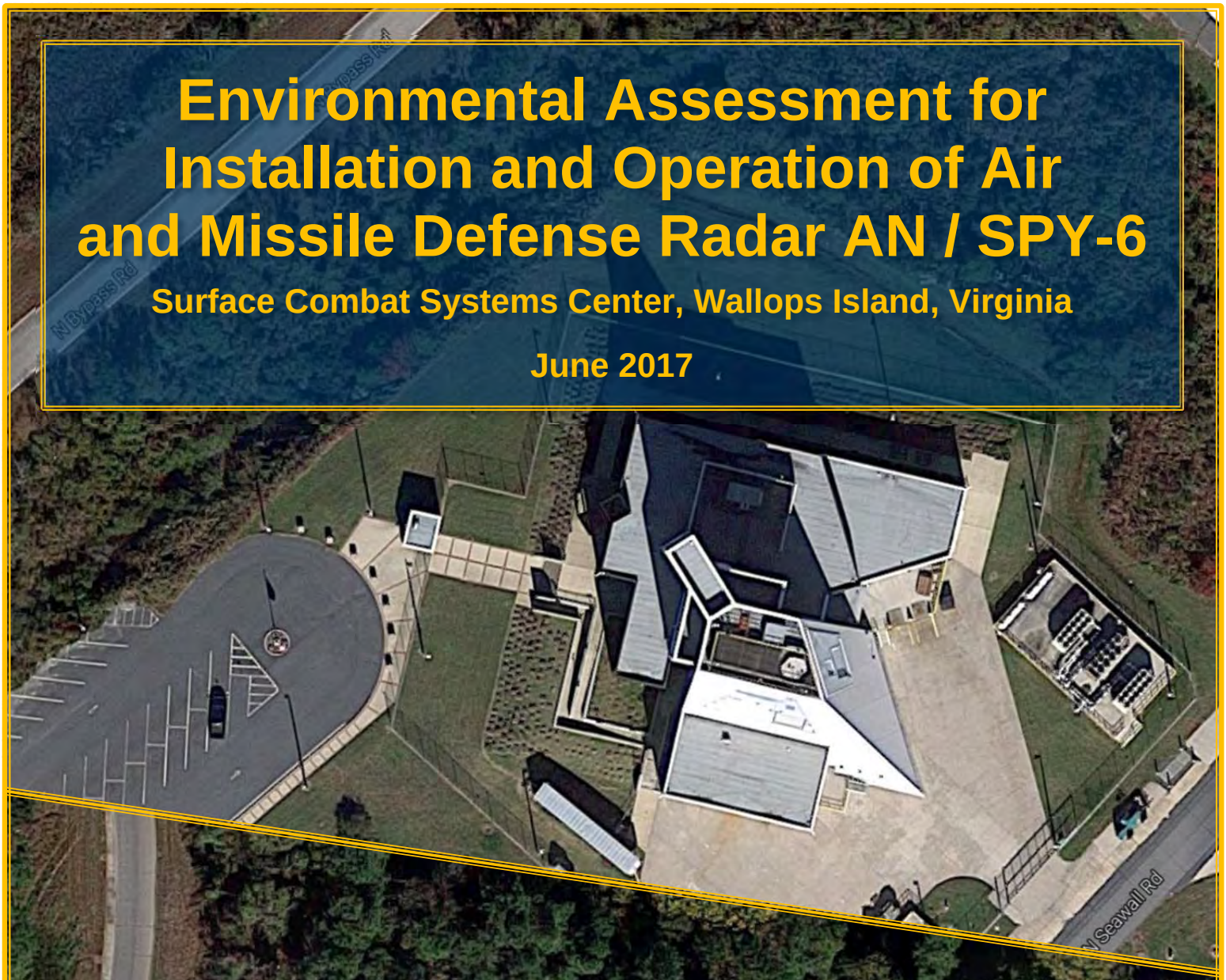
Environmental Assessment for Installation and Operation of Air and Missile Defense Radar AN / SPY-6

Surface Combat Systems Center, Wallops Island, Virginia

June 2017



SURFACE COMBAT SYSTEMS CENTER

NAVSEA
NAVAL SEA SYSTEMS COMMAND

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Environmental Assessment
for
Installation and Operation
of
Air and Missile Defense Radar
AN / SPY-6
at
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Abstract

Designation:	Environmental Assessment
Title of Proposed Action:	Installation and Operation of Air and Missile Defense Radar AN / SPY-6 Radar
Project Location:	Wallops Flight Facility (WFF), Wallops Island
Lead Agency for the EA:	Department of the Navy
Cooperating Agency:	National Aeronautics and Space Administration (NASA)
Affected Region:	Accomack County, Virginia
Action Proponent:	Surface Combat Systems Center (SCSC)
Point of Contact:	Ms. Jill Jester, Code 1000 Public Affairs Officer Surface Combat Systems Center Wallops Island Building R30, 30 Battlegroup Way Wallops Island, Virginia 23337 Wllp_SCSC_Wi-PAO@navy.mil
Date:	June 2017

The Department of the Navy (Navy) along with National Aeronautics and Space Administration (NASA) as a cooperating agency has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) and Navy regulations implementing NEPA. The Proposed Action is the installation and operation of an AN/ SPY-6 Air and Missile Defense Radar (AMDR) system on Wallops Island at NASA's Wallops Flight Facility (WFF) in Accomack County, Virginia. The purpose and need for the Proposed Action is to enable the integration and testing of the AN / SPY-6 system with the other components of the Aegis Weapons System Advanced Capability Build (ACB) 20 and fulfill specific testing objectives established under the Department of Defense (DoD) Acquisition Program and set forth in DoD Instruction 5000.02. The EA evaluates the potential environmental impacts associated with two action alternatives, Alternatives 1 (Preferred) and 2, and the No Action Alternative on the following resource areas: air quality, water resources, geological resources, biological resources, land use, noise, infrastructure, public health and safety, and hazardous materials and wastes.

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Executive Summary

Proposed Action

The Department of the Navy (hereafter, Navy) proposes to install and test an Air and Missile Defense radar (AMDR), designated by the Navy as AN / SPY-6 at Naval Sea Systems Command's (NAVSEA's) Surface Combat Systems Center (SCSC) on Wallops Island at the National Aeronautics and Space Administration's (NASA's) Wallops Flight Facility (WFF) (see Figure ES-1). WFF is located in Accomack County, Virginia. The Navy is the lead agency for the Proposed Action, with NASA serving as a cooperating agency.

Purpose of and Need for the Proposed Action

AN / SPY-6 is the Navy's next generation of shipboard, multi-function, phased-array radar intended for integration with Aegis Weapon System Advanced Capability Build (ACB) 20, which will be deployed on the DDG 51 Flight III series of Arleigh Burke-class destroyers by the end of fiscal year 2021. Relative to the AN / SPY-1, the AN / SPY-6 system will bring enhanced ballistic missile defense and air defense capabilities to the Aegis system, addressing the current system's gaps in these areas.

The purpose of the Proposed Action is to enable the integration and testing of the AN / SPY-6 radar system with the other components of Aegis Weapon System ACB 20. Such integration and testing would complement the current testing and evaluation of the system being conducted at Pacific Missile Range Facility (PMRF) Barking Sands, which focuses on radar development and evaluation objectives. The Proposed Action would also provide training and life cycle support for the Aegis DDG 51 Flight III program.

The Proposed Action is needed to fulfill specific testing objectives established under the Department of Defense (DoD) Acquisition Program and set forth in DoD Instruction 5000.02. The achievement of those objectives will allow DoD to move to the next step of the acquisition process, which consists of limited production of the AN / SPY-6 system for the purpose of operational testing and evaluation as well as to establish production capabilities to prepare for full-rate production and deployment aboard Navy ships.

Alternatives Considered

Alternatives were developed for analysis based upon the following reasonable alternative screening factors:

1. The location must make use of existing training and testing assets and systems provided that the proposed activities do not interfere with ongoing or planned programs.
2. The location must adequately support integration and testing of the system with Aegis ACB 20.
3. The location must be accessible to testing personnel and teams in a time- and cost-efficient manner.

The Navy is considering two action alternatives that meet the purpose and need for the Proposed Action and a No Action Alternative. Under Alternative 1 (Preferred Alternative), a four-story addition would be built to accommodate the AN / SPY-6 system in Building V-003, a SCSC facility at Wallops Island. The addition would be built above an existing two-story extension of Building V-003, for a total of six stories, and would consist entirely of vertical construction; the addition would not increase the overall height or

footprint of Building V-003. Installation, operation, and testing of the AN / SPY-6 system would begin following the completion of the addition to Building V-003.

Under Alternative 2, a new facility would be built on the northern end of Wallops Island to house the AN / SPY-6 system. The new facility would be built on the site of V-095, which consists of an existing observation tower and associated support facilities. Alternative 2 includes the demolition of V-095. The new facility would be similar in size and configuration to Building V-021, which houses SCSC's AN / SPY-1 system at Wallops Island. Installation, operation, and testing of the AN / SPY-6 system would begin upon completion of the new facility to be built on the V-095 site.

Once installed under either action alternative, the AN / SPY-6 system would be tested for integration with Aegis. The area scanned by the new radar would be defined by azimuths 114.3 and 204.3 degrees from true north. Vertically, the radar array would be situated approximately 60 feet (18 meters) above ground level and would not scan at angles below 0 degree; thus, there would be no electromagnetic exposure at ground level around the facility. Testing would be conducted using targets of opportunity such as Navy or NASA aircraft or rockets, or any targets or projectiles used for other testing or training purposes within the scanning area.

Under the No Action Alternative, the AN / SPY-6 system would not be installed at Wallops Island.

Summary of Environmental Resources Evaluated in the EA

Council on Environmental Quality (CEQ) regulations, National Environmental Policy Act (NEPA), and Navy instructions for implementing NEPA, specify that an Environmental Assessment (EA) should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact.

Consistent with section 7 of the Endangered Species Act, the Navy has obtained from the U.S. Fish and Wildlife Service (USFWS) a list of threatened, endangered, and candidate species that may occur in the vicinity of the project and assessed the potential effects of the Proposed Action on these species. The Navy requested USFWS's review of, and concurrence with the findings of this assessment for the Preferred Alternative. In an email dated October 19, 2015, the USFWS concurred with the Navy's finding that the Preferred Alternative would either have no effect or is not likely to adversely affect threatened and endangered species.

In compliance with Section 106 of the National Historic Preservation Act, the Navy has consulted with the Virginia State Historic Preservation Office to assess the potential effects of the Proposed Action on historic properties listed or eligible for listing in the National Register of Historic Places. In a memorandum dated August 28, 2015 the Virginia State Historic Preservation Office informed the Navy that no further consultation was needed and that no historic properties would be affected by the Proposed Action.

The Navy has determined that the Proposed Action would be fully consistent with the applicable enforceable policies of Virginia's Coastal Zone Management Program. In accordance with 15 C.F.R. 930.39, the Navy prepared a federal consistency determination for review and concurrence under the Virginia Coastal Zone Management Program. By letter dated January 17, 2017, the Virginia Department of Environmental Quality concurred with the consistency determination.


Wallops Flight Facility
New Church
Horntown
13
175
Wattsville
Wallops Main Base
Wallops Island National Wildlife Refuge
Simon-easton Bay
Chincoteague Bay
Mud Bay
Chincoteague Island
Assateague Island National Seashore
Watts Bay
Temperanceville
Powells Bay
Toms Cove
Wallops Island
Chincoteague National Wildlife Refuge
Bogues Bay
Wallops Mainland
Atlantic Ocean
Assawoman Island
Chincoteague National Wildlife Refuge
OH
PA
NJ
MD
WV
VA
NC
SC
Wallops Flight Facility Boundary
0 12,000 24,000
Feet
0 3,600 7,200
Meters
N

Figure ES-1

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The following resource areas are addressed in this EA: air quality, water resources, geological resources, terrestrial biological resources[1], land use, noise, infrastructure and utilities, public health and safety, and hazardous materials and wastes. Because potential impacts were considered to be negligible or nonexistent, the following resources were not evaluated in this EA: cultural resources, visual resources, air space, transportation, socioeconomics, environmental justice and protection of children, and aquatic biological resources.

Summary of Potential Environmental Consequences of the Action Alternatives and Major Mitigating Actions

Air Quality: There would be no significant impacts to air quality. Accomack County is in attainment for all criteria pollutants regulated under the Clean Air Act (CAA) and the CAA General Conformity Rule does not apply. Construction activities under Alternative 1 would generate temporary increases in emissions of criteria pollutants. Depending on the pollutant, these emissions (on an annual basis) would range from 0.004% to 0.5% of the 250-ton Prevention of Significant Deterioration threshold (which, although not applicable to the emissions under consideration, provides a yardstick to assess the intensity of impacts in an attainment area such as Accomack County). Emissions of green-house gases also would be very small, less than 0.2% of the 25,000 metric -ton carbon dioxide equivalent (CO_2e) reporting threshold. Additionally, the emissions would end when construction is complete. In the long term, no new stationary source would be created and the small increase in the volume of Building V-003 would have a negligible effect on emissions associated with the heating and cooling of the building. Under Alternative 2, more construction emissions would occur but, based on the minimal level of emissions estimated for Alternative 1 and the small scale of construction activities under Alternative 2, there is no potential for these emissions to approach the 250-ton Prevention of Significant Deterioration threshold for criteria pollutants or the 25,000-metric-ton threshold for CO_2e emissions. In the long term, there would be new emissions from heating and cooling the new buildings, but because of their small size, these emissions would amount to only a minute portion of the 250-ton (for criteria pollutants) or 25,000-metric-ton (for CO_2e emissions) thresholds.

Water Resources: Impacts on water resources would be negligible to minor; no significant impacts to water resources would occur. Neither Alternative 1 nor Alternative 2 would require withdrawals of groundwater. Neither alternative would directly affect bodies of surface water or wetlands. Because most construction activities would take place within an existing building (Alternative 1) or would incorporate best management practices (BMPs) for erosion and sedimentation control as well as stormwater management (Alternative 2), the potential for direct and indirect impacts to surface waters or wetlands would be negligible. Both alternatives would involve construction in the 100-year floodplain. The two action alternatives are the only two reasonable alternatives that would support the Navy's purpose and need and, as such, there are no practicable alternatives to construction in the floodplain. Alternative 1, involving a vertical addition to an existing building, would have no effects on flood levels and floodways, while Alternative 2 would have only minor effects because of the small size of the new building and because it would replace existing facilities. Either alternative would be implemented, as applicable, consistent with Executive Order (EO) 11988 and EO 13690.

Geological Resources: There would be no significant impacts to geological resources. Neither action alternative would affect the geology or topography of Wallops Island. Under Alternative 1, construction would take place within an existing building, with minimal potential for impacts on soils from increased

[1] Including nesting sea turtles, which are under the jurisdiction of USFWS and, for the purposes of this EA, are considered with terrestrial resources.

erosion or sedimentation. Under Alternative 2, BMPs would be implemented to minimize risks of soil erosion and sedimentation in accordance with applicable permitting requirements.

Biological Resources: There would be no significant impacts to biological resources. Under Alternative 1, there would be no loss of vegetation or habitat. Construction activities, including noise, could disturb nearby wildlife, but this effect would be minimal given the developed setting and limited duration of these activities. In the long term, operation of the AN / SPY-6 radar would only create a risk of exposure to electromagnetic energy above approximately 60 feet (18 meters) from ground level; thus only flying species (birds and, to a lesser extent, bats) could possibly be exposed. Because of the way the radar operates, exposure would be extremely brief and such exposure is not likely to adversely affect the animals. Thus, impacts would be negligible. For the same reasons, Alternative 1 may affect, but is not likely to adversely affect the following threatened or endangered species: red knot (*Calidris canutus rufa),* piping plover *(Charadrius melodus),* and northern long-eared bat *(Myotis septentrionalis).* Alternative 1 would have no effect on any other protected species. Alternative 1 would not adversely affect bald eagles (*Haliaeetus leucocephalus*) protected under the Bald and Golden Eagle Protection Act. Alternative 1 would have no effect on migratory birds; no takes of migratory birds protected under the Migratory Bird Treaty Act would occur.

Under Alternative 2, construction of the new facility would result in the loss of a small amount of low-quality habitat (maintained vegetation.) No clearing of trees would be required. The potential for disturbance from construction activities, including noise and lighting, would be somewhat greater than under Alternative 1, but the small scale of the project, limitation of construction to daylight hours, and compliance with the Wallops Flight Facility Turtle Lighting Management Plan, would ensure these impacts remain minimal, including those to the sea turtles or piping plovers that could be nesting in the general vicinity. Impacts from radar operation would be the same as under Alternative 1. Therefore, impacts would be negligible. Alternative 2 may affect, but is not likely to adversely affect the following threatened or endangered species: nesting loggerhead sea turtle (*Caretta caretta*), red knot*,* piping plover, and northern long-eared bat*.* Alternative 2 would have no effect on any other protected species. Alternative 2 would not adversely affect bald eagles protected under the Bald and Golden Eagle Protection Act. Alternative 2 would have no effect on migratory birds; no takes of migratory birds protected under the Migratory Bird Treaty Act would occur.

Land Use: There would be no significant impacts on land use. Alternative 1 would result in no change in land use on the site. Alternative 2 would result in a change in land use that would not be consistent with the future land use plan presented in the 2008 *NASA Goddard Space Flight Center Master Plan*. However, this would affect only a small area and is not anticipated to have effects on future land uses outside the project site. This impact would be negligible.

Noise: There would be no significant impacts related to noise. Noise from construction activities would be minor and there would be no impacts from operation. Under Alternative 1, construction noise would be partly dampened due to its occurrence within an existing building. Under Alternative 2, construction noise would be somewhat greater because of the larger scale of construction under this alternative, but the site's relatively remote location would aid in attenuating the noise for human receptors. No noise-sensitive receptors (e.g., schools, hospitals, residences) would be affected under either action alternative, as none are located on Wallops Island. The Proposed Action would not create a new permanent source of noise at Wallops Island.

Infrastructure: There would be no significant impacts to infrastructure and utility systems. Under both action alternatives, construction activities would have some impacts on stormwater collection, solid waste management, and energy systems. These impacts would be somewhat greater under Alternative

2, but existing systems would be able to absorb them. In the long term, additional demand for energy and utilities (from the temporary presence of rotating testing staff) would also be easily absorbed.

Public Health and Safety: The action alternatives would have no significant impacts on public health and safety. There are no ordnance or fuel storage or handling concerns associated with any of the buildings within the Hazards of Electromagnetic Radiation to Fuel (HERF) and Hazards of Electromagnetic Radiation to Ordnance (HERO) radii associated with the proposed AN / SPY-6 system under either alternative. With respect to Hazards of Electromagnetic Radiation to Personnel (HERP), measures would be taken to control exposure within the estimated 127-foot-radius (38.7-meter-radius) safety zone for personnel in a controlled environment. Activities would comply with applicable federal and state, NASA, DoD, and Navy occupational safety, health, and environmental regulations to ensure protection of the public and WFF / Navy personnel.

Hazardous Materials and Wastes: There would be no significant impacts related to hazardous materials and wastes under either action alternative. Construction activities associated with either alternative would involve the use of hazardous substances and generate corresponding quantities of hazardous wastes. Such materials would be handled, stored, and disposed of in accordance with applicable federal, state, and local regulations, policies and procedures, including those promulgated and enforced by NASA and the Navy. The generation of hazardous wastes during construction activities would not exceed the Navy's capacity to manage and dispose of them. If determined necessary, structures and equipment would be surveyed for lead-based paint (LBP) or asbestos-containing materials (ACM) at either alternative site. Structures and equipment determined to contain such substances would be removed by a qualified contractor and disposed of in accordance with applicable federal, state, and local regulations. Either of the alternative sites would result in small permanent increases in the quantity of hazardous substances used to maintain the expanded or new facility, and resulting wastes. These additional hazardous materials and wastes would be handled, stored, and disposed of in accordance with applicable NASA and Navy policies and procedures.

Cumulative Impacts: Based on the intensity or duration of the anticipated impacts, neither alternative has potential to result in cumulatively significant impacts when considered along with relevant past, present, and reasonably foreseeable future projects at and near WFF.

Table ES-1 provides a tabular summary of the potential impacts of the alternatives on the resources considered in the EA. In general, impacts under Alternative 1 and Alternative 2 would be similar and not significant, though they would be greater under Alternative 2, which involves the construction of a new facility instead of the expansion of an existing one.

Public Involvement

The Navy circulated the Draft EA for public review from March 1 through April 3, 2017. No public comments were received.

Table ES-1: Summary of Potential Impacts on Resource Areas

Resource Area	No Action Alternative	Alternative 1 (Preferred Alternative) – Modify Building V-003	Alternative 2 – Build New Facility
Air Quality	No impacts on any resources. Existing conditions would continue.	No significant impacts. Negligible construction-related impacts from emissions of criteria pollutants and greenhouse gases from diesel and gasoline-powered equipment and workers' vehicles during construction. Negligible operational impacts, as the expansion of Building V-003 would not create a new source of emissions but only generate a very small increase in emissions from heating the expanded facility.	No significant impacts. Negligible impacts from emissions of criteria pollutants and greenhouse gases from construction equipment and workers' vehicles; these emissions would be somewhat greater than under Alternative 1 but remain well below significance. Similarly, while the new facility would generate additional emissions, such emissions would be minimal and would not be significant because of the facility's small size.
Water Resources		No significant impacts. No impacts on groundwater, surface water, or wetlands, as all construction and operations would take place within an existing structure. Project site is within the 100-year floodplain but there is no practicable alternative outside the floodplain. Water-sensitive equipment and supplies associated with the AN / SPY-6 system would be located above the freeboard flood level (approximately 13 feet [4 meters] above mean sea level. The addition to Building V-003 would be above the flood elevation and thus have no effect on floodways or flood levels.	No significant impacts. No impacts on groundwater. No direct impacts on surface water or wetlands. Negligible indirect construction-related impacts on surface water and no indirect to wetlands due to use of erosion and sedimentation control best management practices during construction. New facility would be in the 100-year floodplain but there are no practicable alternatives outside the floodplain. Because of its small size and because it would replace existing structures, the facility would not significantly affect floodways or flood levels. Impacts on the floodplain would be minor and would not be significant.
Geological Resources		No impacts on geological resources.	No significant impacts. No impacts on geologic strata or topography. Negligible impacts on soils from erosion during construction (minimized by application of best management practices) and because the new facility would be partly built on currently open soils. These soils are not prime farmland.
Biological Resources		No significant impacts. No loss of vegetation or habitat; minimal, negligible disturbance of wildlife during construction activities. No risk of exposure to electromagnetic energy below approximately 60 feet (18 meters) from ground level; only flying species (birds and bats) could possibly be exposed. Because of the way the radar operates, exposure would be extremely brief and not likely to adversely affect the animals. Alternative 1 may affect, but is not likely to adversely affect the following threatened or endangered species: red knot (*Calidris canutus rufa*), piping plover (*Charadrius melodus*), and northern long-eared bat (*Myotis septentrionalis*). No effect on any other protected species.	No significant impacts. Loss of a small amount of low-quality habitat (maintained vegetation.) No clearing of trees. Potential for disturbance from construction activities, including noise and lighting, somewhat greater than under Alternative 1; the small scale of the project, limitation of construction to daylight hours, and compliance with the Wallops Flight Facility Turtle Lighting Management Plan would ensure these impacts remain minimal, including on the sea turtles or piping plovers that could be nesting in the general vicinity. Impacts from radar operation would be the same as under Alternative 1. Alternative 2 may affect, but is not likely to adversely affect the following threatened or endangered species: nesting loggerhead sea turtle (*Caretta caretta*), red knot, piping plover, and northern long-eared bat. No effect on any other protected species.
Land Use		No significant impacts. No change in land use on the site.	No significant impacts. Change in land use would not be consistent with the future land use plan presented in the 2008 NASA Goddard Space Flight Center Master Plan. This would affect only a small area and is not anticipated to have effects on future land uses outside of this area.
Noise		No significant impacts. Minor impacts from construction-related noise. Noise-producing activities would take place indoors and there are no sensitive noise receptors nearby. No operational impacts: no new permanent source of noise would be created.	No significant impacts. Minor impacts from construction-related noise. Greater construction noise than under Alternative 1 but the site's remote location would aid in attenuating impacts. No operational impacts: no new permanent source of noise would be created.

