause health issues and elevate the safety risk of exposure to UXO. However, effects would be less than significant because the Navy would use BMPs to minimize effects. In addition, newly discovered hazardous materials uncovered during these activities would be removed and disposed according to appropriate regulations. Some cumulative effects may have a positive effect on overall public health and safety. For instance, the new potable water system would provide clean drinking water to the installation, and road

improvements would enhance safety for drivers and pedestrians. Overall, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant effects within the study area.

4.2.10 Hazardous Materials and Wastes

4.2.10.1 Description of Geographic Study Area

The study area for assessment of cumulative effects on hazardous materials and wastes is NSF Indian Head.

4.2.10.2 Relevant Past, Present, and Future Actions

All past, present, and future actions listed in Section 4.1 could directly or indirectly affect hazardous materials and wastes.

4.2.10.3 Cumulative Effect Analysis

Cumulative effects associated with hazardous materials and wastes would occur from construction and demolition activities that would use small quantities of hazardous materials and wastes. Activities would adhere to existing hazardous materials, waste, and spill management plans. The Navy continually monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes. Routine inspections and abatement of special hazards prior to demolition would occur. In addition, the discovery of previously undocumented soil contamination or groundwater contamination would be removed according to federal, state, and location regulations. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant effects within the study area.

4.2.11 Environmental Justice

4.2.11.1 Description of Geographic Study Area

The study area for assessment of cumulative effects on environmental justice includes NSF Indian Head and the surrounding communities.

4.2.11.2 Relevant Past, Present, and Future Actions

All projects presented in Section 4.1 have the potential to affect environmental justice.

4.2.11.3 Cumulative Effect Analysis

Cumulative environmental justice effects would occur within the study area from construction and demolition activities; however, these effects would be short-term and intermittent. Long-term, minor to moderate beneficial environmental justice effects would occur from the NSF Indian Head potable water system updates, demolition of two buildings, decommission of another building not in use, and Thomas Road improvements. The Proposed Action would not have long-term effects. Therefore, the implementation of the Proposed Action combined with past, present, and reasonably foreseeable future projects, would not result in significant environmental justice effects within the study area.

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Appendix A Relevant Laws and Regulations

Appendix B Public Involvement and Agency Correspondence Materials

Appendix C General Conformity Applicability Analysis

Appendix D Construction Equipment Noise Emission Levels

Appendix E Noise Calculations

Appendix F Draft Noise Study