Resource Area	No Action Alternative	Alternative 1 (Preferred Alternative) – Modify Building V-003	Alternative 2 – Build New Facility
Infrastructure		No significant impacts. Construction activities would have some impacts on stormwater collection, solid waste management, and energy systems. Existing systems would be able to absorb these impacts, which would be negligible. In the long term, additional demand for energy and utilities (from the temporary presence of rotating testing staff) would also be easily absorbed.	No significant impacts. Construction activities would have some impacts on stormwater collection, solid waste management, and energy systems. These impacts would be somewhat greater than under Alternative 1, but existing systems would be able to absorb them and the impacts would be negligible. In the long term, additional demands for energy and utilities (from the temporary presence of rotating testing staff) would also be easily absorbed.
Public Health and Safety		No significant impacts on public health and safety. No ordnance or fuel storage or handling concerns associated with any of the buildings within the Hazards of Electromagnetic Radiation to Fuel (HERF) and Hazards of Electromagnetic Radiation to Ordnance (HERO) radii associated with the AN / SPY-6 system. With respect to Hazards of Electromagnetic Radiation to Personnel (HERP), measures would be taken to control exposure within the estimated 127-foot-radius (38.7-meter-radius) for personnel in a controlled environment. Activities would comply with applicable federal and state, NASA, DoD, and Navy occupational safety and environmental regulations to ensure protection of the public and WFF / Navy personnel.	Same as Alternative 1.
Hazardous Materials and Wastes		No significant impacts. Construction activities would involve the use of hazardous substances and generate corresponding quantities of hazardous wastes. Such materials would be handled, stored and disposed of in accordance with applicable federal, state, and local regulations, policies and procedures, including those promulgated and enforced by NASA and the Navy. Generation of hazardous wastes during construction activities would not exceed the Navy's capacity to manage and dispose of them. Small permanent increases in the quantity of hazardous substances used to maintain the expanded or new facility, and resulting wastes. These additional hazardous materials and wastes would be handled, stored, and disposed of in accordance with applicable NASA and Navy policies and procedures. Impacts would be negligible.	No significant impacts. Construction activities would involve the use of hazardous substances and generate hazardous wastes in somewhat greater quantities than under Alternative 1 but still well within the Navy's capacity to manage and dispose of them. Same with the increases from maintenance and operation of the new facility. Impacts would be negligible.
Cumulative Impacts	No cumulative impacts.	No significant impacts anticipated when considered with other past, present, and reasonably foreseeable projects and activities at Wallops Island.	Same as Alternative 1.

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Abbreviations and Acronyms

Acronym	Definition
ACB	Advanced Capability Build
ACM	Asbestos Containing Material
AFTT	Atlantic Fleet Testing and Training
AMDR	Air and Missile Defense Radar
ARDEL	Advanced Radar Detection Laboratory
BMP	Best Management Practice(s)
CAA	Clean Air Act
CaA	Comacca Fine Sand
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
C.F.R	Code of Federal Regulations
cm	Centimeter(s)
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	Decibel
DoD	Department of Defense
DPS	Distinct Population Segment
EA	Environmental Assessment
EISA	Energy Independence and Security Act
ELV	Expendable Launch Vehicle
EM	Electromagnetic
EMI	Electromagnetic Interference
EMR	Electromagnetic Radiation
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
FPPA	Farmland Protection Policy Act
FrB	Fisherman Comacca Complex
GHz	Gigahertz
GSFC	Goddard Space Flight Center
HERF	Hazards of Electromagnetic Radiation to Fuel
HERO	Hazards of Electromagnetic Radiation to Ordnance
HERP	Hazards of Electromagnetic Radiation to Personnel
kHz	Kilohertz
LBP	Lead Based Paint
MBTA	Migratory Bird Treaty Act
MHz	Megahertz
MIDLANT	Mid-Atlantic
MW	Megawatt
mW / cm^2	Milliwatts per Square Centimeter
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
n.d.	No Date
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	Nitrogen Oxides
NO_2	Nitrogen Dioxide

Acronym	Definition
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
OPAREA	Operating Area
Pb	Lead
PCB	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit
PEO IWS	Program Executive Office, Integrated Warfare Systems
$PM_{2.5}$	Fine particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	Suspended particulate matter less than or equal to 10 microns in diameter
PMRF	Pacific Missile Range Facility
RCRA	Resource Conservation and Recovery Act
RF	Radio Frequency
RMA	Radar Modular Assembly
ROI	Region of Influence
SAR	Specific Absorption Rate
SCSC	Surface Combat Systems Center
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
SRIPP	Shoreline Restoration and Infrastructure Protection Program
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
tpy	Tons Per Year
TSCA	Toxic Substances Control Act
UAS	Unmanned Aerial Systems
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
VAC	Virginia Administrative Code
VACAPES	Virginia Capes
VCP	Virginia Coastal Zone Management Program
VDEQ	Virginia Department of Environmental Quality
VPDES	Virginia Pollutant Discharge Elimination System
WFF	Wallops Flight Facility
W / kg	Watts per Kilogram

1 Purpose and Need

1.1 Introduction

The Department of the Navy (hereafter, Navy), in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [U.S.C.] sub-section 4321-4370h); the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [C.F.R.] part 1500-1508); and Navy regulations implementing NEPA (32 C.F.R. part 775), has prepared this environmental assessment (EA) to evaluate the potential environmental impacts from the installation and testing of an Air and Missile Defense radar (AMDR), designated by the Navy as AN / SPY-6 at the Naval Sea Systems Command's (NAVSEA's) Surface Combat Systems Center (SCSC) on Wallops Island at the National Aeronautics and Space Administration's (NASA's) Wallops Flight Facility (WFF) (hereafter, the Proposed Action). The Navy is the lead agency for the Proposed Action with NASA serving as a cooperating agency (see Section 1.9).

1.2 Location

WFF is located in Accomack County, Virginia at the northern end of Virginia's Eastern Shore. The location of WFF is shown on Figure 1-1. WFF is composed of three distinct land areas in close proximity to each other: Main Base, Mainland, and Wallops Island. SCSC is located on the north-central portion of Wallops Island and is the largest tenant at WFF.

1.3 Purpose and Need

The purpose of the Proposed Action is to enable the integration and testing of the AN / SPY-6 radar system with the other components of Aegis Weapon System Advanced Capability Build (ACB) 20. Such integration and testing would complement the current testing and evaluation of the system being conducted at Pacific Missile Range Facility (PMRF) Barking Sands, which focuses on radar development and evaluation objectives. The Proposed Action would also provide training and life cycle support for the Aegis DDG 51 Flight III program.

> 10 U.S.C. Section 5062: "The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war."

The Proposed Action is needed to fulfill specific testing objectives established under the Department of Defense (DoD) Acquisition Program and set forth in DoD Instruction 5000.02. The achievement of those objectives will allow DoD to move to the next step of the acquisition process, which consists of limited production of the AN / SPY-6 system for the purpose of operational testing and evaluation, as well as to establish production capabilities to prepare for full-rate production and deployment aboard Navy ships.

Background information regarding the purpose and need for the Proposed Action is summarized in Section 1.4.

1.4 Background

1.4.1.1 Surface Combat Systems Center

SCSC provides the Navy with live integrated warfare systems in a maritime environment for fleet operations, testing, evaluation, training, research, and development. Among others, the installation hosts systems that replicate the Navy's Aegis Combat System used to train naval personnel in the operation and maintenance of the system, as well as to test new or upgraded components in an integrated manner and solve operational issues.

1.4.1.2 Aegis Weapon System and AN / SPY-1 Radar

Aegis is the Navy's most modern surface combat system. It is deployed on more than 70 Navy ships, a majority of them destroyers. Aegis is a centralized, automated, command-and-control, and weapons control system designed to be a total weapon system, from detection to destruction (Navy 2013a). The heart of the system is a powerful radar that both detects targets and guides missiles fired to destroy the targets. The radar system currently in use as part of the Aegis system aboard Navy ships is the AN / SPY-1, a 4-megawatt (MW) phased-array radar with a tracking capacity of more than 100 targets, including aircraft, ships, and submarines (Navy 2013a).

A conventional radar system emits a mechanically-rotating beam that "sees" a target when the beam hits it, once during each rotation only. The use of a separate tracking radar is required to engage the target. By contrast, a phased-array radar like AN / SPY-1 is capable of performing both tasks simultaneously. Instead of one rotating beam, the fixed arrays of the system emit beams of electromagnetic energy in all directions at once, allowing for the detection and tracking of multiple targets simultaneously. As needed, the operator may focus in one particular direction without becoming blind to potential threats from other directions.

The first Aegis ship, the USS Ticonderoga, was commissioned in 1983. Since then, Aegis has undergone multiple technological enhancements and improvements through the ACB process of the Aegis Modernization (AMOD) program. The latest iteration of Aegis operating on Navy ships is designated as ACB 12.

1.4.1.3 AN / SPY-6 System

Overview

AN / SPY-6 is the Navy's next generation of shipboard, multi-function, phased-array radar intended for integration with Aegis ACB 20, which will be deployed on the DDG 51 Flight III series of *Arleigh Burke*-class destroyers by the end of fiscal year 2021 (Derr, pers. comm. 2015; PEO IWS 2012). Relative to the AN / SPY-1, the AN / SPY-6 system will bring enhanced ballistic missile defense and air defense capabilities to the Aegis system, addressing the current system's gaps in these areas. The three major components of the AN / SPY-6 radar are: S-band radar, a new air and missile defense radar; X-band radar, a horizon and surface search radar; and the Radar Suite Controller, a radar resource management and open interface with the shipboard Aegis system.

S-band radars operate on a wavelength of 8 to 15 centimeters and a frequency of 2 to 4 gigahertz (GHz). Because of the wavelength and frequency, S band radars are not easily attenuated (i.e., weakened or diminished due to distance and / or dust, debris or other objects the radar beam encounters). AMDR-S provides sensitivity for long-range detection and engagement of advanced threats. S-band radar provides the AN / SPY-6 system with air and ballistic missile search functions.

X-band radars operate on a wavelength of 2.5 to 4 centimeters and a frequency of 8 to 12 GHz. Because of the smaller wavelength, X-band radar is more sensitive and can detect smaller particles. In the AMDR suite, X-band radar fulfills the horizon search function (Navy 2013b; Everything Weather 2000).


Wallops Flight Facility
New Church
Horntown
13
175
Wattsville
Wallops Main Base
Wallops Island National Wildlife Refuge
Simon-easton Bay
Mud Bay
Chincoteague Bay
Chincoteague Island
Assateague Island National Seashore
Watts Bay
Temperanceville
Powells Bay
Toms Cove
Wallops Island
Chincoteague National Wildlife Refuge
Bogues Bay
Wallops Mainland
Atlantic Ocean
Assawoman Island
Chincoteague National Wildlife Refuge
OH
PA
NJ
MD
WV
VA
NC
SC
Wallops Flight Facility Boundary
0 12,000 24,000
Feet
0 3,600 7,200
Meters
N
Path: L:_Common\GIS_Data\60342567_SPYREAM\XDs\Ch_1\Figure_1-1_Wallops_Flight_Facility.mxd

Figure 1-1

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Air and missile defense requires extended detection ranges and increased radar sensitivity against advanced threats with high speeds and long interceptor fly-out times (Office of the Director, Operational Test and Evaluation [DOTE] no date [n.d.]). AN / SPY-6 is a modular, scalable system composed of individual elements called Radar Modular Assemblies (RMAs), each a self-contained radar occupying eight cubic feet (0.2 cubic meters). Just nine RMAs provide the same sensitivity as the AN / SPY-1 systems currently deployed on Navy ships; 37 RMAs can see a target half the size at twice the distance; and 69 RMAs can see a target half the size at four times the distance (Raytheon 2015). This modularity makes the system scalable to ships of varying sizes and mission types and provides the Navy with flexibility in deploying the system.

The Navy is currently conducting a land-based developmental testing and operational assessment of the AN / SPY-6 system at PMRF Barking Sands, Kauai, Hawai'i (an EA was prepared for the construction and operation of this facility in 2009 [Navy 2009]). Testing and evaluation of the AN / SPY-6 system conducted at the PMRF facility are intended to validate radar performance, evaluate hardware and software integration issues, and mitigate risks.

Radar Operation

This section provides a general description of how AN / SPY-6 operates. The information is primarily drawn from the Environmental Assessment, Advanced Radar Detection Laboratory (ARDEL), Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii (Navy 2009).

Radar uses radio waves to determine the location and speed of distant objects. Radio waves are a type of electromagnetic radiation with frequencies ranging from 300 gigahertz (GHz) to 3 kilohertz (kHz) and wavelength ranging from 1 millimeter to 100 kilometers. When the radio waves emitted by the radar encounter an object, a small amount of the energy is reflected toward the radar, which uses this "echo" to determine the position, direction, and speed of the object. Radar technology has been in use since the World War II era and has given rise to a wide range of applications.

AN / SPY-6's electromagnetic waves are emitted in a series of short pulses separated by non-transmission intervals or rest time. Pulses are generated when the transmitter is active; when the transmitter is off, the radar only receives echoes from the sent pulse. Radars typically operate in receive mode more frequently than in transmit mode. The duration of the transmission of a pulse is usually measured in microseconds.

AN / SPY-6 is a phased-array radar. Phased-array radars concentrate the radiated electromagnetic pulse from individual radar elements into a directional beam. If this beam were visible to the eye, it would look like a teardrop-shaped lobe aimed in the direction of interest (see Exhibit 1-1). This beam is called the main lobe. The main lobe forms from the electromagnetic signals emitted by the individual radar elements. To produce a functional main lobe, the electromagnetic waves of the individual signals emitted from each radar element must be concentrated and aligned at the same phase. The process of concentrating the electromagnetic signals into the main lobe results in the formation of much smaller secondary lobes called side lobes. The main lobe is the carrier through which the radar sends and receives information. The side lobes are not used to send or receive information. Therefore, it is desirable to have most of the available energy concentrated into the main lobe. The main lobe of the directional beam as related to the side lobes is shown in Exhibit 1-1.

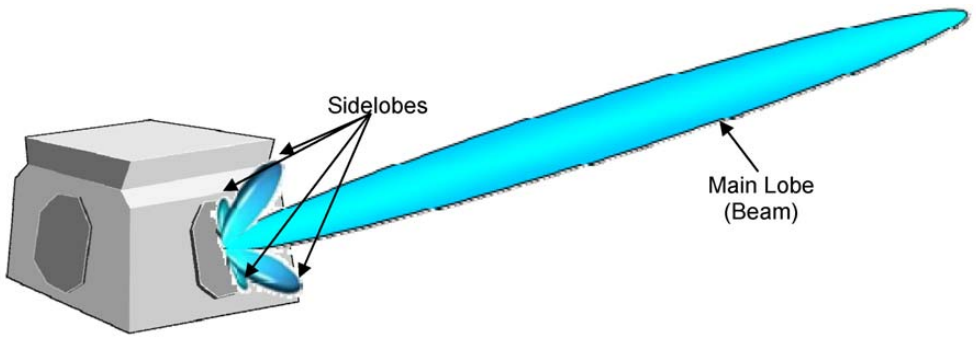

Exhibit 1-1: Visualization of a Radar Directional Beam, Including Main Lobe And Side Lobes (Navy 2009)

Scanning is the steering of the radar beam's main lobe through the sky to cover a prescribed area. It is the rapidity with which the beam can be steered that allows phased-array radars to be used at the same time for detecting and engaging targets. The main lobe is steered horizontally and vertically hundreds of times a second to examine a designated area of sky for objects of interest. The maximum search area is typically between 90° and 120° azimuth (horizontal angle) and 0° and 90° elevation. A typical radar search pattern is a rectangular sector similar to the one illustrated in Exhibit 1-2.

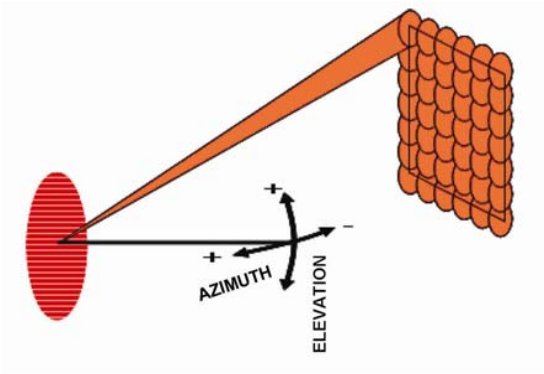

Exhibit 1-2: Typical Radar Search Pattern (Navy 2009)

1.5 Scope of the Environmental Analysis

This EA includes an analysis of potential environmental impacts associated with the action alternatives and the No Action Alternative. The environmental resource areas analyzed in this EA include: air quality, water resources, geological resources, biological resources, land use, noise, infrastructure, public health and safety, and hazardous materials and wastes. The study area for each resource analyzed may differ due to how the Proposed Action interacts with or impacts the resource. For instance the study area for geological resources may only include the construction footprint of a building whereas the noise study area would expand out to include areas that may be impacted by airborne noise.

1.6 Key Documents

The following documents include environmental analysis of previous or ongoing activities that are related to, or support, the installation and operation of the AN / SPY-6 radar system on Wallops Island.

- *Environmental Assessment, U.S. Navy Testing of Hypervelocity Projectiles and an Electromagnetic Railgun, National Aeronautics and Space Administration's Wallops Flight Facility, Wallops Island, Virginia* (Navy 2014).
- *Environmental Assessment, Advanced Radar Detection Laboratory (ARDEL), Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii* (Navy 2009).
- *Environmental Assessment, DD(X) Radar Test Facility Construction and Use at Surface Combat Systems Center* (Navy n.d.).
- *Final Site-wide Environmental Assessment, Wallops Flight Facility, Virginia* (NASA 2005).

- *Atlantic Fleet Training and Testing Final Environmental Impact Statement / Overseas Environmental Impact Statement* (Navy 2013c).
- *Environmental Resources Document (External Version – Redacted June 2015)* (NASA 2015).

1.7 Relevant Laws and Regulations

The Navy has prepared this EA based upon federal and state laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action, including the following:

- NEPA (42 U.S.C. sections 4321-4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment.
- Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 C.F.R. parts 1500-1508).
- Navy regulations for implementing NEPA (32 C.F.R. part 775), which provides Navy policy for implementing CEQ regulations and NEPA.
- NASA's regulations for implementing NEPA (14 CFR Subpart 1216.3).
- NASA NEPA Management Requirements (NASA Procedural Requirements 8580.1A).
- Clean Air Act (CAA) (42 U.S.C. section 7401 *et seq*.).
- Clean Water Act (CWA) (33 U.S.C. section 1251 *et seq*.).
- Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 *et seq*.).
- National Historic Preservation Act (NHPA) (54 U.S.C. section 306108 *et seq*.).
- Endangered Species Act (ESA) (16 U.S.C. section 1531 *et seq*.).
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. section 703-712).
- Bald and Golden Eagle Protection Act (16 U.S.C. section 668-668d).
- EO 11988, *Floodplain Management.*
- EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input.*
- EO 12088, Federal Compliance with Pollution Control Standards.

A description of the Proposed Action's consistency with these laws, policies and regulations, as well as the names of regulatory agencies responsible for their implementation, is presented in Chapter 5 (Table 5-1).

1.8 Public and Agency Participation and Intergovernmental Coordination

Regulations from the CEQ (40 C.F.R. part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. The Draft EA was made available for public review from March 1 through April 3, 2017. A Notice of Availability was published in the *Eastern Shore News* on March 1, 2017; the *Chincoteague Beacon* on March 2, 1017; and the *Eastern Shore Post* on March 3, 2017. The notice provided information on how to obtain a copy of the draft document for review and a point of

contact to submit comments. Copies of the published notices are included in Appendix A. Hard copies of the Draft EA were made available for review at the following repositories: NASA WFF Visitor Center at Building J-20, Wallops Island, VA; Chincoteague Island Library, at 4077 Main Street, Chincoteague Island, VA; and Eastern Shore Public Library, at 23610 Front Street, Accomac, VA. No public comments were received.

Consistent with section 7 of the Endangered Species Act (ESA), the Navy obtained from the U.S. Fish and Wildlife Service (USFWS) a list of threatened, endangered, and candidate species that may occur in the vicinity of the project; assessed the potential effects of the Proposed Action on these species or designated critical habitats; and requested USFWS's review of, and concurrence with, the findings of this assessment. The Navy received an email from USFWS on October 19, 2015, concurring with the Navy's determination that the Proposed Action would either have no effect, or may affect, but is not likely to adversely affect, species protected under the ESA. This concluded the section 7 informal consultation process. A copy of the correspondence between the Navy and USFWS is included in Appendix B.

The Proposed Action qualifies as an undertaking as defined in the regulations implementing Section 106 of the National Historic Preservation Act (NHPA; 36 C.F.R. Part 800.16 (y)). Therefore, in compliance with Section 106, the Navy has consulted with the Virginia State Historic Preservation Office (SHPO) to assess the potential effects of the Proposed Action on historic properties listed or eligible for listing in the National Register of Historic Places. In a memorandum dated August 28, 2015, the Virginia SHPO concurred that the proposed action would not affect historic properties. Correspondence between the Navy and the SHPO is included in appendix C.

The Navy determined that the Proposed Action would be fully consistent with the applicable enforceable policies of Virginia's federally approved coastal zone management program and prepared a Consistency Determination in accordance with 15 C.F.R. 930, Subpart C. The determination was submitted to the Virginia Department of Environmental Quality (VDEQ) for review under the Virginia Coastal Zone Management Program. Concurrence was received by letter dated January 17, 2017. Copies of the consistency determination and concurrence letter from VDEQ are included in Appendix D.

1.9 Cooperating Agency

NASA is serving as a Cooperating Agency in preparing this EA. Under NEPA, a Cooperating Agency is a federal, state, local, or tribal government agency other than the proposing agency with jurisdiction by law or special expertise regarding the Proposed Action or its potential environmental effects. As the federal landowner at WFF, including Wallops Island, NASA possesses both jurisdiction by law and special expertise pertaining to the environmental resources within, and adjacent to, the installation. Moreover, as a federal agency, NASA has its own NEPA policies and procedures (14 C.F.R. Subpart 1216.3) with which it must comply. As such, this EA was prepared to satisfy NASA's NEPA obligations as well as the Navy's. The NASA action considered in this EA is permitting the Navy to install and operate an AN / SPY-6 radar system on Wallops Island at WFF.

1.10 Organization of the EA

- Chapter 1 describes the background and purpose and need for the Proposed Action.
- Chapter 2 describes the Proposed Action as well as the Navy's alternative site selection process.

- Chapter 3 describes the existing conditions of the resources that may be affected by the Proposed Action as well as the environmental consequences of implementing the Proposed Action on those resources.
- Chapter 4 addresses the cumulative impacts of the Proposed Action when considered with other past, present, and foreseeable future actions with the potential to affect the same resources.
- Chapter 5 discusses other considerations required by NEPA, including irreversible or irretrievable commitments of resources and unavoidable adverse impacts.
- Chapter 6 lists the references used in preparing the EA.
- Chapter 7 lists the preparers and reviewers of the EA.
- Chapter 8 lists the persons contacted during the preparation of the EA.

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2 Proposed Action and Alternatives

CEQ regulations require an EA to contain a brief description of the proposed action's features as well as a description of alternatives to the proposed action, consistent with Section 102(2)(e) of NEPA. Agencies are directed to use "…the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the environment" (40 C.F.R. 1500.2[e]). Alternatives found not to be reasonable do not need to be evaluated in the EA. Accordingly, this chapter describes the Proposed Action and alternatives considered, including the alternatives considered but dismissed as not reasonable.

2.1 Proposed Action

The Proposed Action consists of installing an AN / SPY-6 radar system at SCSC on Wallops Island. Integration and testing of the radar with Aegis ACB 20 would follow the installation and comprise the operational component of the Proposed Action.

2.2 Screening Factors

As stated in Section 1.3, the Navy's purpose for the Proposed Action is to enable the integration and testing of the AN / SPY-6 radar system with the other components of Aegis ACB 20. When evaluating potential alternatives to meet this purpose and need, the Navy considered the following factors:

1. The location must make use of existing training and testing assets and systems, provided that the proposed activities do not interfere with ongoing or planned programs.
2. The location must adequately support integration and testing of the system with Aegis ACB 20.
3. The location must be accessible to testing personnel and teams in a time- and cost-efficient manner.

2.3 Alternatives Carried Forward for Analysis

Based on the reasonable alternative screening factors and meeting the purpose and need for the Proposed Action, two action alternatives were identified and will be analyzed in this EA.

2.3.1 No Action Alternative

Under the No Action Alternative, SCSC would not install or operate an AN / SPY-6 system at Wallops Island.

The No Action Alternative would not meet the Navy's purpose and need and, as such, is not a reasonable alternative. However, in accordance with NEPA requirements, it is analyzed in this EA to provide a baseline against which the impacts of the other alternatives can be assessed.

2.3.2 Alternative 1 - Install AN / SPY-6 System in Building V-003 (Preferred Alternative)

Under Alternative 1, the Preferred Alternative, the Navy would install and operate an AN / SPY-6 radar system in SCSC's Building V-003 on Wallops Island after modifying the building to accommodate the new system. Building V-003 is located between Seawall Road and Bypass Road in the northern part of

Wallops Island (see Figures 2-1 and 2-2). It is a multilevel, steel-framed structure built in 2010 and featuring a 1,600-square-foot (148.6-square-meter) trapezoidal carbon composite face on its south side. The carbon composite face contains radar arrays associated with the DDG-1000 program the building was constructed to support. The arrays slope back 20 degrees from the vertical. The existing south face of the building is shown in Exhibit 2-1. A rectangular two-story structure extends from the south elevation of Building V-003 below the inclined trapezoidal face.

Exhibit 2-1: Existing South Elevation of Building V-003 with Carbon Composite Radar Array. The Two-Story Extension to the South Elevation is Visible Directly Below the Radar Array (Source: NAVFAC MIDLANT 2014a)

Because the DDG-1000 program is nearing completion, the building is anticipated to be available for the AN / SPY-6 integration and testing program in the near future. However, the current configuration of the carbon composite panel cannot accommodate the AN / SPY-6 system of "S" band and "X" band arrays without modification.

2.3.2.1 Construction Activities

To accommodate the AN / SPY-6 radar, the Navy would construct a four-story addition to the south-facing side of Building V-003 above the existing two-story extension, resulting in a six-story elevation. This would involve removing the existing roof deck structure and all metal siding on the two-story extension, and installing seven new steel columns and seven pile caps (foundations) to provide structural support for the addition. The new foundations would require selective demolition of the existing grade-level slab and the installation of 40 concrete piles to support the foundations. The piles would be drilled and poured. New concrete decks to be constructed on Decks 3 and 4 in the addition would be continuous with Decks 3 and 4 of the existing building. A new grating deck would be constructed on Deck 6, which would be continuous with Deck 6 of the existing building. The new floor systems for Decks 4 and 6 would terminate approximately five to six feet (1.5 to 1.8 meters) behind the new radar array face to provide operating clearance for the new radar systems.

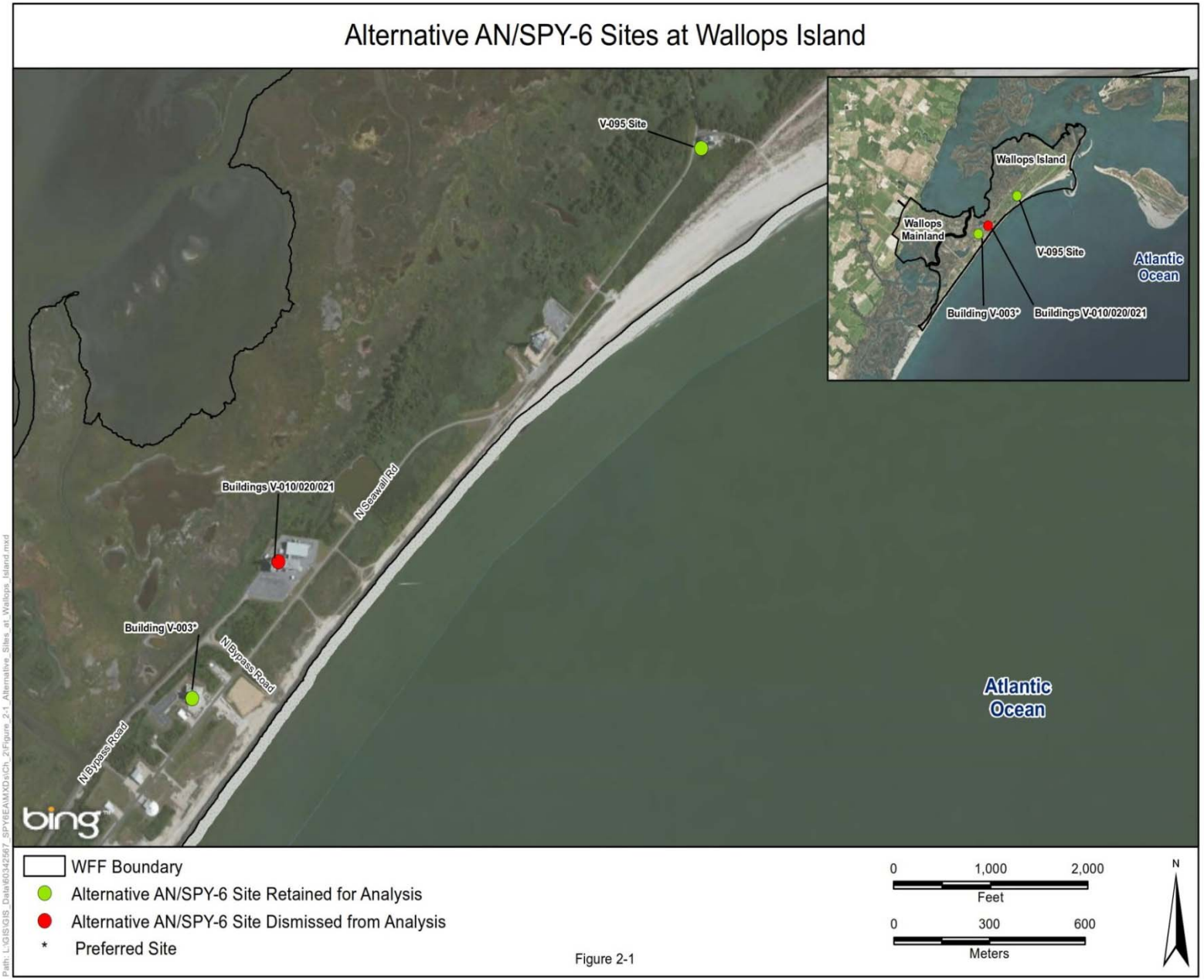
Alternative AN/SPY-6 Sites at Wallops Island
V-095 Site
Wallops Island
Wallops Mainland
V-095 Site
Atlantic Ocean
Building V-003*
Buildings V-010/020/021
Buildings V-010/020/021
N Scawell Rd
Building V-003*
N Bypass Road
N Bypass Road
Atlantic Ocean
bing
WFF Boundary
Alternative AN/SPY-6 Site Retained for Analysis
Alternative AN/SPY-6 Site Dismissed from Analysis
* Preferred Site
0 1,000 2,000
Feet
0 300 600
Meters
N

Figure 2-1

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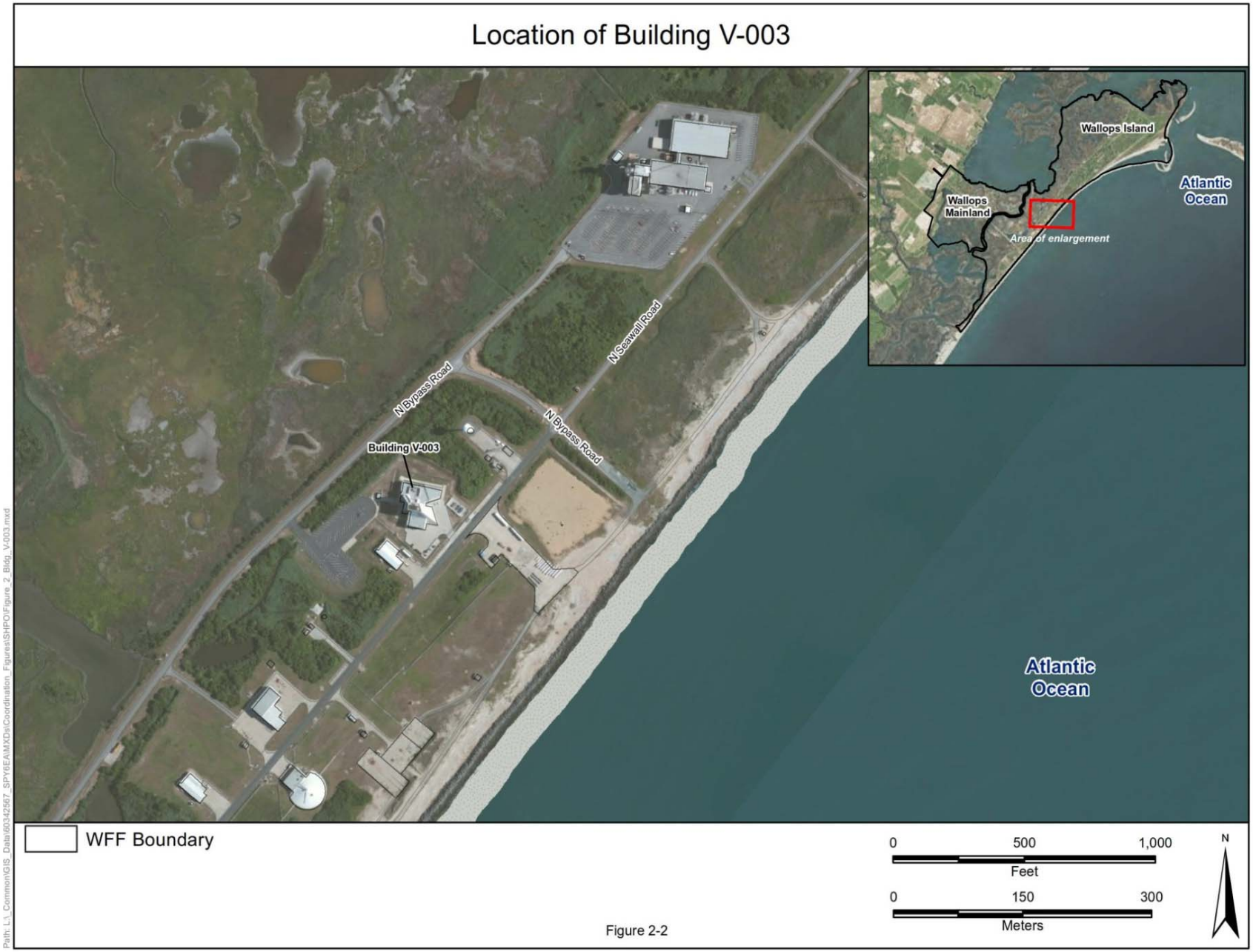
Location of Building V-003
Wallops Island
Atlantic Ocean
Wallops Mainland
Area of enlargement
N Bypass Road
N Seawall Road
N Bypass Road
Building V-003
Atlantic Ocean
WFF Boundary
0 500 1,000
Feet
0 150 300
Meters
N
Figure 2-2

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If necessary, additional local operating platforms with stair access could be constructed if the new decks do not provide optimal access to the interior of the array face. Construction associated with the addition to the facility would also include the replacement of Building V-003's existing air cooled chillers with new, similar units. The total height and footprint of the building would not change.

The new array face on the addition would be angled at 15 degrees from the vertical instead of 20 degrees for the existing array, and would be rotated 34 degrees counterclockwise relative to the current orientation to avoid interfering with NASA launch structures. The new array face would be configured with the X-band array mounted directly above the S-band array on the 15-degree sloped surface. The X-band array would be approximately 12 feet (3.6 meters) wide by 12 feet (3.6 meters) high and 5 feet (1.5 meters) deep, and the S-band array would be approximately 16 feet (4.9 meters) wide by 16 feet (4.9 meters) high by 5 feet (1.5 meters) deep. A catwalk mounted on the vertical wall directly beneath the radar arrays would facilitate exterior maintenance and cleaning. The exterior of the addition would be finished in vertical metal siding that would be similar in appearance to that found on the existing building (NAVFAC MIDLANT 2014a).

Construction activities would be primarily confined to areas of the building in front of the existing 20-degree south face and above the two-story extension as well as to a limited area behind the existing 20-degree face. There would be no construction outside the existing footprint of the facility. Exhibit 2-2 shows a rendering of the modified building.

2.3.2.2 Operation of the AN / SPY-6 System

Once installed, the AN / SPY-6 system would be tested for integration with Aegis. A general description of radar operations is provided in Section 1.4 of this EA. The area scanned by the new radar would be defined by azimuths 114.3 and 204.3 degrees from true north (Figure 2-3). Vertically, the radar array would be situated approximately 60 feet (18 meters) above ground level and would not scan at angles below 0 degree. Thus, there would be no electromagnetic exposure at ground level around the facility. Testing would be conducted using targets of opportunity such as Navy or NASA aircraft or rockets, or any targets or projectiles used for other testing or training purposes within the scanning area.

Therefore, other than the construction and operation of the radar, the Proposed Action includes no activities beyond those that are currently conducted at WFF. Such activities have been or will be addressed in separate NEPA documentation, as appropriate, and are not part of this Proposed Action.

Alternative 1 is consistent with all three selection factors and was retained for analysis in the EA. It is the Navy's Preferred Alternative.

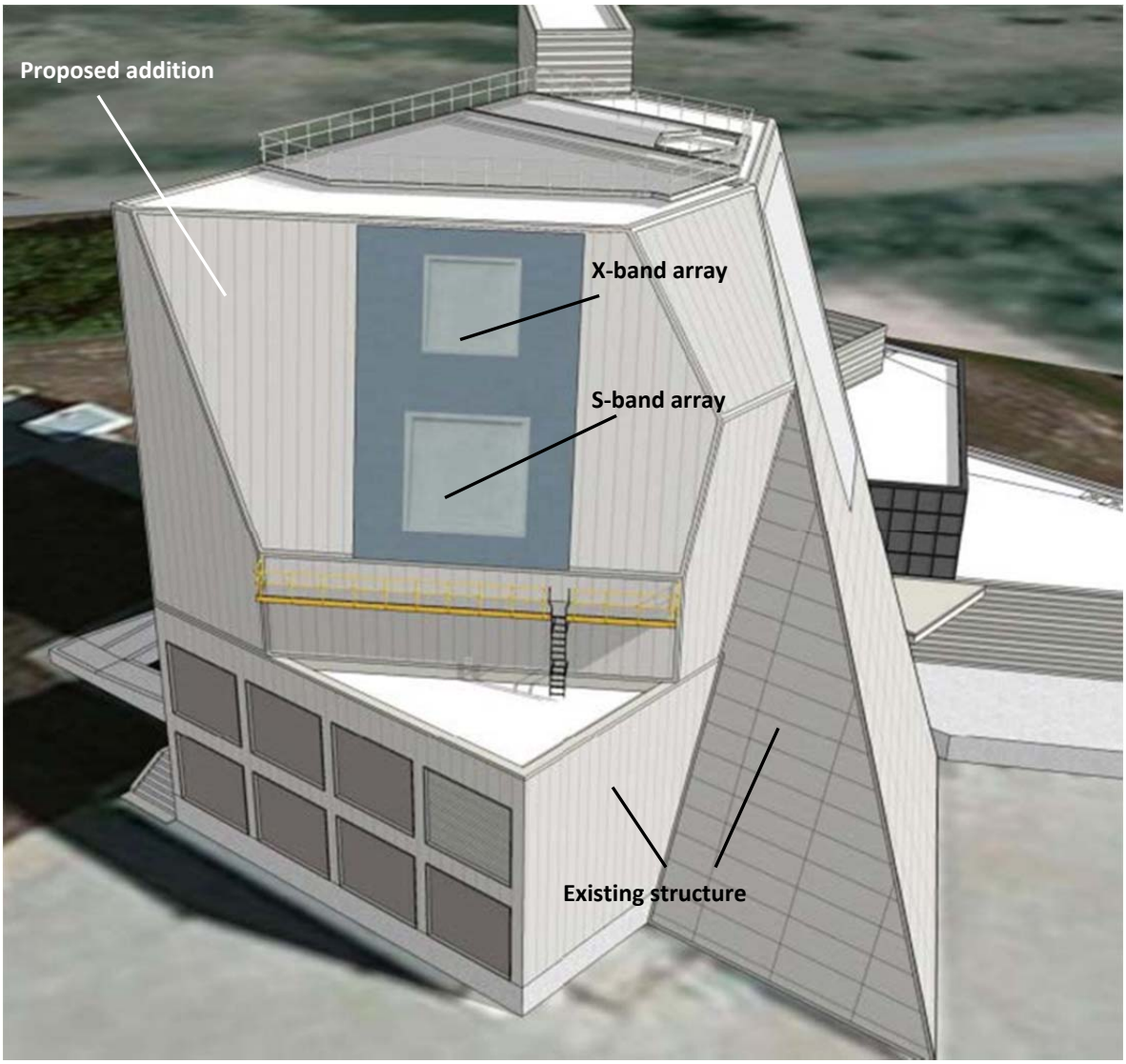

Exhibit 2-2: Exterior Configuration of the Proposed Addition to Building V-003 (Source: NAVFAC MIDLANT 2014a)

2.3.3 Alternative 2 - Install AN / SPY System in a New Facility

2.3.3.1 Construction Activities

Under this alternative, the Navy would construct a new facility at Wallops Island for the AN / SPY-6 system on a site currently occupied by an observation tower (Facility V-095) and several trailers, about 1.5 miles (2.4 kilometers) to the northeast of Building V-003 and 0.1 mile (0.2 kilometer) from the shoreline (see Figure 2-1 and Exhibit 2-3).

Exhibit 2-3: Alternative 2 Site - Existing Conditions

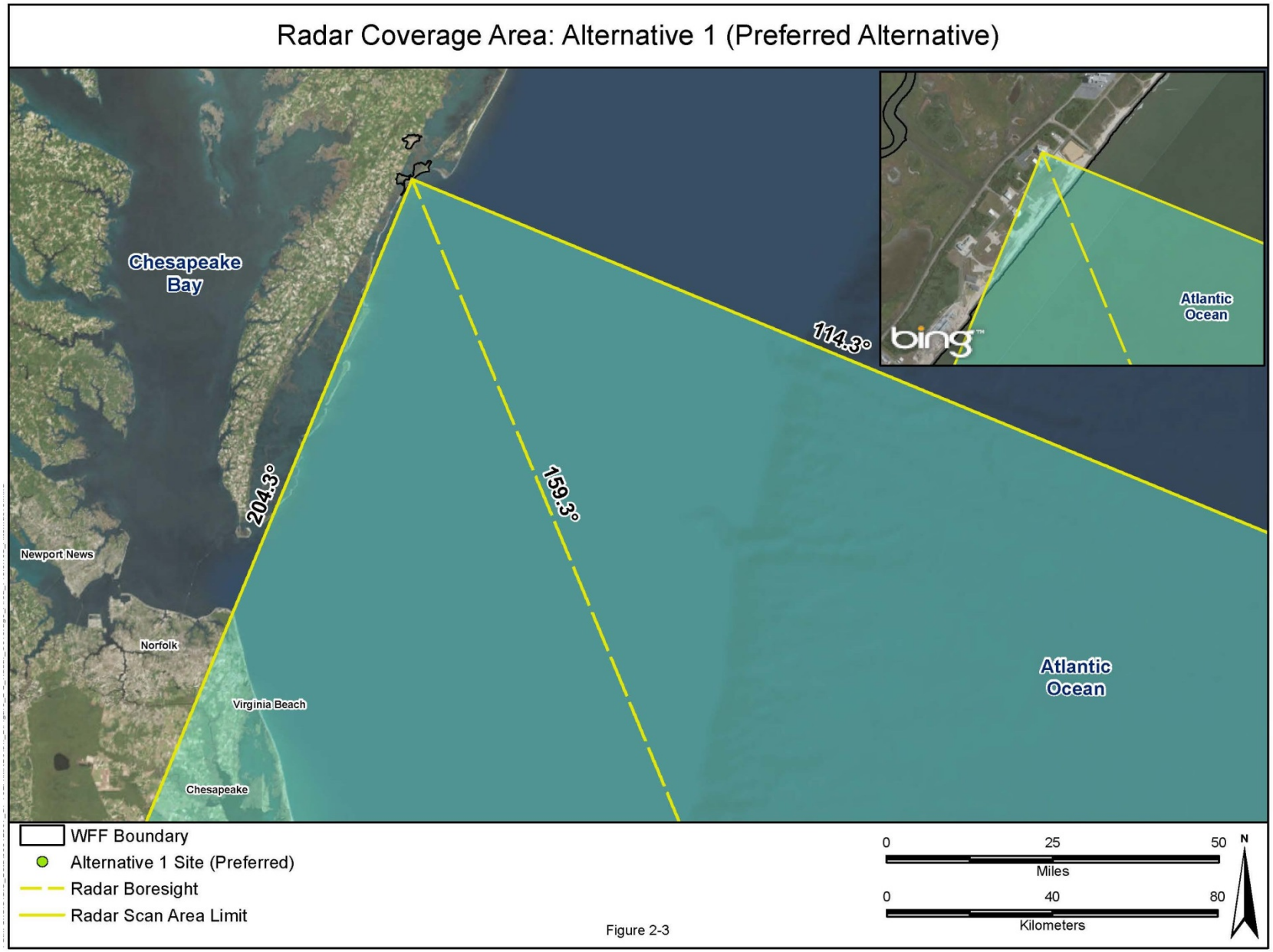
Radar Coverage Area: Alternative 1 (Preferred Alternative)
Chesapeake Bay
Atlantic Ocean
114.3°
204.3°
159.3°
Newport News
Norfolk
Virginia Beach
Chesapeake
Atlantic Ocean
WFF Boundary
Alternative 1 Site (Preferred)
Radar Boresight
Radar Scan Area Limit
0 25 50
Miles
0 40 80
Kilometers
N

Figure 2-3

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This alternative would require the removal of the existing structures. While these structures are intermittently used for training or testing activities, they are not critical to any current or planned programs.

Figure 2-4 shows a conceptual site plan for Alternative 2. For the purpose of this EA, it is assumed that the new facility would have a footprint similar to that of existing Building V-021, which currently houses SCSC's AN / SPY-1 system at Wallops Island (approximately 2,000 square feet [186 square meters]), and an elevation similar to that proposed for Building V-003 under Alternative 1.

In addition, this alternative would require establishing an underground communications / data connection between the new facility and existing Building V-010. Approximately one mile (1.6 kilometers) of conduit would have to be installed. Directional boring would be used to minimize impacts to surface soils and vegetation.

2.3.3.2 Operation of the AN / SPY-6 System

Radar operations under this alternative would be similar to those described in Section 2.3.2.2 for Alternative 1. Radar coverage under this alternative is shown on Figure 2-5. Alternative 2 meets all three selection factors. Although it would not make as efficient a use of existing assets as Alternative 1, Alternative 2 would still make use of SCSC's existing Aegis system at Wallops Island for the integration and testing of the AN / SPY-6 system, and it would not significantly interfere with any existing or planned programs. Therefore, it is considered by the Navy to meet Factor 1. Like Alternative 1, it would also meet Factors 2 and 3. Therefore, it was retained for analysis in the EA.

2.4 Alternatives Considered but Dismissed

The range of potential locations for the Proposed Action was constrained by the previous installation of an AN / SPY-6 system at PMRF Barking Sands and by the location of existing Aegis training and testing facilities - e.g., location in SCSC facilities at Wallops Island of a replica of the Aegis system for the purposes of testing and training. This constraint is reflected in Factor 1. On the basis of this factor, the Navy eliminated from further consideration locations other than PMRF Barking Sands and Wallops Island, as such locations would fail to take advantage of existing assets and result in unnecessary duplication of costs and efforts.

2.4.1 PMRF Barking Sands Alternatives

The Navy considered the following options at PMRF Barking Sands (PEO IWS 2012):

- **Conducting Radar Integration and Testing of Aegis Combat System at PMRF Barking Sands**: Under this alternative, the Proposed Action would be implemented at PMRF Barking Sands, which already has an operational AN / SPY-6 system in place, thus potentially meeting Factor 1. However, it would not entirely meet the factor as using the same system for two types of testing may lead to scheduling conflicts. Additionally, the installation does not have the Aegis ACB 20 elements in place to conduct the testing - thus failing under Factor 2. Finally, the site location (in Hawaii) would require extensive and costly travel for the testing teams, inconsistent with Factor 3.
- **Conducting Radar Integration and Testing of Aegis Combat System at PMRF Barking Sands with Existing Aegis Ashore Assets**: Like the previous alternative, this option would partially meet Factor 1 since it would take advantage of existing assets at PMRF Barking Sands. However, the potential for scheduling conflicts would also occur under this alternative.

Also, Aegis Ashore (the land-based component of the Aegis Ballistic Missile Defense) is planned to maintain an ACB 12 configuration for the foreseeable future, while integration and testing of the AN / SPY-6 system requires ACB 20. Thus, this alternative would not meet Factor 2. Like the previous option, it would also be inconsistent with Factor 3.

- **Conducting Radar Interface Testing at PMRF Barking Sands and Aegis Combat System Testing at Wallops Island**: This option would split the testing process between PMRF Barking Sands and SCSC's facility on Wallops Island, thus addressing the previous options' shortcomings with regard to Factor 1. However, the type of split testing involved has never been conducted and the first full integration of the entire system would be shipboard. Therefore, this option would not result in an adequate testing of the system and would fail to meet Factor 2. Factor 3 would also remain unmet since at least part of the testing would take place in Hawaii, with associated travel and mobilization costs.

Based on the analyses summarized above, the Navy determined that locating the Proposed Action at PMRF Barking Sands was not a reasonable means of achieving its purpose and need.

2.4.2 Wallops Flight Facility Alternatives

The Navy also considered two options in SCSC facilities on Wallops Island but dismissed them from consideration in the EA, as summarized below (NAVFAC MIDLANT 2014b):

- **Conducting Radar Integration and Testing at Existing Building V-003:** Under this alternative, the AN / SPY-6 system would be installed in Building V-003. The existing radar array face would be replaced to accommodate the new system but no further modifications would be performed. Radar orientation would remain as is, with a boresight (centerline) of 193.3 degrees and scan area between the 148.3 and 238.3 azimuths. This alternative would be consistent with Factors 1 and 3, as it would make use of the existing Aegis infrastructure in SCSC facilities at Wallops Island and would not require testing teams to travel to a remote location. However, unchanged radar orientation would substantially affect the effectiveness of the testing, disqualifying the alternative under Factor 2: to avoid interfering with NASA facilities, there would be a cut-out area between the 209 and 220 azimuths and 0- to 5-degree elevation (area within which the radar cannot emit). This cut-out area contains a substantial amount of the terrestrial background clutter needed to appropriately test the radar. Also, with this orientation, rockets launched by NASA would quickly exit the radar coverage, substantially limiting opportunities to use those launches for radar testing (PEO IWS n.d.). For these reasons, this alternative was eliminated from further consideration.
- **Conducting Radar Integration and Testing at the Existing Building V-010 / V-020 / V-021 Complex**: Under this alternative, the AN / SPY-6 system would be installed in the Building V-010 / V-020 / V-021 Complex, which already houses a SPY-1 system (see Figure 2-1). The Building V-010 / V-020 / V-021 Complex has three radar arrays. Installing the AN / SPY-6 in the building would require modifications to the south array, which would be replaced with the new system. When evaluating this alternative, the Navy determined that retrofitting the Building V-010 / V-020 / V-021 Complex for the AN / SPY-6 system would necessitate shutting down up to 85 percent of the facility's radar emitters for a minimum of six months as well as leaving this sensitive facility open to the weather for a similar period of time (PEO IWS n.d.; NAVFAC MIDLANT 2014b). This impact on an existing asset and the program it supports is not acceptable. Thus, this alternative would fail to meet Factor 1 and was dismissed from further consideration.

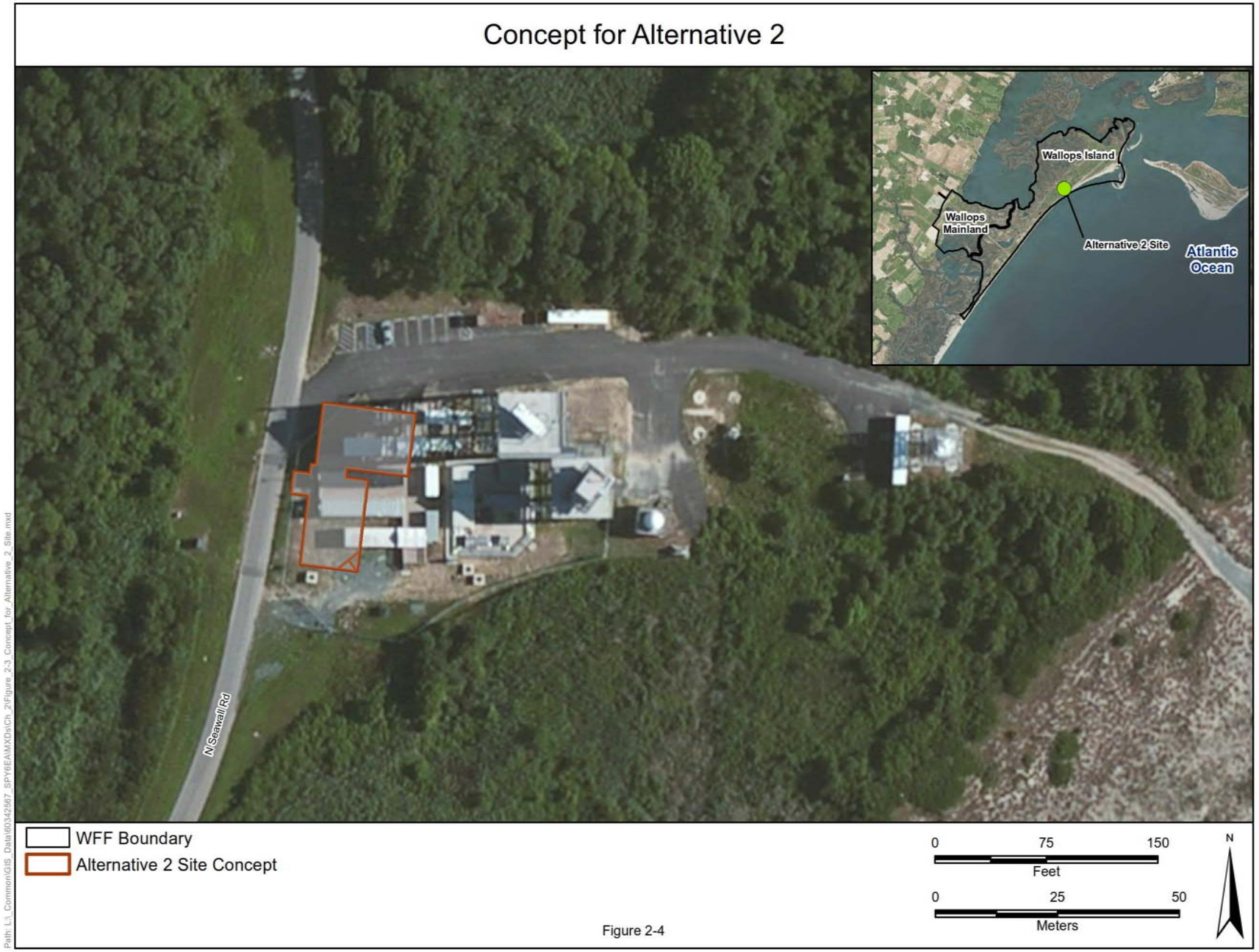
Concept for Alternative 2
Wallops Island
Wallops Mainland
Alternative 2 Site
Atlantic Ocean
N Seawall Rd
WFF Boundary
Alternative 2 Site Concept
0 75 150
Feet
0 25 50
Meters
N
Path: L:_Common\GIS_Data\60342567_SPY6EAIM\XDs\Ch_2\Figure_2-3_Concept_for_Alternative_2_Site.mxd

Figure 2-4

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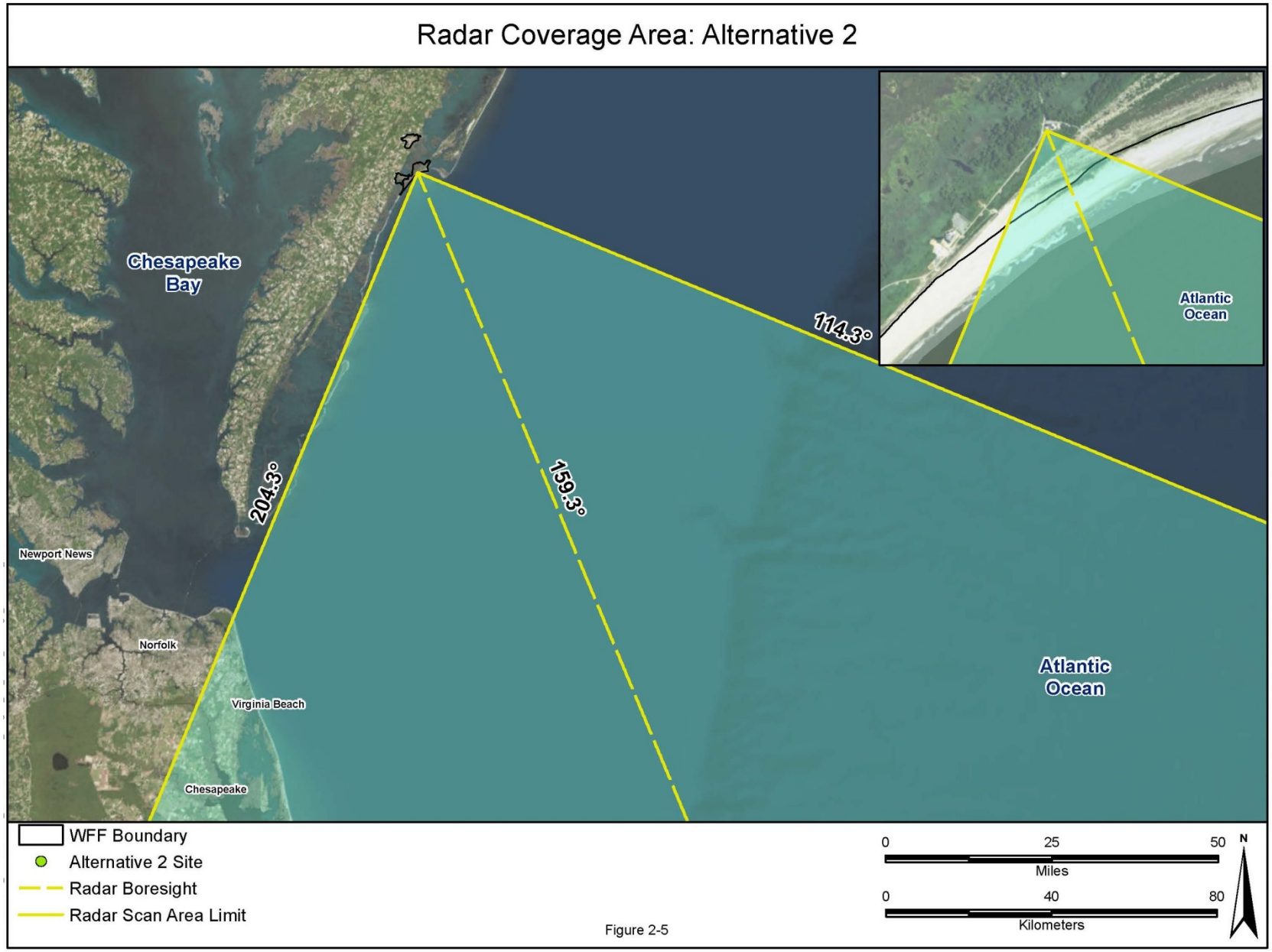
Radar Coverage Area: Alternative 2
Chesapeake Bay
Atlantic Ocean
114.3°
204.3°
159.3°
Newport News
Norfolk
Virginia Beach
Chesapeake
Atlantic Ocean
WFF Boundary
Alternative 2 Site
Radar Boresight
Radar Scan Area Limit
0 25 50
Miles
0 40 80
Kilometers
N

Figure 2-5

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3 Affected Environment and Environmental Consequences

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives and an analysis of the potential direct and indirect effects of each alternative.

All potentially relevant environmental resource areas were initially considered for analysis in this EA. In compliance with NEPA, CEQ, and 32 C.F.R. part 775 guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

"Significantly," as used in NEPA, requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as society as a whole (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 as a whole. Both short- and long-term effects are relevant (40 C.F.R. part 1508.27). Intensity refers to the severity or extent of the potential environmental impact, 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 impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would be expected to be considered significant.

This section includes air quality, water resources, geological resources, terrestrial biological resources[2], land use, noise, infrastructure and utilities, public health and safety, and hazardous materials and wastes.

Consistent with 40 C.F.R. 1501.7(a)(3), the potential impacts to the following resource areas are considered to be negligible or nonexistent so they were not analyzed in detail in this EA:

- **Cultural Resources:** Based on consultation with the Virginia State Historic Preservation Office, the Proposed Action would not directly or indirectly affect historic properties. None of the affected facilities are listed or eligible for listing in the National Register of Historic Places. No areas with potential to contain archaeological resources would be disturbed. In a memorandum dated August 28, 2015, the Virginia State Historic Preservation Office informed the Navy that no further identification efforts are warranted and no historic properties would be affected by the Proposed Action (a copy of the memorandum is in Appendix C).
- **Visual Resources:** Although located along a sparsely-developed segment of the Atlantic coastline, the visual environment in the vicinity of Wallops Island is dominated by human-made structures and facilities of an industrialized character that support the testing, development, and launching of NASA and Navy equipment. The construction of the proposed AN / SPY-6 facility at either alternative site would be similar in character and scale

[2] Including nesting sea turtles, which are under the jurisdiction of USFWS and, for the purposes of this EA, are considered with terrestrial resources.

to existing development on Wallops Island and would not contribute to the further degradation of the visual environment in the vicinity of the installation. Therefore, visual resources were not carried forward for analysis in the EA.

- **Air Space:** The Proposed Action would not affect existing use and control of the airspace at Wallops Island. AN / SPY-6 testing would be performed using targets of opportunities and would not require an increase in or new restrictions on the use of airspace.
- **Transportation:** Other than temporary and limited increases in traffic during construction operations, the Proposed Action would not generate any new vehicular traffic or affect existing transportation facilities. The Proposed Action also has no potential to affect maritime transportation.
- **Socioeconomics and Environmental Justice:** The Proposed Action would take place on Wallops Island and has no potential to affect the demography or economy of the surrounding area. There are no residential uses near the location of the Proposed Action that could be affected by the Proposed Action in the short- or long-term. The Proposed Action has no potential to disproportionately affect minority or low-income populations protected under Executive Order (EO) 12898 or to affect the health and welfare of children protected under EO 12045.
- **Aquatic Biological Resources:** Neither the installation nor the operation of the AN / SPY-6 radar has potential to affect aquatic resources. No underwater activities would take place and no significant amount of electromagnetic energy would penetrate the waters of the Atlantic Ocean.

3.1 Air Quality

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) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., certain building materials and cleaning solvents). Air pollutants are also released from natural sources such as volcanic eruptions and forest fires.

3.1.1 Regulatory Setting

Criteria Pollutants and National Ambient Air Quality Standards

The principal pollutants defining the air quality, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, suspended particulate matter less than or equal to 10 microns in diameter (PM_{10}), fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). CO, SO_2, Pb, and some particulates are emitted directly into the atmosphere from emissions sources. Ozone, NO_2, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes.

Under the CAA, the U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 C.F.R. part 50) for the criteria pollutants. NAAQS are classified as

primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation, and damage to buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. 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.

General Conformity

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year [tpy]) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question.

Title V Operating Permit

The Title V State Operating Permits Program consolidates all CAA requirements applicable to the operation of a source. It applies to stationary sources of air pollution that exceed the major stationary source emission thresholds, as well as other non-major sources specified in a particular regulation. Navy installations subject to Title V permitting must comply with the requirements of the Title V Operating Permit Program, which are detailed in 40 C.F.R. Part 70 and all specific requirements contained in their individual permits.

Greenhouse Gases

Greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

The USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* on September 22, 2009. GHGs covered under the rule are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride. Each GHG is assigned a global warming potential. The global warming potential is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. The equivalent CO_2 rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as carbon dioxide equivalent (CO_2e) are required to submit annual reports to USEPA.

3.1.2 Affected Environment

The following paragraphs describe air quality conditions at and in the vicinity of Wallops Island.

The region of influence for the air quality analysis is the Northeastern Virginia Intrastate air quality control region (defined in 40 C.F.R. Part 81.144). This air quality control region, which includes Accomack County, is designated as in attainment / unclassifiable for all criteria pollutants. Because the region is in attainment, the Clean Air Act General Conformity Rule (40 C.F.R. Parts 51 and 93) does not apply and will not be addressed in the impact analysis.

Air Quality Potential Impacts:

- **No Action:** No impacts.
- **Alternative 1:** No significant impacts. Negligible impacts from construction activities and operation.
- **Alternative 2:** No significant impacts. Negligible impacts from construction activities and operation.
- **Both Alternatives**: The requirements of the CAA General Conformity Rule do not apply as Accomack County is in attainment for all criteria pollutants.

WFF's annual emissions levels do not exceed the Title V of the Clean Air Act major source threshold of 100 tons (907,185 kilograms) per year of any criteria pollutant. Therefore, WFF is regulated as a synthetic minor source (i.e., a source with annual emissions capped under the major source threshold) for air pollutants. WFF maintains two synthetic minor air permits, one for Main Base and a combined one for Mainland and Wallops Island. The most recent annual emissions for these areas at WFF are summarized in Table 3.1-1[3].

Table 3.1-1: Wallops Mainland / Island and Main Base 2014 Emissions[1, 2]

Criteria Pollutant						
SO_2	CO	PM_{10}	$PM_{2.5}$	NO_x	VOC	Pb
Mainland / Wallops Island						
1.01 (0.92)	0.24 (0.22)	0.07 (0.06)	0.09 (0.08)	0.68 (0.62)	0.03 (0.03)	0.01 (0.01)
Main Base						
0.21 (0.19)	3.10 (2.81)	0.04 (0.04)	0.04 (0.04)	5.42 (4.92)	0.48 (0.43)	0.03 (0.03)
Totals						
1.22 (1.12)	**3.34 (3.03)**	**0.11 (0.10)**	**0.13 (0.12)**	**6.10 (5.54)**	**0.51 (0.46)**	**0.04 (0.04)**

Notes:
1. Emissions presented in tons per year (metric tons per year)
2. SO_2 = sulfur dioxide, CO = carbon monoxide, PM_{10} = particulate matter less than 10 micrometers in size, $PM_{2.5}$ = particulate matter less than 2.5 micrometers in size, NO_x = nitrogen oxides, VOC = volatile organic compounds, Pb = lead

Source: Virginia Department of Environmental Quality 2015

Greenhouse Gas Emissions

In accordance with the USEPA final rule on mandatory reporting of GHGs, WFF provides annual estimates of facility-wide total GHG emissions. Between 2009 and 2014, the annual emissions at Wallops Mainland / Island ranged between 734 and 1,667 tons (666 and 1,512 metric tons) of CO_2e (Virginia Department of Environmental Quality 2015). These emissions are well below the USEPA reporting threshold of 25,000 metric tons for carbon dioxide equivalent.

3.1.3 Environmental Consequences

Effects on air quality are based on estimated direct and indirect emissions associated with the action alternatives. The region of influence (ROI) for assessing air quality impacts is the Northeastern Virginia Intrastate air quality control region, within which the project site is located.

[3] NASA tenants and partners, including the National Oceanic and Atmospheric Administration, the Navy and the Mid-Atlantic Regional Spaceport, maintain their own air permits and report emissions separately from those of NASA shown in Table 3.1-1.

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

3.1.3.1 No Action Alternative

Under the No Action Alternative, no construction would occur and the AN / SPY-6 radar system would not be installed or operated at Wallops Island. Existing conditions with respect to air quality at and in the vicinity of Wallops Island would continue. This would have no impacts on air quality at Wallops Island or in the Northeastern Virginia Intrastate air quality control region.

3.1.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

Activities associated with the construction of the addition to Building V-003 would generate some temporary emissions, primarily from diesel-powered construction equipment as well as workers' vehicles and delivery trucks traveling to and from the project site. The quantities of these emissions would vary throughout the project's construction phase but would generally be similar to those typically associated with small- to mid-sized construction projects. No new permanent stationary sources would be created and any additional emissions from heating the slightly larger Building V-003 would be negligible and insignificant.

Quantitative estimates of the construction emissions were developed based on reasonable assumptions with regard to manpower and equipment derived from:

- *2003 RSMeans Facilities Construction Cost Data*, R.S. Means Co., Inc., 2002;
- *2011 RSMeans Facilities Construction Cost Data*, R.S. Means Co., Inc., 2010.

USEPA NONROAD and MOVES 2010B models, in association with default model inputs that are applicable to the county where Wallops Island is located, were used to predict emissions factors for construction equipment and on-road vehicles, respectively. It was assumed that the construction activities associated with the proposed action would occur within one calendar year (2016). The estimated emissions are presented in Table 3.1-2.

Wallops Island is located in an attainment area for all criteria pollutants and, therefore, there are no established thresholds to assess the potential significance of air quality impacts. However, a point of comparison is provided by the Prevention of Significant Deterioration threshold. USEPA uses this threshold to determine whether new major stationary sources or major modifications at existing stationary sources in attainment areas require permitting under the New Source Review Program. As such, this threshold does not apply to the Proposed Action considered in this EA since no new major stationary sources are involved. However, it can be used to provide a general indication of the intensity of the air quality impacts associated with the Proposed Action. The Prevention of Significant Deterioration threshold for regulated pollutants is 250 tons per year in most cases.

Table 3.1-2: Estimated Construction-Related Emissions under Alternative 1

	Total Emissions[1]						
	SO_2	CO	PM_{10}	$PM_{2.5}$	NOx	VOC	CO_2e
Construction Equipment Emissions	0.01	1.29	0.02	0.02	0.31	0.04	33.36
Construction Vehicle Emissions	0.00[2]	0.05	0.00[2]	0.00[2]	0.03	0.01	12.51
Totals	**0.01**	**1.34**	**0.02**	**0.02**	**0.34**	**0.05**	**45.87**
% of Assessment Threshold	0.004%	0.5%	0.008%	0.008%	0.14%	0.02%	0.18%

1. In tons per year except for CO_2e, which is given in metric tons per year.
2. Negligible quantity.

As can be seen in Table 3.1-2, the emissions of criteria pollutants associated with the Proposed Action are well below this threshold. Additionally, these emissions would cease entirely when construction is over. Similarly, project-related emission of CO_2e would represent a minute portion of such emissions at Wallops Mainland / Island and would also cease when construction is over. These emissions are well below the 25,000-metric-ton threshold and would not in themselves contribute to climate change to any discernible extent. Additionally, to the maximum extent practicable, the Navy would implement measures to minimize emissions of GHG and air pollutants during construction activities (e.g., prohibition of unnecessary equipment use or vehicle idling).

Sea-level rise is one anticipated effect of climate change that, in the long-term, has the potential to affect infrastructure and activities at Wallops Island. However, adverse effects from sea level rise are not likely to be felt during the planned lifetime of the Proposed Action evaluated in this EA (approximately 10 years). Thus, climate change would have no effect on the Proposed Action under Alternative 1.

Therefore, Alternative 1 would have negligible impacts on air quality, with no potential to significantly affect air quality at Wallops Island or in the Northeastern Virginia Intrastate air quality control region.

3.1.3.3 Alternative 2 – Build New Facility Potential Impacts

The impacts on air quality resulting from Alternative 2 would be generally similar to those of Alternative 1. The construction of an entirely new facility would require more work that the expansion of an existing one, resulting in greater emissions. However, based on the low level of emissions anticipated for Alternative 1, there is no potential for the emissions from Alternative 2 - which involves constructing a 2000-square-foot (185.8-square-meter) facility - to approach either the 250-ton Prevention of Significant Deterioration threshold for any of the criteria pollutants or the 25,000 metric-ton threshold for CO_2e used to assess significance. All construction-related emissions would stop when construction activities are complete.

In the longer term, stationary emissions would result from the heating of the new facility, but given the facility's small size, these emissions would be minor. Assuming the index of space heat input for the new building to be 30 British thermal units / square foot-hour, with a 20% safety factor, and that the proposed boiler would operate for a total of six months per year, annual estimated emissions would be as shown in Table 3.2-3. As can be seen, the anticipated emissions would be minimal and well below the aforementioned thresholds.

Table 3.1-3: Estimated Building Boiler Emissions - Alternative 2

	Total Emissions[1]						
	SO_2	CO	PM_{10}	$PM_{2.5}$	NOx	VOC	CO_2e
Emissions	0.00[2]	0.01	0.001	0.001	0.01	0.001	19
% of Assessment Threshold	0%[2]	0.004%	0%[2]	0%[2]	0.004%	0%[2]	0.08%

1. In tons per year except for CO_2e, which is given in metric tons per year.
2. Negligible quantity.

The new facility would likely be equipped with diesel-fueled emergency backup generators. At this stage, the number and power of the generators has not been determined. The Virginia Department of Environmental Quality does not require permits for diesel emergency generators that operate no more than 500 hours per year (including testing and maintenance) with an aggregate power of 611 kilowatts. If the Navy decided to proceed with Alternative 2, the number and power of emergency generators would be determined and any required permit would be obtained.

As under Alternative 1, to the maximum extent practicable, the Navy would implement measures to minimize emissions of GHG and air pollutants during construction activities and operation of the new facility. As much as possible, the facility would be designed to be energy-efficient and would make use of renewable or recycled materials. For the same reason as Alternative 1, the rise in sea level anticipated to be caused by climate change would not affect the Proposed Action during its planned lifetime.

Based on the minimal amount of construction-related and operational emissions that would result from Alternative 2, impacts on air quality would be negligible. Alternative 2 would have no significant impacts on air quality.

3.2 Water Resources

This discussion of water resources includes groundwater, surface water, wetlands, and floodplains.

Groundwater is water that flows or seeps downward and saturates soil or rock, supplying springs and wells.

Surface water resources generally consist 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 (TMDL) is an USEPA standard for 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 indicate exceedances of water quality standards.

Wetlands are jointly defined by USEPA and the U.S. Army Corps of Engineers (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” (USACE 1987).

Floodplains are areas of low-lying ground adjacent to rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also 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. Floodplain boundaries are most often defined in terms of frequency of inundation, that is, flood zones. Floodplain delineation maps are produced by the Federal Emergency Management Agency (FEMA) and provide a basis for comparing the locale of the Proposed Action to the floodplains.

3.2.1 Regulatory Setting

Groundwater quality and quantity are regulated under several statutes and regulations, including the Safe Drinking Water Act.

The CWA establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) program, on the amounts of specific pollutants that can be discharged into surface waters to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (i.e., end of pipe) and nonpoint sources (i.e., storm water) of water pollution.

Waters of the United States are defined as (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow perennially or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that abut such tributaries under Section 404 of the CWA, as amended, and are regulated by USEPA and USACE. The CWA requires that states establish a Section 303(d) list to identify impaired waters and establish TMDLs for the sources causing the impairment.

Section 438 of the Energy Independence and Security Act (EISA) establishes storm water design requirements for development and redevelopment projects. Under these requirements, federal facility projects with a development footprint of 5,000 square feet (465 square meters) or larger must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

VDEQ Stormwater Program requires construction site operators engaged in clearing, grading, and excavating activities that disturb one acre (0.4 hectares) or more to obtain coverage under a Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Discharges of Stormwater from Construction Activities (General Permit). Construction or demolition that necessitates an individual permit also requires preparation of a Notice of Intent to discharge storm water and a Stormwater Pollution Prevention Plan (SWPPP) that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Wetlands are regulated by the USACE under Section 404 of the CWA as a subset of all "Waters of the United States." The regulatory definition of Waters of the United States is provided above. Executive Order 11990, *Protection of Wetlands*, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

EO 11988, *Floodplain Management,* requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development, unless it is the only practicable alternative. EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, amends EO 11988 and establishes the Federal Flood Risk Management Standard, a flexible framework to increase resilience against flooding and help preserve the natural values of floodplains. Adherence to the standard is intended to ensure that federal agencies expand management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk (White House Office of the Press Secretary 2015).

Executive Order 13690 amends Executive Order 11988 by establishing a new standard to expand management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk. The EO provides federal agencies with flexibility to select one of the following three approaches for establishing the flood elevation and hazard area during the facility siting, design, and construction process (FEMA 2015a):

- *Climate-informed Science Approach*: An agency can utilize the best-available, actionable data and methods that integrate current and future flooding predictions based on science.

- *Freeboard Value Approach*: An agency can add two or three feet of elevation, depending on the criticality[4] of the action, to the 1-percent annual base (i.e., 100-year) flood elevation.
- *500-year Elevation Approach*: An agency can use the 0.2-percent chance annual (i.e., 500-year) flood elevation.

Under Executive Order 13690, an agency head may exempt the agency from the need to use these approaches if the action is in the interest of national security or is a mission-critical requirement related to a national security interest (FEMA 2015b).

3.2.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under water quality resources at Wallops Island.

3.2.2.1 Groundwater

Four major aquifers underlie the Eastern Shore of Virginia: the Columbia aquifer and the three aquifers comprising the Yorktown-Eastover aquifer system. The Columbia aquifer is the uppermost aquifer, comprising saturated, chiefly sandy, surficial sediments. The aquifer is unconfined throughout the Eastern Shore. The Yorktown-Eastover aquifer system is a multi-aquifer unit consisting of alternating sand and clay-silt units that form three distinct aquifers: the upper, middle, and lower Yorktown-Eastover aquifers. The three Yorktown-Eastover aquifers generally are present throughout the Eastern Shore.

The Columbia and Yorktown-Eastover multi-aquifer system is designated and protected by the USEPA as a sole-source aquifer (USEPA, 2016). A sole source aquifer is a drinking water supply located in an area with few or no alternative sources to the groundwater resource and where, if contamination occurred, the use of an alternative source would be extremely expensive. The designation protects an area's groundwater resource by requiring the USEPA to review any proposed projects within the designated area that are receiving federal financial assistance, to ensure they do not endanger the water source.

The groundwater withdrawal, treatment, and distribution system serving Wallops Island is owned and operated by NASA. Its source of water is two production wells located on the Wallops Mainland, both of which withdraw water from the middle Yorktown-Eastover aquifer. Between 2009 and 2013, combined groundwater withdrawals for Mainland and Wallops Island averaged 1,029,533 gallons per month.

As a Federal agency, NASA is not subject to the requirements of the Virginia Groundwater Management Act of 1992 (Code of Virginia, Title 62.1, Chapter 25). However, NASA voluntarily monitors its groundwater usage, provides monitoring data to VDEQ, and strives to remain within the limits specified in its historic groundwater withdrawal permit that contains both monthly and annual maxima. NASA also maintains a water conservation program consistent with the Accomack County Regional Water Supply Plan.

NASA's Environmental Compliance and Restoration Program (described in additional detail in Section 3.9 of this EA) has identified contamination of the shallow groundwater at two locations on Wallops Island. These are the Former Naval Air Ordnance Test Station (NAOTS) Cantonment Area and the Mid-Atlantic Regional Spaceport Pad 0-A. Groundwater contamination at the Cantonment Area is being addressed by

[4] As defined in Executive Order 11988, a critical action is any activity for which even a slight chance of flooding would be too great a risk. Examples of such facilities include hospitals and evacuation centers.

the U.S. Army Corps of Engineers under the Formerly Used Defense Site program. Groundwater contamination at the Mid-Atlantic Regional Spaceport has been addressed by the Virginia Commercial Space Flight Authority under VDEQ Voluntary Remediation Program. These sites have not impacted WFF's potable water supply (Bundick, pers. comm., October 16, 2015).

3.2.2.2 Surface Water

WFF is located in the Eastern Lower Delmarva and Chincoteague watersheds. The western portion of Wallops Island north of Route 803 is part of the Chincoteague watershed drainage. The portion of Wallops Island south of Route 803 island is part of the Eastern Lower Delmarva watershed drainage.

Surface water on Wallops Island flows through numerous tidal tributaries that subsequently flow to the Atlantic Ocean. The northern boundary of Wallops Island is formed by Chincoteague Inlet, and its western side is bounded by a series of water bodies which separate the island from the Mainland. No natural perennial streams or ponds exist on the island. However, intermittent water bodies may form after storms or in response to other physical forces such as tides. No wild or scenic rivers are located on or adjacent to WFF. Therefore, the Wild and Scenic Rivers Act of 1968 (16 U.S.C. section 1271-1287) does not apply and is not discussed further.

Surface water features in the vicinity of the alternative sites include tidal creeks and their associated tributaries, ponds, and the Atlantic Ocean. In addition, a human-made stormwater management pond and adjacent drainage ditch are located just southwest of Building V-003. The Atlantic Ocean lies to the east. Surface waters in the vicinity are saline to brackish and are influenced by the tides.

The VDEQ has designated the surface waters in the vicinity of WFF as Class I (Open Ocean) and Class II (Estuarine Waters). Surface waters in Virginia must meet the water quality criteria specified in 9 Virginia Administration Code (VAC) 25-260-50. This set of criteria establishes limits for minimum dissolved oxygen concentrations, pH, and maximum temperature for the different surface water classifications in Virginia. In addition, Virginia surface waters must meet the surface water criteria specified in 9 VAC 26-260-140. This set of criteria provides numerical limits for various potentially toxic parameters. For the Class I and II waters in the vicinity of WFF, the saltwater numerical criterion is applied. Both sets of standards are used by the Commonwealth of Virginia to protect and maintain surface water quality.

3.2.2.3 Wetlands

Wetlands at WFF are part of an extensive network of wetlands within Accomack County. Tidal and non-tidal wetlands at WFF have been identified by the USFWS's National Wetlands Inventory (NWI). Non-tidal wetlands occur inland on Wallops Island in lower areas, and tidal marsh wetlands occur on the western edge and northern end of the island. Three major systems make up 3,940 acres (9,736 hectares) of wetlands at WFF. These systems include marine, estuarine, and palustrine wetlands. These wetlands are further categorized by types of vegetation dominant within them. Common types at WFF include emergent wetlands, scrub-shrub wetlands, and forested wetlands.

Common vegetation found in wetlands at WFF include smooth cordgrass (*Spartina alterniflora*), salt meadow hay (*Spartina patens*), salt grass (*Distichlis spicata*), common reed (*Phragmites australis*), and greenbrier (*Smilax rotundifolia*).

Wetlands at WFF provide vital ecosystem services. Tidal and non-tidal wetland functions include water quality control, stream flow maintenance, shoreline stabilization, nutrient recycling, fish and wildlife habitat, sediment and particulate retention, and conservation of biodiversity. These wetlands and marshes also function as both breeding grounds and nurseries for wildlife.

NWI wetlands located near the alternative sites are shown on Figures 3.2-1a and 3.2-1b. The locations of NWI wetlands are based on remote sensing (i.e., imagery from satellites or aircraft) performed in the 1980s and are thus approximate. This explains the presence of NWI wetland polygons underlying areas covered by buildings and pavement on the figures. No wetlands are known or suspected to occur at either of the alternative sites. However, wetlands may be present in areas adjacent to the sites.

3.2.2.4 Floodplains

Flood Insurance Rate Maps produced by the Federal Emergency Management Agency indicate that Wallops Island is located entirely within the 100-year floodplain.

3.2.3 Environmental Consequences

3.2.3.1 No Action Alternative

Under the No Action Alternative, existing conditions at Wallops Island would continue. This would have no impact on water resources on and in the vicinity of the installation.

3.2.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

Groundwater

Construction activities associated with Alternative 1 would not require new or additional groundwater withdrawals, nor would they involve discharges to aquifers underlying Wallops Island. The construction of the addition to Building V-003 would not create new areas of impervious surface. Therefore, the expanded facility would have no impact on groundwater recharge. A slight increase in demand for drinking water would occur when outside personnel are temporarily present (see Section 3.7.3.2), but this would not be enough to have a measurable effect on the groundwater supply. For these reasons, there would be no impacts on groundwater.

Water Resources Potential Impacts:
- **No Action:** No impacts.
- **Alternative 1:** No impacts.
- **Alternative 2:** No impacts on groundwater**.** No significant construction-related impacts; construction impacts would be negligible. No impacts from operation on surface water and wetlands. No significant impacts on floodplains; impacts on floodplains would be minor.

Surface Water

Alternative 1 does not involve in-water construction, nor does it involve the channelization of a body of surface water. Thus, it would have no direct impacts on surface water. All construction activities for the expansion of Building V-003 would be contained within the existing structure and they would not be subject to the erosive effects of wind and water. No excavated soils would be left stockpiled and unprotected outside; any removed soils would either be reused or hauled off for disposal if determined to be unsuitable for reuse. Thus, there would be no indirect impacts from increased runoff of sediments and pollutants from exposed soils into surface waters.

The footprint of Building V-003 and its associated paved areas would remain the same as at present and there would be no change in the volume or quality of the stormwater generated at the facility. Stormwater generated on Wallops Island would continue to be managed and monitored as it currently is. Thus, Alternative 1 would have no indirect impacts on surface water.

Wetlands

The expansion of Building V-003 and the ongoing operation of the SPY-6 system would not involve filling, altering, or otherwise disturbing wetlands. Thus, Alternative 1 would have no direct impacts on

wetlands. Soil disturbance during construction activities associated with Alternative 1 would be confined to the interior of the existing building, and no soils would be stockpiled in an unprotected manner outside. As noted above, the footprint of Building V-003 and its associated paved areas would remain the same as at present and there would be no change in the volume or quality of the stormwater generated at the facility. Thus, there is no potential for indirect effect on wetlands at WFF from the construction or operation of the proposed radar facility under Alternative 1.

Floodplains

Wallops Island and Building V-003 are located entirely within the 100-year floodplain. Therefore, construction and operational activities associated with Alternative 1 would occur within the 100-year floodplain. EO 11988 requires agencies to establish that there is no practicable alternative to a proposed development in the floodplain. As explained in Chapter 2 of this EA, Alternatives 1 and 2 have been determined to be the only two reasonable alternatives meeting the Navy's purpose and need for the Proposed Action. Alternatives not meeting the purpose and need would not be practicable. Both alternatives involve development in the floodplain. Therefore, there is no practicable alternative to development in the floodplain.

The Navy and NASA would ensure that Alternative 1 complies with the relevant requirements of EO 11988, EO 13690, and NASA Interim Directive (NID): *Floodplain and Wetlands Management* (approved March 25, 2015) to the maximum extent possible. Because the Proposed Action would involve federally funded and authorized construction in the 100-year floodplain, this EA also serves as the Navy's and NASA's means for facilitating public review, as required by EO 11988 and EO 13690. Access to Wallops Island is controlled and only authorized personnel are allowed on the facility. Thus, public education regarding flood hazards (e.g., marking flood heights on buildings) is not applicable. Standard flood control measures that would be implemented include locating water-sensitive equipment and associated supplies above the flood level (approximately 13 feet [4 meters][5] above mean sea level), and moving hazardous materials and waste outside of the floodplain when substantial storms are imminent.

[5] Freeboard value, that is, 11-foot (3.4-meter) elevation plus 2 feet (0.6 meters), in accordance with EO 13690 for non-critical facilities.


Alternative 1 Site Wetlands
Bypass Road
Building V-003
Area of Addition
(approximate)
Island Road
NWI Wetlands
Source: USFWS
0
150
300
Feet
0
45
90
Meters
N
Path: L:_Common\GIS_Data\60342567_SPY6EA\MXDs\Ch_3\Figure_3.2-1a_Alt_1_Site_Wetlands.mxd

Figure 3.2-1a

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Alternative 2 Site Wetlands
N Seawall Road
Proposed AN/SPY-6 Facility
NWI Wetlands
Source: USFWS
0
200
400
Feet
0
60
120
Meters
N
Path: L:_Common\GIS_Data\60342567_SPY6EA\MXDs\Ch_3\Figure_3.2-2b_Alt_2_Site_Wetlands.mxd

Figure 3.2-1b

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There would be no reduction in the functionality of the floodplain on Wallops Island because the addition to Building V-003 would be constructed above the 13-foot (4-meter) flood level and would not expand the footprint of the facility. For this reason, the implementation of Alternative 1 would have no significant impacts on floodplains at WFF.

3.2.3.3 Alternative 2 – Build New Facility Potential Impacts

Groundwater

The construction of the AN / SPY-6 facility at the Alternative 2 site would not require new or additional withdrawals of groundwater, nor would it involve discharges to aquifers underlying Wallops Island. The installation of a buried communications / data line to the site from Building V-010 by directional boring would occur at a relatively shallow depth and would not disrupt groundwater flow. The new facility would replace several existing structures and it can be anticipated that, overall, the amount of impervious surface on the site would remain substantially the same. Any difference in either direction would be too small to have a noticeable impact on groundwater recharge. Alternative 2 would not require an increase in permanent personnel and, therefore, would not generate demand for new or additional withdrawals of groundwater for drinking supply at WFF. For these reasons, Alternative 2 would have no impacts on groundwater at WFF.

Surface Water

Alternative 2 does not involve in-water construction, nor does it involve the channelization of a body of surface water. Thus, it would have no direct impacts on surface water. It is likely that the demolition of the V-095 facility, site grading and preparation, and construction of the proposed AN / SPY-6 facility would disturb more than 10,000 square feet (929 square meters) of land. Therefore, the construction contractor would prepare an erosion and sediment control plan and adhere to best management practices (BMPs) specified therein to minimize the runoff of sediments and pollutants in stormwater generated on the site (see also Section 3.3.3). If it is determined that the project would disturb one acre (0.4 hectares) or more, the contractor would also obtain coverage under the VPDES General Permit, which would require the preparation of a Notice of Intent and SWPPP. Compliance with these requirements would minimize the risk of indirect impacts from increased erosion and sedimentation on area surface waters. Any construction-related indirect impacts would be negligible and would not be significant.

As noted above, it is likely that no substantial amount of new impervious surface would be created by Alternative 2. In addition, because the project's footprint exceeds 5,000 square feet (465 square meters), the Navy would incorporate low impact development techniques in the facility design to the maximum extent technically feasible in accordance with Section 438 of the EISA to maintain the pre-development hydrology of the site. For these reasons, there would be no increase in runoff from the site and, therefore, no potential for indirect effects on area surface waters under Alternative 2.

Wetlands

Based on NWI data and initial site visits, the site of the proposed radar facility under Alternative 2 does not contain wetlands and, therefore, the alternative would not require filling, altering, or otherwise disturbing wetlands. Thus, Alternative 2 would have no direct impacts on wetlands. However, if the Navy opted to implement this alternative, it would confirm through a field survey that no wetlands are present within the area of disturbance (including staging areas) prior to initiation of construction.

NWI data suggest that wetlands may be present in the vicinity of the project site. For the reasons explained above with respect to indirect impacts on surface waters, any indirect impacts on nearby wetlands from increased erosion and sedimentation would be negligible and would not be significant. Similarly, for the reasons stated above with respect to surface waters, there would be no indirect impacts on wetlands from increased runoff.

Floodplains

Under Alternative 2, a new radar facility would be constructed within the floodplain. The facility would be designed in a manner that minimizes potential damage from flood events. Because of its relatively small size and because it would replace existing structures, the proposed new facility would not significantly affect flood levels and floodways. EO 11988 requires agencies to establish that there is no practicable alternative to a proposed development in the floodplain. As explained in Chapter 2 of this EA, Alternatives 1 and 2 have been determined to be the only two reasonable alternatives meeting the Navy's purpose and need for the Proposed Action. Alternatives not meeting the purpose and need would not be practicable. Both alternatives involve development in the floodplain. Unlike Alternative 1, Alternative 2 would have some minor impacts on the floodplain, but, the reasons stated above, these impacts would be minor. Impacts would not be significant.

3.3 Geological Resources

This discussion of geological resources includes geology, topography, and soils. The geology of an area may include bedrock materials, mineral deposits, and fossil remains. The principal geological factors influencing the stability of structures are soil stability and seismic properties. Topography is typically described with respect to the elevation, slope, and surface features found within a given area. 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 compatibility or limitations with regard to particular construction activities and types of land use.

3.3.1 Regulatory Setting

Consideration of geologic resources extends to prime or unique farmlands. The Farmland Protection and Policy Act (FPPA) was enacted in 1981 in order to minimize the loss of prime farmland and unique farmlands as a result of federal actions. The implementing procedures of the FPPA require federal agencies to evaluate the adverse effects of their activities on farmland, which includes prime and unique farmland and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects.

3.3.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under geological resources at Wallops Island.

3.3.2.1 Geology

WFF is located within the Atlantic Coastal Plain Physiographic Province. This area is underlain by approximately 7,000 feet (2,134 meters) of sediment, lying above crystalline basement rock. The sedimentary section ranges in age from Cretaceous to Quaternary periods and consists of a thick sequence of terrestrial, continental deposits overlain by a much thinner sequence of marine sediments.

These sediments are generally unconsolidated and consist of clay, silt, sand, and gravel. The uppermost stratigraphic deposit at WFF is the Yorktown Formation which was deposited during the Pliocene epoch of the Tertiary Period. The Yorktown Formation generally consists of fine to coarse, glauconite quartz sand, which is greenish gray, clayey, silty, and in part, shelly. The Yorktown Formation occurs at depths of 60 to 140 feet (18 to 43 meters) in Accomack County.

3.3.2.2 Topography

The topography at WFF is typical of the Mid-Atlantic coastal region, generally low-lying with elevations ranging from sea level to 50 feet (15.2 meters) above mean sea level. The three major landforms found at WFF are mainland, tidal marsh, and barrier island.

Wallops Island is a barrier island approximately 7 miles (11 kilometers) long and 0.5 mile (0.8 kilometer) wide. It is separated from the Main Base and Mainland by numerous inlets, marshes, bays, creeks, and tidal estuaries. Wallops Island is bordered by Chincoteague Inlet to the north, Assawoman Island to the south, the Atlantic Ocean to the east, and marshland to the west. The sandy portion of Wallops Island has an elevation of about 7 feet (2.1 meters) above mean sea level, although most of the island is less than 10 feet (3 meters) above mean sea level.

Inland areas of Wallops Island are separated from the beach along the Atlantic shoreline by a seawall / primary dune that consists of large mounded rocks, sand, and planted beach grass. Following storm damage, the seawall / dune was restored and the beach extended as part of a beach nourishment effort at Wallops Island that was implemented beginning in spring and summer 2012 and again in summer 2014. In total, the nourishment project added approximately 4 million cubic yards (3,058,220 cubic meters) of sand to 3.6 miles (5.8 kilometers) of beaches along the Atlantic shoreline of Wallops Island.

Topographic conditions at both alternative sites are similar: they are located approximately 700 feet (210 meters) inland from the beach, and are relatively flat and developed with facilities and paved surfaces. Elevations on the sites range from four to eight feet (1.2 to 2.4 meters) at the Alternative 1 site and six to nine feet (1.8 to 2.7 meters) at the Alternative 2 site.

3.3.2.3 Soils

Soil types underlying the Alternative 1 and Alternative 2 sites are shown on Figure 3.3-1a and Figure 3.3-1b, respectively and described in Table 3.3-1. Generally, soils underlying Wallops Island are high in sand content, resulting in a highly leached condition, an acidic pH, and low natural fertility. The Alternative 1 site is underlain by Comacca fine sand (CaA), while the Alternative 2 site is underlain by Fisherman Comacca complex (FrB) (Natural Resource Conservation Service [NRCS] 2015a, NRCS 2015b).

Table 3.3-1: Project Site Soils

Soil Type	Symbol	Typical Slopes	Location	Description
Comacca fine sand	CaA	0-2%	Wallops Island – central and western portions in depressions and on flats associated with dunes and marshes	Nearly level, very deep, very poorly drained
Fisherman Comacca complex	FrB	0-6%	Wallops Island – depressions and areas associated with dunes and salt marshes	Very poorly to moderately well-drained
Source: NRCS 2015a, NRCS 2015b				

Select properties of soils underlying the proposed sites are shown in Table 3.3-2.

Table 3.3-2: Select Properties of Project Site Soils

Soil Type	Soil Characteristics				
	Hydric	Prime Farmland	Shallow excavations of five to six feet	Erosion (water)	Erosion (wind)
Comacca fine sand (CaA)	Yes	No	Very limited	Moderately low	Low susceptibility
Fisherman Comacca complex (FrB)	Yes	No	Very limited	Moderately low	Highly susceptible

Both alternative sites include large areas of paved or otherwise developed surfaces, as shown in Figures 3.1.a and 3.1.b. Because of previous development, it is likely that the soils underlying the alternative sites have been supplemented with fill and have characteristics that vary from those presented in Table 3.3-1 and Table 3.3-2.

Geological Resources Potential Impacts:
- **No Action:** No impacts.
- **Alternative 1:** No impacts.
- **Alternative 2:** No impacts on geology and topography; no significant impacts on soils.

3.3.3 Environmental Consequences

3.3.3.1 No Action Alternative

The No Action Alternative would have no impact on geological resources at Wallops Island. Existing conditions would remain.

3.3.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

The construction of the addition to Building V-003 would require the installation of 40 support piles, each approximately 120 feet (36 meters) in length. In geological terms, this is a relatively shallow depth and would have no potential to penetrate geologic strata underlying Wallops Island. The operation of the expanded facility would have no potential to affect geologic strata either. Thus, the implementation of Alternative 1 would have no impacts on the geology of Wallops Island. Alternative 1 would have no impacts on topographic features on Wallops Island either, as the expansion of Building V-003 would not require any site grading and leveling.

Soil disturbance associated with the implementation of Alternative 1 would be limited to small areas underlying the sections of the existing concrete slab that would be demolished to facilitate the installation of the new support piles. Such soil disturbance would occur entirely within Building V-003 and exposed soils would not be subject to the erosive effects of wind and rain. No soils would remain exposed following the implementation of Alternative 1. Soils underlying Building V-003 are not considered prime farmland and have already been disturbed by the construction of the building. The operation of the expanded facility has no potential to disturb soils. Thus, Alternative 1 would have no impacts on soils at Wallops Island.

3.3.3.3 Alternative 2 – Build New Facility Potential Impacts

It is likely that the proposed AN / SPY-6 facility would require the installation of piles to provide foundational support. Although the number of piles that would be required is unknown at this point in the planning process, it is anticipated that the use of piles for the proposed facility would be similar in scale to other comparatively-sized facilities on Wallops Island. It is also likely that piles would be drilled and poured to a depth similar to that described for Alternative 1, which would be relatively shallow from a geological perspective and would have no potential to penetrate geological strata underlying Wallops Island.


Alternative 1 Site Soils
Bypass Road
UpD
CaA
Building V-003
Area of Addition
(approximate)
Island Road
UpD – Udorthents and Udipsamments
CaA – Comacca fine sand
0
100
200
Feet
0
30
60
Meters
N
Source: Natural Resources Conservation Service (NRCS)

Figure 3.3-1a

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Alternative 2 Site Soils
CaA
FrB
AtD
N Seawall Road
Proposed AN/SPY-6 Facility (approximate)
CaA – Comacca fine sand
FrB – Fisherman Comacca fine sands complex
AtD – Assateague fine sand
Source: Natural Resources Conservation Service (NRCS)
0 100 200
Feet
0 30 60
Meters
N

Figure 3.3-1b

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The operation of the proposed facility would have no potential to affect geologic strata either. Therefore, Alternative 2 would have no impacts on the geology of Wallops Island.

Although the implementation of Alternative 2 may require some minor site leveling and grading following the demolition of the V-095 facility, the site is already level and no unique or noteworthy topographical features would be altered or removed. Thus, Alternative 2 would have no impacts on topographic features on Wallops Island.

Soil disturbance associated with the demolition of the existing V-095 facility and construction of the proposed AN / SPY-6 facility would likely disturb in excess of 10,000 square feet (929 square meters). As such, the construction contractor will prepare an erosion and sediment control plan. If, as the design of the project is finalized, it is determined that one acre (0.4 hectare) or more of land would be disturbed during the construction of the proposed facility, the construction contractor would also obtain a VPDES General Permit and prepare a SWPPP. Acquisition of the permit would require the preparation of a SWPPP. Compliance with the requirements set forth in the erosion and sediment control plan, the General Permit, and the SWPPP would minimize impacts on soils resulting from construction-related soil erosion and stormwater runoff. As noted previously, there may be a small change in the amount of pavement on the project site, but the soils that may be affected have already been developed and are not considered prime farmland. Thus, impacts on soils would be negligible.

3.4 Biological Resources

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are referred to generally as vegetation, and animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that support a plant or animal.

In this EA, biological resources are divided into two major categories: terrestrial vegetation and terrestrial wildlife. Aquatic biological resources, including sea turtles occurring in the waters adjacent to Wallops Island, are not addressed in the EA because the Proposed Action has no potential to significantly affect them. However, nesting sea turtles are included as part of the discussion of terrestrial wildlife, as specimens of the loggerhead sea turtle (*Caretta caretta*) have been known to nest on beaches at Wallops Island. Species listed as threatened or endangered under the ESA are discussed in their respective categories.

3.4.1 Regulatory Setting

This section describes laws protecting biological resources that are relevant to the Proposed Action.

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires federal action proponents to consult with the USFWS or National Oceanic and Atmospheric Administration (NOAA) to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of designated critical habitat. Table 3.4-1 lists all federally listed species that are potentially present near the project sites based on information obtained from USFWS (see Appendix B). Figure 3.4-1 shows known occurrences of protected species on Wallops Island.

Table 3.4-1: ESA-Listed Species Potentially Present Near Project Sites

Common Name	Scientific Name	Federal Status	Critical habitat Present?
Plants			
Seabeach amaranth	*Amaranthus pumilus*	Threatened	No
Sea Turtles[1]			
Loggerhead sea turtle (Northwest Atlantic Ocean Distinct Population Segment [DPS])	*Caretta caretta*	Threatened	No
Green sea turtle (North Atlantic DPS)	*Chelonia mydas*	Proposed Threatened[2]	No
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	No
Kemp's Ridley sea turtle	*Lepidochelys kempii*	Endangered	No
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	No
Birds			
Red knot	*Calidris canutus rufa*	Threatened	No
Piping plover	*Charadrius melodus*	Threatened	No
Roseate tern[3]	*Sterna d. dougallii*	Endangered	No
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	Threatened	No

Note:
1. Nesting sea turtles only. The Proposed Action has no potential to affect sea turtles at sea.
2. The green sea turtle is currently listed as threatened throughout its range with exception of Florida and Mexican coast breeding populations, which are listed as endangered. The National Marine Fisheries Service (NMFS) has proposed listing eight DPS (including the North Atlantic DPS) as threatened and three DPS as endangered.
3. Northeast U.S. nesting population.

Source: USFWS 2015

Birds, both migratory and most native-resident bird species are protected under the Migratory Bird Treaty Act (MBTA), and their conservation by federal agencies is mandated by EO 13186 (Migratory Bird Conservation). Under the MBTA it is unlawful by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, or possess migratory birds or their nests or eggs at any time, unless permitted by regulation.

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act. This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald or golden eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

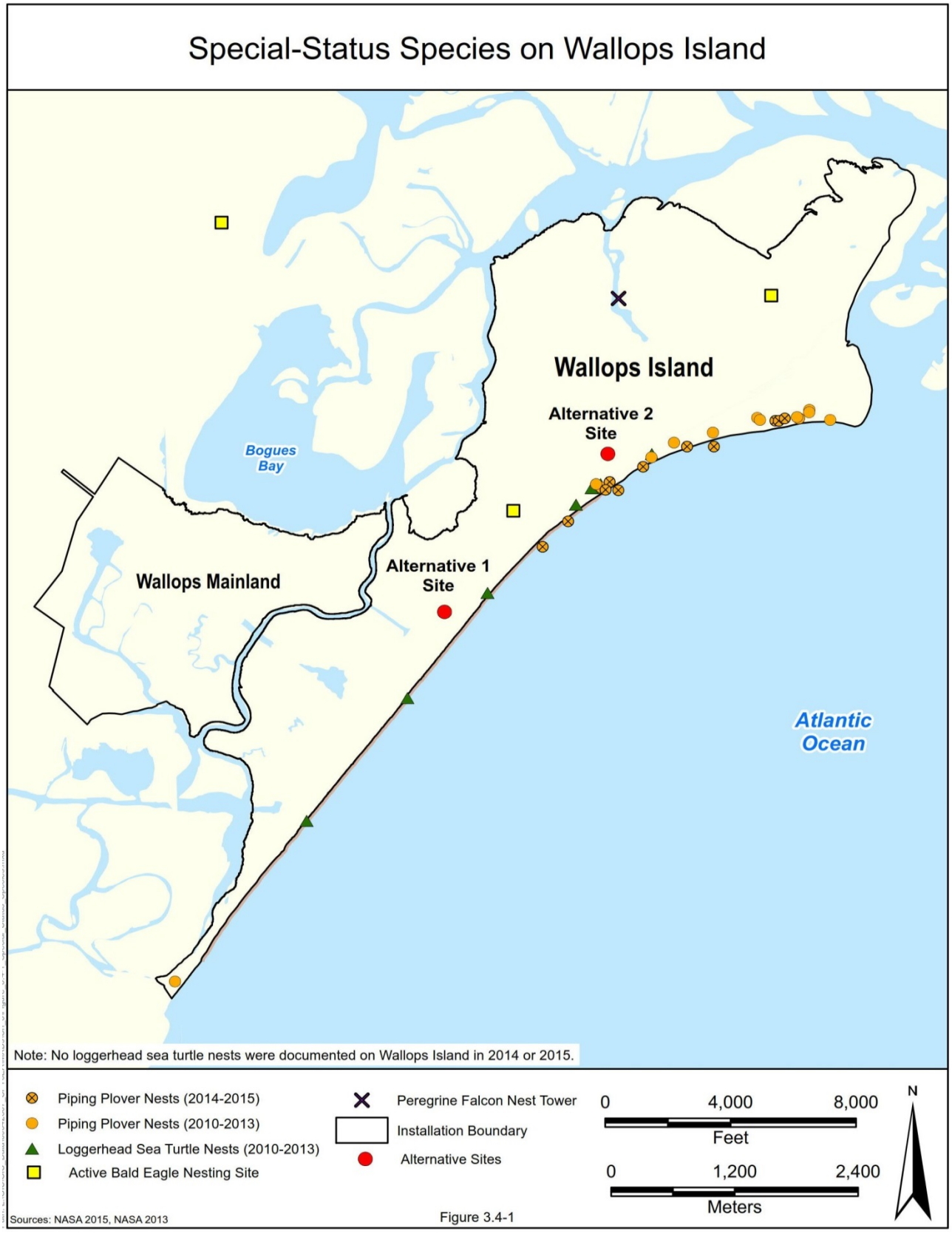
Special-Status Species on Wallops Island
Wallops Island
Alternative 2 Site
Bogues Bay
Wallops Mainland
Alternative 1 Site
Atlantic Ocean
Note: No loggerhead sea turtle nests were documented on Wallops Island in 2014 or 2015.
Piping Plover Nests (2014-2015)
Piping Plover Nests (2010-2013)
Loggerhead Sea Turtle Nests (2010-2013)
Active Bald Eagle Nesting Site
Peregrine Falcon Nest Tower
Installation Boundary
Alternative Sites
0 4,000 8,000
Feet
0 1,200 2,400
Meters
N
Sources: NASA 2015, NASA 2013

Figure 3.4-1

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3.4.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under biological resources at Wallops Island.

3.4.2.1 Terrestrial Vegetation

Vegetative communities found on Wallops Island include beaches, maritime grassland, maritime scrub, maritime woodland, maritime forest, wetlands, interdune ponds, and managed / maintained areas. Managed / maintained vegetation on Wallops Island consists mainly of meadows, lawn, and open roadside. Species found in the meadows include bushy bluestem (*Andropogon glomeratus*), little bluestem (*Schizachyrium scoparium*), boneset (*Eupatorium spp*.), and goldenrods (*Solidago spp*.). Man-made ponds on Wallops Island are dominated by widgeon grass (*Ruppia maritima*) and duck weed (*Lemna minor*). The northern half of the island includes areas of maritime forest dominated by loblolly pine (*Pinus taeda*) along with red maple (*Acer rubrum*), wild cherry (*Prunus serotina*), and black willow (*Salix nigra*).

Vegetation adjacent to Building V-003 is limited to areas of maintained lawn and low-growing landscape shrubs. The portion of Building V-003 where the proposed expansion would occur consists entirely of paved surfaces.

Maintained vegetation is the predominant vegetation on the Alternative 2 site. A narrow row of trees borders the site to the north, while scrub-shrub vegetation with scattered trees is predominant to the south. Generally, trees growing to the south / southeast (i.e., the direction in which the proposed AN / SPY-6 radar would scan) of either site do not exceed 60 feet (18 meters), the height above which the proposed AN / SPY-6 radar would scan.

According to USFWS, one listed plant might occur in the vicinity of the project sites: the seabeach amaranth (*Amaranthus pumilus*). Seabeach amaranth is an annual plant that is listed as threatened under the ESA. It occupies a narrow beach zone that lies at elevations from 0.7 to 5 feet (0.2 to 1.5 meters) above mean high tide. Seaward, the plant grows only above the high tide line, as it is intolerant of even occasional flooding during the growing season. Landward, seabeach amaranth does not occur more than approximately 3 feet (1 meter) above the beach elevation on the foredune, or anywhere behind it, except in overwash areas.

Seabeach amaranth has never been documented on Wallops Island, but has been found on nearby Assateague Island. Although this species is not found on Wallops Island, the necessary habitat is present. WFF currently performs annual surveys for this plant species to ensure no unintended impacts occur. There were no documented occurrences of seabeach amaranth at WFF as of 2015. Beach re-nourishment activities have restored the primary dune over what was once a seawall along Wallops Island. As this habitat stabilizes and becomes more established, natural recruitment of seabeach amaranth is possible.

3.4.2.2 Terrestrial Wildlife

Invertebrates

Common invertebrates found at WFF include the salt marsh grasshopper (*Orchelium fidicinium*), plant hoppers (*Prokelisia spp*.), salt marsh mosquitoes (*Ochlerotatus spp*.), greenhead flies (*Tabanus nigrovittatus*), and various wasps, parasitic flies, spiders, mites, and fiddler crabs (*Uca spp*.).

Reptiles and Amphibians

Reptiles and amphibians found at WFF include Fowler's toad (*Anaxyrus fowleri*), green treefrog (*Hyla cinerea*), eastern ratsnake (*Pantherophis alleghaniensis*), eastern hognose snake (*Heterodon platirhinos*), fence lizard (*Sceloporus undulates*), eastern box turtle (*Terrapene carolina*), and northern diamond-backed terrapin (*Malaclemys terrapin*).

According to USFWS, five species of sea turtles might be present in the vicinity of the project sites (see Table 3.4-1). However, only one of those is known to nest at Wallops Island: the loggerhead sea turtle, listed as threatened under the ESA. Loggerheads successfully nest from Texas to Virginia with major nesting concentrations from North Carolina to southwest Florida and the majority of nests – about 80 percent – occurring in six Florida counties. Generally, loggerhead nesting occurs on open, sandy, high-energy beaches above the high-tide mark and seaward of well-developed dunes; steeply sloped beaches with gradually sloped offshore approaches are favored (NatureServe Explorer 2015). In the southeastern United States, loggerheads mate from March to early June, and females lay eggs between late April and early September. Loggerheads nest only at night, with the females coming ashore individually and depositing 50 to 200 eggs in a pit they dig with their back flippers. Surveys conducted in 2014 and 2015 have observed no loggerhead sea turtle nesting activity on Wallops Island (NASA 2015a; NASA 2014).

Birds

WFF is home to a wide variety of bird species. A large number of migratory birds have been documented at WFF due to its location within the Atlantic Flyway, which is a major route for migratory birds along the Atlantic coast. Millions of migratory birds, including waterfowl, shorebirds, and songbirds, use the Atlantic flyway to travel between their summer breeding grounds and winter feeding grounds.

Many waterfowl species are found at WFF because of the abundance of wetlands and surface water. Waterfowl that occur at WFF include loons (*Gavia spp*.), Canada goose (*Branta canadensis*), snow goose (*Chen caerulescens*), gadwall (*Anas strepera*), American black duck (*Anas rubripes*), blue-winged teal (*Anas discors*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucep angula*), canvasback (*Aythya valisineria*), scaup (*Aythya spp*.), and mergansers (*Mergus spp*.). These waterfowl commonly overwinter in areas around WFF.

The marshes and shorelines at WFF also provide habitat for a variety of shorebirds and wading birds including least sandpiper (*Calidris minutilla*), short-billed dowitcher (*Limnodromus griseus*), least tern (*Sterna antillarum*), great-black-backed gull (*Larus marinus*), American oystercatcher (*Haematopus palliatus*), willet (*Catoptrophorus semipalmatus*), glossy ibis (*Plegadis falcinellus*), ring-billed gull (*Larus delawarensis*), double-crested cormorant (*Phalacrocorax auritus*), horned grebe (*Podiceps auritus*), great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and green heron (*Butorides striatus*).

Songbirds found at WFF include saltmarsh sharp-tailed sparrow (*Ammodramus caudacutus*), swamp sparrow (*Melospiza Georgiana*), common yellowthroat (*Geothlypis trichas*), white-eyed vireo (*Vireo griseus*), ruby-crowned kinglet (*Regulus calendula*), and white-breasted nuthatch (*Sitta canadensis*).

Raptor species found at WFF include turkey vulture (*Cathartes aura*), black vulture (*Coragyps atratus*), sharp-shinned hawk (*Accipiter striatus*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), and peregrine falcon (*Falco peregrinus*). These species are found mainly in the marsh areas to the west of Wallops Island.

According to USFWS, ESA-listed birds that may be present on or near Wallops Island include the piping plover, the red knot, and the roseate tern. However, roseate terns are rarely observed along the U.S. east coast south of New Jersey. While they may transit through oceanic areas during seasonal migration, they are not likely to be present on Wallops Island.

Piping plovers are listed as threatened. These small, beige and white shorebirds with a black band across their breast and forehead typically feed on invertebrates such as marine worms, beetles, fly larvae, crustaceans, and mollusks. Habitat generally consists of ocean beaches, and sand or algal flats in protected bays. Breeding occurs mainly on gently sloping foredunes or blow-out areas behind dunes.

The piping plover is a common transient and summer resident of the upper Virginia barrier islands and is known to inhabit the coastal habitats of the nearby Chincoteague National Wildlife Refuge. Piping plovers are also known to use the sandy beaches and tidal flats along the shore of Wallops Island. In 2015, six piping plover nests were documented on Wallops Island; five were documented in 2014 (NASA 2015; NASA 2014).

The red knot, listed as threatened, is a medium-sized sandpiper and one of the longest-distance migrants known in the world. Red knots have a rusty red head and breast during the breeding season, but are grey during the rest of the year. Red knots migrate more than 9,300 miles (15,000 kilometers) each spring and autumn. The red knot feeds on small mussels and other mollusks for much of the year and horseshoe crab eggs during migration. Red knots do not breed in the vicinity of Accomack County, although they appear regularly during spring migration on Wallops Island beaches, mostly during the second half of May. In 2015, 1,091 red knots were observed on the north end of Wallops Island. In 2014, only 87 were seen, the lowest number since monitoring began in 2010 (NASA 2015a; NASA 2014).

There is an active bald eagle nest on the northern end of Wallops Island, well away from the alternative sites. Another nest has been documented approximately 3,970 feet (1,200 meters) from the Alternative 1 Site and 3,550 feet (1,100 meters) from the Alternative 2 site (see Figure 3.4-1). Nesting activities typically begin in November and conclude in the summer when young eagles fledge. There are no golden eagle nests near the alternative sites.

Mammals

The only large mammal that occurs at WFF is the white-tailed deer (*Odocoileus virginianus*). Other mammals occurring on WFF include the red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), eastern grey squirrel (*Sciurus carolinesis*), white-footed mouse (*Peromyscus leucopus*), meadow vole (*Microtus pennsylvanicus*), river otter (*Lontra canadensis*), and eastern cottontail (*Sylvilagus floridanus*).

One threatened species of mammals was identified by USFWS as potentially present in the vicinity of the project sites: the northern long-eared bat (*Myotis septentrionalis*). The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches (7.6 to 9.4 centimeters) and a wingspan of 9 to 10 inches (22.9 to 25.4 centimeters). Fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. The northern long-eared bat is one of the species of bats most impacted by white-nose syndrome. During the winter, northern long-eared bats hibernate in caves and mines with constant temperatures, high humidity and no air currents. The bats roost singly or in colonies under bark or in the cavities and crevices of live or dead trees (i.e., snags) in summer months.

The northern long-eared bat's range includes Accomack County. However, little information exists regarding the types of habitat utilized, or the extent (both spatially and temporally) of its distribution within the action area. During 2008 acoustic bat surveys conducted in the marshes on Wallops Island, 0.3 percent of the calls identified were attributed to *Myotis* spp. While northern long-eared bats were

not separated from the rest of the Myotis guild, based on this information it is reasonable to assume that this species could occur in the vicinity of the action area, even if irregularly and / or in low numbers.

To avoid and / or reduce the potential effects on the northern long-eared bat, NASA has incorporated the following conservation measures as integral parts of tree clearing activities occurring at WFF:

- To the extent practicable, NASA conducts tree removal activities outside of the June 1 through July 31 timeframe.
- Should NASA deem it necessary to remove trees of 3 inches (7.6 centimeters) diameter at breast height or greater between June 1 through July 31, it conducts a presence / absence survey of the affected area, employing a qualified bat surveyor.

Should a bat emergence survey be undertaken and NASA observes no emergence, NASA would provide the results of the negative determination to the USFWS's Virginia Ecological Services Field Office and there would be no requirement for USFWS approval prior to removing the subject trees. Should a presence / absence survey be conducted, NASA would provide the results to the Virginia Ecological Services Field Office for concurrence prior to removing the trees.

If, while conducting either survey approach, NASA were to identify a tree as a potential maternal roost site, personnel would conspicuously mark the tree (e.g., by using alternate colored flagging) and either 1) avoid removing the tree altogether (e.g., by re-routing the action to a site without observed roosting behavior) or 2) remove the tree outside of the June 1 through July 31 timeframe. Should neither of these options be possible, additional consultation with the Virginia Ecological Services Field Office would be initiated prior to tree removal.

3.4.3 Environmental Consequences

Biological Resources Potential Impacts:

- **No Action:** No impacts.
- **Alternative 1:** No significant impacts. Impacts would be negligible. May affect, but is not likely to adversely affect the red knot, piping plover, and northern long-eared bat. No effect on other ESA-listed species.
- **Alternative 2:** No significant impacts. Impacts would be negligible. May affect, but is not likely to adversely affect the loggerhead sea turtle (nesting), the red knot, piping plover, and northern long-eared bat. No effect on other ESA-listed species.

3.4.3.1 No Action Alternative

Under the No Action Alternative, existing conditions at Wallops Island would continue. This would have no impact on biological resources on the installation.

3.4.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

The expansion of Building V-003 would not involve the clearing or disturbance of vegetation or the removal or disturbance of habitat, as there is none located on the project site. The noise, increased vehicular traffic, and increased human presence during construction activities could disturb wildlife in the vicinity of the site. However, because of the small size of the site - Building V-003 and its immediate surrounding - its location in a developed part of Wallops Island, the relatively short duration of the construction activities, and their containment mostly within an existing building, this disturbance is not anticipated to result in significant impacts on wildlife.

Once in operation, the proposed AN / SPY-6 radar would scan in a generally south / southeasterly direction from a position approximately 60 feet (18 meters) above ground level and would not scan below zero degrees. Thus, the operation of the radar has no potential to affect wildlife, vegetation, or habitat occurring below that height, including seabach amaranth, nesting loggerhead sea turtles, and nesting or foraging piping plovers or red knots, if any were present in the vicinity. There also is no

potential to affect nesting bald eagles, as no known or potential nesting trees are present within the radar scan area.

The radar beam could intersect with the flight paths over the beach or nearshore environment of the various birds found at Wallops Island, including migratory birds, piping plovers, red knots, or bald eagles. It could also intersect with the flight patterns of northern long-eared bats, if any were present.

As explained in Section 1.4, the AN / SPY-6 radar emits a focused directional beam that is steered in multiple directions at a very rapid rate, with each directional pulse duration being generally measured in microseconds. The likelihood of a bird's or bat's flight path intersecting with a beam is thus very low. If it happened, exposure would be for a small time and unlikely to be repeated in the short or medium term. The fact that there is no potential for exposure below 60 feet (18 meters) above ground further reduces the likelihood of exposure during flight, especially for bats, which also are less likely to be present in the open beach and ocean environment toward which the radar would primarily emit.

While field studies of the effects of electromagnetic fields in the range of 10 MHz–3.6 GHz on birds have shown anomalies and deviations from normality in the behavior of exposed subjects (Cucurachi et al. 2013), these studies focused on situations characterized by ongoing exposure of foraging and nesting areas, something that would not occur as a result of Alternative 1. Studies also have detected an adverse effect on bats in habitats exposed to radiofrequencies in the 1-4 GHz range (Nicholls and Racey, 2009), but those results were obtained with exposure durations much greater than what might occur with the AN / SPY-6. Furthermore, as already noted, the area of potential exposure is one where bats are unlikely to be present in the first place.

Therefore, any construction-related or operational impacts to biological resources would be negligible and not significant. Further, Alternative 1 would have no impacts at all on critical habitat, as none is present at the project site or on Wallops Island. Nor would Alternative 1 adversely affect bald eagles protected under the Bald and Golden Eagle Protection Act, disturb bald eagle nests or habitat, or result in a bald eagle taking (USFWS concurred with this finding of no effect on bald eagles by email dated October 19, 2015; a copy is provided in Appendix B). Finally, Alternative 1 would have no effect on migratory birds; no takes of migratory birds protected under the MBTA would occur.

Threatened and Endangered Species

The Navy conducted informal consultation with USFWS with respect to the potential effects of Alternative 1 on species protected under the ESA. The Navy's findings are summarized in Table 3.4-2. USFWS concurred with these findings by email dated October 19, 2015 (see Appendix B).

Table 3.4-2: Section 7 Findings of Effects - Alternative 1

Common Name	Scientific Name	Finding	Basis for Finding
Plants			
Seabeach amaranth	*Amaranthus pumilus*	No Effect	There have been no documented occurrences of this species on Wallops Island. All construction activities would take place within the footprint of an existing building. The radar beam would not intersect with potential suitable habitat (e.g., sand beach) for the species.
Sea Turtles[1]			
Loggerhead sea turtle	*Caretta caretta*	No Effect	All project-related construction activities would take place within the footprint of an existing building and the radar beam would not intersect with suitable nesting habitat (e.g., sand beach).
Green sea turtle	*Chelonia mydas*	No Effect	
Hawksbill sea turtle	*Eretmochelys imbricata*	No Effect	
Kemp's Ridley sea turtle	*Lepidochelys kempii*	No Effect	
Leatherback sea turtle	*Dermochelys coriacea*	No Effect	
Birds			
Red knot	*Calidris canutus rufa*	May Affect, Not Likely to Adversely Affect	All project construction activities would take place within the footprint of an existing building and the radar beam would not intersect with suitable nesting or foraging habitat (e.g., sand beach). The radar beam could intersect with flight paths over the beach or nearshore environment. Although it is possible that an individual could be exposed to the radar beam, this is very unlikely and would not result in adverse effects for the following reasons: the AN / SPY-6 radar emits a focused directional beam that is steered in multiple directions at a very rapid rate, with each directional pulse duration being generally measured in microseconds. The likelihood of a bird's flight path intersecting with a beam is thus very unlikely. If it happened, exposure would be for a vanishingly small time and unlikely to be repeated in the short or medium term. The fact that there is no potential for exposure below 60 feet (18 meters) above ground (because the radar would emit only at a positive angle from its elevation, which is approximately 60 feet [18 meters]) further reduces the likelihood of exposure. While field studies of the effects of radiofrequency electromagnetic fields in the range of 10 megahertz (MHz)–3.6 gigahertz (GHz) on birds have shown anomalies and deviations from normality in the behavior of exposed subjects (Cucurachi et al., 2013), these studies focused on situations characterized by ongoing exposure of foraging and nesting areas, which would not occur as a result of the proposed project.
Piping plover	*Charadrius melodus*	May Affect, Not Likely to Adversely Affect	
Roseate tern	*Sterna d. dougallii*	No Effect	Individuals are rarely observed along the U.S. east coast south of New Jersey. They may transit through oceanic areas during seasonal migration (Nisbet 1984).

Common Name	Scientific Name	Finding	Basis for Finding
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	May Affect, Not Likely to Adversely Affect	All project-related construction activities would take place within the footprint of an existing building surrounded mostly by pavement and an open beach environment to the east. The lack of significant vegetation cover combined with the elevation of the radar beam (approximately 60 feet [18 meters] above ground level) and its orientation toward the nearby beach and open ocean make it very unlikely that bats would be exposed to electromagnetic energy from radar operations.
Note: 1. Nesting sea turtles only. The Proposed Action has no potential to affect sea turtles at sea.			

3.4.3.3 Alternative 2 – Build New Facility Potential Impacts

Construction of the proposed new facility under Alternative 2 site would result in the loss of small areas of landscape-quality vegetation primarily consisting of maintained grass and shrubs. In addition to being small, these areas are part of a site that is already disturbed and predominantly developed with an observation tower and the associated support structures that are part of the V-095 facility. The impact of this loss of low-quality habitat would be minimal. Animals making use of the site for foraging, such as common rodents or birds, would be temporarily or permanently displaced, but the numbers involved would be small and it can be anticipated that most of them could relocate their foraging activities to similar space nearby. Some less mobile or slower moving specimens, particularly small invertebrates, could be destroyed as a result of the construction activities, but here also the numbers involved would be small. Thus, the losses from the construction of the new facility have no potential to have an impact beyond the loss of a few individual animals.

As previously noted, the ESA-listed seabeach amaranth has never been documented at Wallops Island, though potential habitat is present. The mostly disturbed site of Alternative 2 does not provide adequate potential habitat for this species. Thus, Alternative 2 is not anticipated to affect the seabeach amaranth. There are no trees on the site of Alternative 2 and, therefore, it does not provide potential summer habitat for the northern long-eared bat or nesting habitat for the bald eagle. Similarly, the construction of the new facility would not affect the protected nesting sea turtles and seabirds that may be present on Wallops Island, as none of the beach habitat where these species have the potential to be present would be disturbed or lost.

Outside the project site proper, noise and increased human activity during construction could disturb animals making use of the surrounding land. However, the area within which this effect would occur would be small and the number of animals disturbed by construction operations would be limited. Because of the relative proximity of piping plover and loggerhead sea turtle nesting sites (see Figure 3.4-1), noise and light from construction activities could affect these species. The intensity of the noise generated on the Alternative 2 site would vary throughout the project's construction phase and would be limited to daytime working hours (generally, 7:00 a.m. to 5:00 p.m.), as overnight work is not anticipated. Daytime noise could disturb nearby piping plovers or red knots, but such disturbance could be easily mitigated and, because of the limited scale and duration of the construction activities, is not anticipated to result in fatalities or in any adverse effects at the species level. Recently observed piping plover nests (NASA 2014; NASA 2015a) are not very close to the project site (the closest one was about 870 feet [265 meters] from it). It is possible that a plover could nest close enough to the project to be

affected by construction noise if the noise started after the nest was established, resulting in the possible abandonment of the nest. However, this is very unlikely given the relatively few documented nests at Wallops Island and the large amount of potential nesting habitat available. Daytime noise would not affect nesting sea turtles on the beach or any northern long-eared bats that might be present in the nearby tree-covered areas, as these species would generally be present near the project site only at night, if at all. Lighting used to illuminate the construction site at night for security purposes would comply with the WFF Turtle Lighting Management Plan. As such, it is unlikely to disturb any nesting sea turtles. Potential impacts from the operation of the new radar would be the same as under Alternative 1. These impacts would be negligible.

Therefore, under Alternative 2, any impacts to biological resources, including ESA-listed species, would be negligible and not significant. Further, Alternative 2 would have no impacts at all on critical habitat, as none is present at the project site or on Wallops Island. Nor would Alternative 2 adversely affect bald eagles protected under the Bald and Golden Eagle Protection Act or result in the taking of a bald eagle, as no known or potential nesting trees are present near the project site or within the radar scan area. Finally, Alternative 2 would have no effect on migratory birds; no takes of migratory birds protected under the MBTA would occur.

Threatened and Endangered Species

The Navy's findings regarding the effects of Alternative 2 on threatened and endangered species are presented in Table 3.4-3.

Table 3.4-3: Section 7 Findings of Effects - Alternative 2

Common Name	Scientific Name	Finding	Basis for Finding
Plants			
Seabeach amaranth	*Amaranthus pumilus*	No Effect	There have been no documented occurrences of this species on Wallops Island. There is no potential habitat on the project site. The radar beam would not intersect with potential suitable habitat (e.g., sand beach) for the species.
Sea Turtles[1]			
Loggerhead sea turtle	*Caretta caretta*	May Affect, Not Likely to Adversely Affect	Project site is outside though in the vicinity of potential nesting habitat. However, no loggerhead sea turtle have recently been observed to nest on Wallops Island (NASA 2014; NASA 2015). Potential effects from lighting would be minimized in accordance with WFF's Lighting Plan. No potential effects from noise. The radar beam would not intersect with suitable habitat.
Green sea turtle	*Chelonia mydas*	No Effect	Not known to nest at Wallops Island. The radar beam would not intersect with potentially suitable nesting habitat (e.g., sand beach).
Hawksbill sea turtle	*Eretmochelys imbricata*	No Effect	
Kemp's Ridley sea turtle	*Lepidochelys kempii*	No Effect	
Leatherback sea turtle	*Dermochelys coriacea*	No Effect	
Birds			
Red knot	*Calidris canutus rufa*	May Affect, Not Likely to Adversely Affect	The project site is outside potential nesting or foraging habitat. Red knots are generally observed on the north end of Wallops Island, sufficiently far to not be affected by noise or lighting from construction. The radar beam could intersect with flight paths over the beach or

Common Name	Scientific Name	Finding	Basis for Finding
			nearshore environment. Although it is possible that an individual could be exposed to the radar beam, this is very unlikely and would not result in adverse effects for the same reasons as stated in Table 3.4-2.
Piping plover	*Charadrius melodus*	May Affect, Not Likely to Adversely Affect	The project site is outside though in the general vicinity of potential nesting and foraging habitat. Effects from noise would be limited to the daytime and to the duration of construction activities. The effect of noise on foraging activities would be minimal due to distance and the abundance of adequate foraging habitat nearby. Relatively few piping plover nests are observed on Wallops Island every year and the likelihood of one being close enough to the project site to be affected by construction noise is very low. Effects from lighting would be minimized in accordance with the Wallops Flight Facility Turtle Lighting Management Plan. The radar beam could intersect with flight paths over the beach or nearshore environment. Although it is possible that an individual could be exposed to the radar beam, this is very unlikely and would not result in adverse effects for the same reasons as stated in Table 3.4-2.
Roseate tern	*Sterna d. dougallii*	No Effect	Individuals are rarely observed along the U.S. east coast south of New Jersey. They may transit through oceanic areas during seasonal migration (Nisbet 1984).
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	May Affect, Not Likely to Adversely Affect	No trees would be cleared to construct the proposed new facility. There are forested areas near the project site. Daytime construction noise would not affect bats making use of this habitat, and nighttime lighting would be minimized in accordance with the WFF Turtle Lighting Management Plan. The elevation of the radar beam (approximately 60 feet [18 meters] above ground level) and its orientation toward the nearby beach and open ocean make it very unlikely that bats would be exposed to electromagnetic energy from radar operations.

Note:
1. Nesting sea turtles only. The Proposed Action has no potential to affect sea turtles at sea.

3.5 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.

3.5.1 Regulatory Setting

In many cases, land use descriptions are codified in installation master planning and local zoning laws. The *NASA Goddard Space Flight Center Master Plan* (NASA 2008) was prepared in 2008 to provide a framework for future facilities development at NASA Goddard Space Flight Center's (GSFC) Greenbelt Campus and WFF. With regard to WFF, the plan inventories natural and man-made resources; analyzes their conditions, functional relationships, and constraints; and identifies current and future research and activity program requirements.

3.5.2 Affected Environment

The following discussions provide a description of the existing conditions for the relevant categories of land uses at Wallops Island.

WFF and Wallops Island

WFF is located in Accomack County, Virginia in the northern extent of Virginia's Eastern Shore near the Maryland state line. As shown on Figure 1-1, the installation is divided into three distinct land areas: Main Base, Wallops Mainland, and Wallops Island. The Main Base is largely developed and predominantly consists of airfield operations and administrative uses. The Mainland consists mostly of marshland and includes long-range radar, communications, and optical tracking facilities. The Mainland and Wallops Island are connected by a bridge spanning the Virginia Inside Passage, a public waterway.

WFF's Wallops Island is a 6.5-square mile (16.8-square kilometer) coastal barrier island separated from the mainland by tidal marshes and waterways. Wallops Island includes launch and testing facilities, blockhouses, rocket storage buildings, assembly shops, tracking facilities, an unmanned aerial systems airstrip, a Resource Conservation and Recovery Act-permitted open burning area for off-specification rocket motors, and other related support structures.

Taking advantage of the marine environment and the technological support structure available at Wallops Island, the Navy broke ground on Wallops Island in 1982 for the Aegis Combat Systems Center facility. That building has since expanded into a full base. Support facilities are located on the Main Base, 5.5 miles (9 km) north of the first building. Navy facilities on Wallops Island include Building V-003, Building V-010, and V-095.

The *NASA Goddard Space Flight Center Master Plan* was prepared in 2008 to provide a framework for future facilities development at NASA GSFC's Greenbelt Campus and WFF. With regard to WFF, the plan presents three future development alternatives. Alternative 1 would maintain, and in some cases decrease, the existing amounts of some land uses on the installation while substantially increasing land devoted to fabrication and aircraft operations. Land designated as Operations Range would be relocated to the southern portion of the island while assembly and integration uses, along with an unmanned aerial systems runway, would be moved to the north and designated as Process / Integration and Operations Aircraft, respectively.

Alternative Sites

Both alternative sites considered in this EA are located on Wallops Island in an area designated as Operations-Range in the WFF master plan. Building V-003 is located between Bypass Road and Island Road a little over 0.1 mile (160 meters) inland from the Atlantic shoreline and less than one mile (1.6 kilometers) north of the causeway connecting Wallops Island to Wallops Mainland. It is a steel-framed, multi-level facility that includes office, training, administrative, and radar operation / testing areas that support the DDG-1000 program. An adjacent asphalt-paved parking lot is located to the south of the

facility. Building V-003 is flanked to the north, west, and south by generally low-lying scrub-shrub vegetation that buffers it from smaller facilities to the north and south. Pad 5, which is the proposed site for the Navy's installation and testing of a 5" / 62 powder gun and electromagnetic rail gun, is located immediately east of Building V-003 on the opposite side of Island Road (an EA [Navy 2014] was prepared by the Navy and a FONSI was signed for the powder gun / rail gun project in January 2015).

The Alternative 2 site is located along Seawall Road approximately 1.5 miles (2.4 kilometers) north of Building V-003 and 0.1 mile (160 meters) west of the Atlantic shoreline. The site consists of a steel-framed observation tower (Facility V-095), a number of trailers and other associated support structures, and an asphalt-paved driveway and parking lot. These structures support a number of intermittently-occurring testing and training activities that occur on Wallops Island, including those conducted by the Navy and other tenants.

The Alternative 2 site is located in an area designated as Process / Integration on the future land use map included in the NASA Goddard Space Flight Center Master Plan. This designation is intended to encourage the development of facilities supporting the assembly and testing of vehicles and equipment used in launches at WFF.

3.5.3 Environmental Consequences

3.5.3.1 No Action Alternative

The No Action Alternative would have no impacts on land use. Existing conditions would continue.

Land Use Potential Impacts:
- **No Action:** No impacts.
- **Alternative 1:** No impacts.
- **Alternative 2:** No significant impacts. Impacts would be negligible.

3.5.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

Construction activities associated with Alternative 1 and their associated effects, such as noise and dust, could cause annoyance to nearby land uses, but would not inhibit or substantially degrade the continued use of nearby facilities. Construction materials and equipment associated with the expansion of Building V-003 would be stored on the project site and would not impede the continued use of nearby properties. The expansion of Building V-003 and the installation and operation of the AN / SPY-6 system would be consistent with the area's historic and current uses. The operation of the AN / SPY-6 system would not impede, degrade or require the relocation of NASA, Navy, or other tenant activities occurring on Wallops Island. Alternative 1 would have no impacts on land use at WFF.

3.5.3.3 Alternative 2 – Build New Facility Potential Impacts

Construction activities associated with Alternative 2 would occur entirely within the boundaries of the project site and would be unlikely to cause annoyance to, impede, or degrade other land uses at WFF due to the distance between the project site and other facilities on the installation. Construction equipment and materials would be stored on or adjacent to the site throughout the duration of the project.

Alternative 2 would result in the loss of facility V-095 and its users would have to find alternative facilities or locations to conduct activities currently conducted on the site. However, use of the existing facility is intermittent and irregular, and it is anticipated that, with sufficient notice, current users would be able to identify adequate alternatives. Although the facility would not be consistent with the Process / Integration land use designation for this part of the island shown on the future land use map in the WFF master plan, the project site represents only a small part of the land covered by this designation. It

is not anticipated that the implementation of Alternative 2 would impede or prohibit the development and operation of WFF facilities elsewhere within the area designated for the future Process / Integration land use.

The site of Alternative 2 is located adjacent to a site tentatively identified by the DoD and Navy for potential future development of a directed energy project (see additional discussion in Chapter 4, and Figure 4-1). At this time, project details are undefined. It can be anticipated that if the DoD and Navy pursue development of the project in this location, it would be designed to be compatible with the configuration and operation of the proposed AN / SPY-6 facility. It is not anticipated that the operation of the proposed AN / SPY-6 facility at the Alternative 2 site would impede the development and operation of a directed energy facility on an adjacent site. NEPA documentation would be prepared, as applicable, if this direct energy project is confirmed.

For these reasons, Alternative 2 would have negligible impacts on land use. These impacts would not be significant.

3.6 Noise

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. 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); and
- 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.

3.6.1 Affected Environment

Ongoing activities that generate noise at WFF include:

- Institutional support projects, such as construction, demolition and ongoing routine or recurring facility maintenance activities.
- Operational missions, which consist of airfield operations from the Main Base, science missions, rocket launch activities, and development tests and exercises for the Navy.

The noise environments on Mainland and Wallops Island are relatively quiet with the dominant noise sources being naturally occurring wind and wave action, resulting from the coastal location. Activities that generate noise above ambient conditions include aircraft flight operations and rocket launch activities from NASA, Navy, and the Mid-Atlantic Regional Spaceport. Noise generated from airfield operations is mostly over lands zoned for agricultural use around the Main Base. Rocket activities generate the greatest noise levels on Wallops Island. However, such noise is short-term in duration. There are no sensitive noise receptors (e.g., schools, hospitals, residences) on Wallops Island.

3.6.2 Environmental Consequences

Noise Potential Impacts:
- **No Action:** No impacts.
- **Alternative 1:** No significant impacts. Minor construction-related impacts and no impacts from operations.
- **Alternative 2:** No significant impacts. Minor construction-related impacts and no impacts from operations.

3.6.2.1 No Action Alternative

The No Action Alternative would have no impacts on the ambient noise environment at Wallops Island. Existing conditions would continue.

3.6.2.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

In the short term, construction activities associated with Alternative 1 would generate noise on and in the vicinity of the project site. Equipment and activities anticipated to generate noise on the site would include cranes, heavy trucks, concrete mixers, portable generators, saws, and jackhammers. The intensity of noise generated by such equipment and activities would vary throughout the project's construction phase and would be generally similar to noise associated with small- to medium-scale building construction projects, which occur with relative frequency at Wallops Island.

Construction noise would be limited to daytime working hours (Monday through Friday, 7:00 a.m. to 5:00 p.m.). Jackhammering to demolish the existing floor slab in preparation to install the new structural support piles and many other noisy activities would occur within Building V-003, which would substantially dampen noise outside the facility. In general, the perception of noise generated by the construction would vary based on the distance of the listener from Building V-003 as well as wind, the presence of buildings and vegetation, and noise of the surf along the installation's Atlantic shoreline. No sensitive noise receptors (e.g., school, hospital, residences) would be affected by the construction noise, as none are located on Wallops Island. Construction personnel would be provided with all necessary equipment to protect hearing, as would non-construction staff working inside Building V-003, if determined necessary. Ambient noise in the vicinity of Building V-003 would return to pre-construction conditions following the completion of the addition to the facility. For these reasons, construction noise impacts under Alternative 1 would be minor and would not be significant.

The operation of the AN / SPY-6 radar would not create a new source of noise at Wallops Island. Therefore, Alternative 1 would have no permanent impacts on ambient noise.

3.6.2.3 Alternative 2 – Build New Facility Potential Impacts

Noise levels generated by construction activities associated with Alternative 2 would be somewhat greater than those described for Alternative 1, as more work would be required to construct a new facility than to add to an existing one. However, the relatively remote location of the Alternative 2 site at the northern end of Wallops Island would aid considerably in attenuating impacts from construction activities to listeners elsewhere on the island. Construction workers on the site would be provided with all necessary hearing protection equipment. It is unlikely that such equipment would be necessary for non-construction personnel outside the site. Ambient noise levels in the vicinity of the Alternative 2 site would return to pre-construction levels following the completion of the proposed facility. Thus, construction-related noise impacts resulting from Alternative 2 would be minor and would not be significant.

Alternative 2 would have no permanent impacts on noise, as operation of the AN / SPY-6 facility would not generate any noise.

3.7 Infrastructure

This section discusses infrastructure including utilities (such as potable water distribution, wastewater collection and treatment, stormwater collection, solid waste management, energy, and communications). As noted at the beginning of Chapter 3, transportation and traffic are not analyzed in the EA because the Proposed Action has no potential to affect those resources.

3.7.1 Regulatory Setting

EO 13693, *Planning for Federal Sustainability in the Next Decade*, requires federal departments and agencies to enact specific actions and operations outlined within the EO to reduce agency direct greenhouse gas emissions by at least 40 percent over the next decade. Improved environmental performance and federal sustainability will be achieved by reducing energy use and cost. Pursuing clean sources of energy will improve energy and water security.

Chief of Naval Operation Instruction 4100.5E outlines the Secretary of the Navy's vision for onshore energy management. The focus of this instruction is to establish the energy goals and implementation strategy to achieve energy efficiency.

3.7.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under infrastructure at Wallops Island.

3.7.2.1 Potable Water

WFF obtains all of its potable water from groundwater supply wells located within the boundaries of the installation. The water is used primarily for domestic purposes and fire protection. Groundwater withdrawal, usage, and quality are regulated by the VDEQ and the Virginia Department of Health.

The Wallops Island and Mainland potable water system is a non-transient, non-community water system that utilizes two groundwater wells and serves a peak population of 725 persons. The potable water supply wells are 245 feet (75 meters) and 265 feet (80 meters) below the ground surface and withdraw groundwater within the middle Yorktown-Eastover aquifer. Water is stored in an 80,000-gallon (300,000-liter) ground-level tank (Building U-049) located on the Mainland, adjacent to the treatment facility, prior to being pumped to three elevated tanks in the island's water distribution system. The southernmost tank, Building X-46, has a capacity of 100,000 gallons (380,000 liters). Building W-55 has a volume of 150,000 gallons (570,000 liters). The northernmost tank, Building V-90, has a capacity of 50,000 gallons (190,000 liters). WFF limits the Wallops Island potable water system groundwater withdrawal to 1,800,000 gallons (6,800,000 liters) per month and 13,000,000 gallons (50,345,000 liters) per year.

3.7.2.2 Wastewater Treatment

Wastewater generated on the northern portion of Wallops Island is discharged to two septic tanks on the north end of the island. The septic tanks are pumped out biennially and the waste is transported to the wastewater treatment plant on Main Base. Wastewater generated on the remainder of Wallops Island is sent to one of five pump stations and pumped through a 7-mile (11-kilometer) force main to the Main Base collection system, through which it is transported to the treatment plant.

NASA owns and operates the wastewater treatment plant on Main Base. The plant has the capacity to treat up to 300,000 gallons (1,100,000 liters) per day and currently treats flows of approximately 60,000

gallons (230,000 liters) per day. Treated wastewater from the wastewater treatment plant is discharged via a single outfall to an unnamed freshwater tributary to Little Mosquito Creek in accordance with WFF's VPDES permit VA0024457.

3.7.2.3 Stormwater Collection

Wallops Island has storm drains that divert stormwater flow to several individual discharge locations (NASA 2009). The northern portion of Wallops Island drains by overland flow to Bogues Bay and Chincoteague Inlet via Sloop Gut and Ballast Narrows. The central portion of the island drains primarily to the west toward Bogues Bay. Cross-culverts under Island Road drain stormwater collected by culverts and ditches. Weirs have been installed west of Island Road to release stormwater to Bogues Bay via Hog Creek.

Stormwater discharges associated with industrial activities must be permitted in accordance with the NPDES as established by the CWA (33 U.S.C. section 1342). VDEQ administers NPDES permitting under the VPDES in accordance with 9 VAC 25-151. There are three permitted stormwater outfalls located on Wallops Island that require monitoring for flow, pH, total suspended solids, and total petroleum hydrocarbons under the conditions of WFF's VPDES permit.

The Alternative 1 site is located at the northern end of drainage area DA-307. Stormwater draining from DA-307 discharges at outfall WI-1 into the marshlands along the west side of Wallops Island and ultimately into Cat Creek. Monitoring of WI-1 is not required under the permit.

The Alternative 2 site straddles the boundary between drainage areas DA-302 and DA-303. Stormwater generated within these drainage areas initially runs off of impervious surfaces into adjacent permeable areas, and ultimately to either the inland marshes and surface water bodies immediately to the west of Wallops Island, or to the Atlantic Ocean to the east.

NASA maintains a WFF-wide SWPPP (NASA June 2015) to ensure that its operations have minimal impact on stormwater quality.

3.7.2.4 Solid Waste Management

Waste collection and disposal services for WFF are provided under contract with a private vendor. Solid waste from both commercial and construction sources at WFF is taken to the North Accomack County Landfill (in the town of Atlantic). Approximately 20 acres (8 hectares) of the 140-acre (57-hectare) North Accomack County Landfill (about 14 percent) have been used.

In 2011, NASA WFF launched a single-stream recycling program. Recycling containers were placed on each floor of every NASA building on the installation to divert plastic, aluminum, glass, cardboard, and paper from local landfills. Additional resources exist on the facility to recycle used oils and solvents, chemicals, fluorescent lights, batteries, toner cartridges, scrap metal and wood, and packing materials. In fiscal year 2014, NASA WFF diverted 39 percent of its non-construction and demolition solid waste from local landfills. SCSC limits its recycling activities to fluorescent lights, batteries, and scrap metal.

3.7.2.5 Energy

Electrical power is delivered to the Mainland and Wallops Island by A&N Electric Cooperative from the Wallops Island substation in Wattsville, Virginia, through a single set of 12.47-kilovolt buried conductors. This feeder is routed along the road and interconnects to WFF on a pole just outside of the Mainland / Wallops Island gate, where it transitions underground into the Building U-012 switching station. The utility provider regulates voltage at the Wallops Island substation via single phase regulators.

Two 3-megawatt generators and a control room were added to Building U-012 in March 2013 to provide centralized emergency power for the launch range and other mission critical infrastructure on Wallops Island and the Mainland. The Facilities Management Branch operates the backup power generator when either service is not sufficient or short-term power services throughout the facility are needed for special projects. The Mainland / Wallops Island load is the primary consumer of power from the Wallops Island substation and capacity is not currently an issue. However, due to increased development in the Captain's Cove area, the load on the Wattsville substation has grown in recent years.

3.7.2.6 Communications

Communication services to Wallops Island are provided by commercial providers.

3.7.3 Environmental Consequences

3.7.3.1 No Action Alternative

The No Action Alternative would have no impacts on infrastructure and utilities at Wallops Island. Existing conditions would continue.

Infrastructure and Utilities Potential Impacts:
- **No Action:** No impacts.
- **Alternative 1:** No significant impacts. Impacts would be negligible.
- **Alternative 2:** No significant impacts. Impacts would be negligible.

3.7.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

With the exception of energy systems and solid waste management, the construction of the addition to Building V-003 would not increase demands on utility and infrastructure systems at Wallops Island. The increased demands on energy systems to power electric tools used to demolish the existing radar arrays and other selected areas of Building V-003, and to build the addition, would vary throughout the project's construction phase, and would cease upon the complete of construction activities. In comparison to the energy demands of ongoing NASA, Navy, and other tenant operations occurring at Wallops Island, any such increases would be minimal.

Demolition of the existing radar array and other selected areas of Building V-003, and construction of the addition to the facility and installation of the AN / SPY-6 system, would generate construction-related debris and waste. Such debris would be collected in on-site rubbish containers and transported to a facility outside WFF for disposal in accordance with all applicable federal, state, and local policies; regulations; and procedures, including those promulgated and enforced by WFF and the Navy. The amount of construction-related debris would be typical of that generated by a small to medium-size construction project and is not anticipated to exceed the capacity of existing procedures at WFF to manage such debris. Disposal of the waste generated by the expansion of Building V-003 would require a fraction of the available space at the North Accomack County Landfill. As applicable, recyclable waste would be sorted and disposed of in accordance with WFF policies, which would further reduce the quantity of construction-related waste disposed of at the local landfill. For these reasons, Alternative 1 would have negligible construction-related impacts on energy systems and solid waste management. These impacts would not be significant. There would be no construction-related impacts on other utility and infrastructure systems at Wallops Island.

In the long term, operation of the AN / SPY-6 system would likely increase energy demand at Wallops Island. As project planning and design continues, the energy requirements of the proposed AN / SPY-6 system would be determined and assessed against available capacity at the installation. As necessary, the AN / SPY-6 system would be modified to operate more energy-efficiently, or the energy system at

Wallops Island would be enhanced to support the increased demand imposed by the radar. The ongoing operations of NASA, the Navy, and other tenants at Wallops Island would not be impeded or degraded by the operation of the AN / SPY-6 system. Thus, in the long term, Alternative 1 would have negligible, impacts on energy systems at Wallops Island. These impacts would not be significant.

It is anticipated that the number of permanently-assigned staff associated with the AN / SPY-6 system at Building V-003 would be approximately the same as those assigned to the facility for the existing DDG-1000 program. Thus, no substantial increases in permanently-assigned staff at Building V-003 are anticipated under Alternative 1. Periodically, groups of additional personnel would rotate into the facility for training on the AN / SPY-6 system. It is anticipated that these groups would number no more than 10-20 personnel during any given period and that the durations of their rotations would not exceed a few months. These personnel would be lodged outside Wallops Island during their training rotations. Any additional demands on potable water, wastewater treatment, and solid waste management generated by personnel temporarily assigned to Building V-003 would be minimal and within the existing capacity of those systems at Wallops Island. Thus, impacts on these systems resulting from Alternative 1 would be negligible. They would not be significant.

The addition to Building V-003 would not create new areas of impervious surface at Wallops Island. Stormwater would continue to be collected on, and conveyed from, the site of the facility as it is currently. Therefore, Alternative 1 would have no impacts on stormwater collection.

The expansion of Building V-003 and the operation of the AN / SPY-6 system would not generate increased demand on communications systems at Wallops Island. Alternative 1 would have no impacts on those systems.

3.7.3.3 Alternative 2 – Build New Facility Potential Impacts

As described in Section 2.3.3, the construction and operation of the AN / SPY-6 facility at the Alternative 2 site would require the extension of a communications / data line to the site from Building V-010. The new line would have adequate capacity to accommodate the requirements of the new facility and there would be no adverse impacts on communications systems at Wallops Island.

During construction, energy needed to power tools to build a new facility from the ground up under Alternative 2 would be somewhat greater than that required to expand an existing facility under Alternative 1. However, demand would vary throughout the project's construction phase. In the context of the energy demands of NASA, the Navy, and other tenants on Wallops Island, the additional demands on energy systems needed to construct the AN / SPY-6 facility would be minimal. Construction-related impacts on energy systems resulting from Alternative 2 would thus be negligible. They would not be significant.

The demolition of the V-095 facility, including the observation tower and supporting facilities, and the construction of the AN / SPY-6 facility would generate similar quantities and types of waste as that described for Alternative 1. The collection and disposal of such waste would not exceed the capacity of existing procedures at WFF to manage them, and their quantity would be a fraction of the available space at the North Accomack County Landfill. Thus, impacts from construction on solid waste management would be negligible and not significant.

It is anticipated that the number of staff permanently assigned to the new AN / SPY-6 facility would be the same as those currently assigned to the DDG-1000 program at Building V-003. Thus, there would be no increases in permanently-assigned staff at Wallops Island, and correspondingly, no additional increases in the demands on potable water and wastewater treatment. As described for Alternative 1, groups of approximately 10 to 20 personnel would periodically rotate into the facility for training on the

AN / SPY-6 system, but increased demands on potable water and wastewater treatment generated by these personnel would be within the existing capacity of those systems at Wallops Island. Impacts on those systems resulting from facility operation under Alternative 2 would remain negligible and would not be significant.

Maintenance and upkeep requirements for the new facility would generate an increase in solid waste at Wallops Island. However, any such increases in solid waste generated by the new facility would be small in the context of solid waste generated at Wallops Island and would remain within the installation's capacity to manage solid waste. Thus, operational impacts on solid waste management resulting from Alternative 2 would be minor. These impacts would not be significant.

In addition to the increased energy demand that would be generated by the AN / SPY-6 system, the creation of a new facility at Wallops Island to house the system would generate additional energy demand for day to day electrical needs such as interior and exterior lighting and heating and cooling systems. The energy requirements for the new facility would be analyzed and compared against existing electrical capacity at Wallops Island. Enhancements to the design of the facility, the AN / SPY-6 system, and / or the island's energy system would be made as necessary to minimize demand of the Proposed Action on electrical utilities. In comparison to other facilities at Wallops Island such as Building V-003 and the Building V-010 / V-020 / V-021 complex, the proposed AN / SPY-6 facility would be relatively small, and increased demand on energy systems (other than those generated by the radar system itself) are anticipated to be on the same scale. Therefore, operational impacts on energy systems resulting from Alternative 2 would be minor. These impacts would not be significant.

With regard to stormwater collection, as previously noted (Section 3.2.3.3), if it is determined that more than one acre (0.4 hectares) would be disturbed during the project's construction phase, the construction contractor would obtain coverage under the VPDES General Permit and prepare a construction SWPPP. Adherence to BMPs specified in the SWPPP would ensure that the volume of stormwater discharged from the project site, and the concentrations of pollutants therein, are minimized. Thus, impacts on stormwater collection resulting from the construction of the proposed facility under Alternative 2 would be negligible and would not be significant.

In the long term, no substantial amount of new impervious surface would be created by Alternative 2. Because the project's footprint exceeds 5,000 square feet (465 square meters), the Navy would incorporate in the facility design low impact development facility design techniques to the maximum extent technically feasible, in accordance with Section 438 of the EISA to maintain the pre-development hydrology of the site. For these reasons, there would be no increase in runoff from the site and, therefore, no potential for indirect effects on stormwater collection at Wallops Island.

3.8 Public Health and Safety

This section discusses policies and procedures that are intended to protect employees, military personnel, visitors, and civilians living in the vicinity of WFF from hazards associated with operational activities occurring at the installation.

3.8.1 Regulatory Setting

The WFF Safety Office plans, develops, and provides functional management of policies and procedures for safety and establishes and approves safety precautions for the protection of the public, NASA personnel, contractors, and civilians. The Safety Office is divided into the Ground Safety and Flight Safety Groups. Ground safety considers potential hazards associated with operations and maintenance activities (e.g., fueling, handling, assembly, and checkout for all prelaunch activities), occupational

hazards, and facility security and emergency planning and operations including fire, crash, and rescue. Flight safety considers the risks from potentially hazardous operations such as flight operations, flight trajectory and dispersion, and launch failures. All ground and flight safety processes are guided by the *Range Safety Manual for Goddard Space Flight Center , Wallops Flight Facility* (NASA 2013a). Additionally, the Wallops Flight Facility Wallops Range User Handbook summarizes policies, procedures, facilities, and services (NASA 2013b).

The Ground Safety Group plans, develops, and implements facility programs and controls for the safety of personnel, protection of property, and reliable operations of facilities. Day-to-day institutional operations and maintenance activities conducted at WFF are performed in accordance with applicable NASA institutional safety and mission assurance programs and controls. Safety controls are established to minimize the potential hazards associated with institutional and workplace activities.

WFF requires all range users to submit formal documentation pertaining to their proposed operations for safety review. Ground Safety Plans addressing all potential ground hazards related to a given operation or mission are prepared by WFF's Ground Safety Group in accordance with the Range Safety Manual (NASA 2013a). The Ground Safety Plan outlines operational management procedures for minimizing risks to human health and the environment, including health and safety monitoring; hazardous materials handling; explosive safety; training; personal protective equipment; and operational security, controls, and procedures.

All personnel involved with scientific research programs and facilities follow appropriate safety protocols, including Occupational Safety and Health Administration regulations and training requirements. Activities comply with all applicable federal, state, NASA, DoD, and Navy occupational safety and environmental regulations.

3.8.2 Affected Environment

The following sub-sections describe the characteristics of electromagnetic radiation (EMR) and associated hazards that are generally applicable to conditions at WFF.

3.8.2.1 Electromagnetic Emissions

EMR is energy that travels outwards from a source (i.e., radiates) and includes such phenomena as radio waves, visible light, and ultraviolet light. The EM spectrum is the range of EMR and is expressed by frequency (measured in cycles per second called Hertz), wavelength (measured in meters), and energy (measured in electron volts). EM energy travels in waves: the closer together the waves, the higher the frequency; conversely, the farther apart the waves, the lower the frequency. The radio waves emitted by radar have longer wavelengths and lower frequencies than visible light.

The EMR covered in this section is nonionizing radiation, a form of radiation that does not have sufficient energy to cause ionization of atoms or molecules. However, radar and communication systems which use high-power radio frequency (RF) transmitters and high-gain antennas represent a potential hazard to personnel working on, or in the vicinity of, these systems. The detrimental effects of overexposure to EMR are associated with an increase in overall body temperature or a temperature rise in specific organs. In addition to living organisms, EMR can affect substances such as fuels, ordnance, and electronic equipment. An EM hazard occurs when transmitting equipment produces an electronic field sufficient to cause harm to persons, ignite fuels, trigger ordnance, or interfere with electronic equipment. Safety zones are defined around sites producing EM energy to ensure that personnel and sensitive materials are not within range of these potentially adverse effects as outlined below.

- **Hazards of EM Radiation to Personnel (HERP) safety zones are determined for each EM emitter** – Personnel involved with the test inside the safety zone must either leave the HERP safety zone during operations or limit their time in these areas based on approved exposure limits (DoD 2009). These limits are similar to exposure times recommended for humans to sunbathe safely. Because EM energy dissipates exponentially as the distance from the energy source increases, ensuring personal safety is usually as simple as moving personnel farther away from the source. Therefore, hazards-to-personnel safety zones are calculated for each EM energy emitter.
- **Hazards of EM Radiation to Fuel (HERF)** – Fuel vapors can be ignited by EM energy field-induced arcs during fuel-handling operations close to high-powered RF radar and transmitting antennas. Therefore, no fuel storage or fueling takes place within HERF safety zones.
- **Hazards of EM Radiation to Ordnance (HERO) safety zones are determined for each EM energy emitter** – Ordnance that might detonate due to EM overexposure must be kept out of the EM source's HERO safety zones during operation.
- **The Potential for Electromagnetic Interference (EMI)** – The potential for EMI is identified prior to operation of higher-power EM energy emitters. EMI includes the potential to affect any device that uses EM energy nearby, ranging from causing static on television sets to interfering with automotive remote-entry control devices or cell phones.

Increasing distance from the source dramatically reduces EMR energy and power levels, and, in turn, potential HERP, HERO, HERF, and EMI risks. As a rule of thumb, doubling the distance reduces the energy, and thus the risk, by a factor of four.

The Navy's operating procedures and precautions to minimize the risk of adverse effects from EMR are set forth in *Technical Manual - Electromagnetic Radiation Hazards (Hazards to Personnel, Fuel and Other Flammable Material)*, NAVSEA OP 3565 / NAVAIR 16-1-529, Volume 1 Sixth Revision and Volume 2 Seventeenth Revision (NAVSEA 2003, 2008).

An EA was prepared for the AN / SPY-6 system at PMRF Barking Sands, Hawaii (Navy 2009). The EA included an evaluation of the electromagnetic compatibility review of the system conducted by the Navy's Space and Naval Warfare Systems Center, San Diego, California, covering HERP, HERF, HERO, and EMI hazards (Navy 2009). As the same system would be used at WFF, the results of the review were also used in this EA.

As described in Section 2.1.2, the radar array would be situated approximately 60 feet (18 meters) above ground level and would only scan at angles above 0 degree with no electromagnetic exposure at ground level around the facility.

Hazards of Electromagnetic Radiation to Personnel (HERP)

Frequencies, power levels, and distances from the point of origin are used to evaluate HERP. At frequencies below 5 GHz, EMR overexposure can cause an increase of internal body temperature, which may result in tissue damage or death. Above 10 GHz, EMR overexposure primarily results in the heating of an organism's external surface, with the heat gradually warming internal tissues from the outside. In the range between 5 GHz and 10 GHz, the organism may experience a combination of internal and external tissue heating.

As discussed in Section 1.4, the AN / SPY-6 system has S-band and X-band radars. In the range of frequencies of the system's S-band radar (2 GHz to 4 GHz), the effect of overexposure would likely be an

increase in internal temperature. Prolonged exposure to this frequency range may cause tissue or organ damage. Within the range of frequencies associated with the system's X-band radar (8 GHz to 12 GHz), the anticipated overexposure effect would mostly be an increase in skin temperature. Prolonged exposure to this range of frequencies may cause skin burns, with the burns more prevalent toward the 10 GHz frequency range.

Human EMR exposure is primarily described in terms of Specific Absorption Rate (SAR), which is the amount of energy absorbed during a period of exposure divided by the total mass of the body expressed in watts per kilogram (W / kg). Exposure restrictions to EM energy are based on short-term, immediate health effects, including stimulation of peripheral nerves and muscles, shocks and burns caused by touching conducting objects, and elevated tissue temperatures resulting from absorption of energy during exposure to EM fields (International Commission on Non-Ionizing Radiation Protection 1998). The SAR threshold for potentially harmful biological effects in humans used by the DoD is set at 0.4 W / kg for controlled environments and 0.08 W / kg for uncontrolled environments. These thresholds incorporate a safety factor of 10, as the risk of adverse biological effect increases at a SAR of 4 W / kg or more. Below this threshold, there is no evidence of harm to humans (NAVSEA 2003).

SAR does not provide a convenient field measurement. Therefore, more easily measured equivalent limits have been defined, referred to as Permissible Exposure Limit (PEL). The ERM PEL represents the strength of electromagnetic energy that a human body can safely withstand for an indefinite period of time. It is expressed in milliwatts per square centimeter (mW / cm^2) for frequencies above 300 MHz (0.3 GHz). PELs vary with the frequency of the emission. Short-term exposure above the PEL is acceptable provided the average exposure over a defined period (i.e., 6 minutes in controlled environments for frequencies below 15 GHz; variable according to the frequency otherwise) does not exceed the PEL. In such a case, the SAR would remain at or below the 0.4 W / kg threshold. This means that intermittent exposure above the PEL can occur, for example when a person stands in the beam of a rotating radar antenna, without harm.

PEL and averaging times associated with the S-band and X-band radar components of the AN / SPY-6 radar system for controlled and uncontrolled environments are presented in Table 3.8-1 (Navy 2009).

Controlled Environment: A location where exposure to EM energy may be incurred by persons who are aware of the potential for such exposure. Examples of controlled environments include radar and communication equipment spaces and the flight deck and weather decks of a ship.

Uncontrolled Environment: A location where access is uncontrolled and where persons do not expect to encounter higher levels of electromagnetic energy. Such locations include living quarters, workplaces, and public access areas.

HERP separation distance provides a metric to determine the distance from the emission source beyond which the applicable PEL would not be exceeded. Closer to the source, a study is required to determine the permissible exposure duration so that average exposure over the applicable averaging time does not exceed the PEL. For electromagnetic fields, the energy level falls rapidly as the distance from the source increases (proportional to the square of the distance). For example, a doubling of the distance from the source results in exposure to one-fourth of the original field.

Table 3.8-1: PEL for Radio Frequencies in Controlled and Uncontrolled Environments

Radar Frequency	Environments	Controlled		Uncontrolled	
	Frequency (GHz)	PEL (mW / cm^2)	Averaging Time (minutes)	PEL (mW / cm^2)	Averaging Time (minutes)
S-band	2.0	6.7	6	1.3	30
	3.0	10	6	2.0	30
	4.0	10	6	2.7	22.5
X-band	8.0	10	6	5.3	11.2
	10	10	6	6.6	9
	12	10	6	8	7.5
Source: Navy 2009					

Tables 3.8-2 and 3.8-3 show the HERP separation distances calculated for the AN / SPY-6 radar system at PMRF Barking Sands for the S-band and X-band, respectively (Navy 2009). These distances area also considered applicable to the AN / SPY-6 radar system proposed at WFF. For the S-band radar, distances were calculated for the main beam and side lobes at 5°, 15°, and 20° below the main beam axis. For the X-band radar, distances were calculated for the main beam and the peak side lobe (i.e., maximum side lobe that would be generated). The maximum distance (S-band main beam for uncontrolled environment) represents the point beyond which there is no HERP risk associated with the AN / SPY-6 radar (Navy 2009). However, it should be noted that the AN / SPY-6 radar system would not operate below 0 degrees elevation.

Table 3.8-2: HERP Separation Distances in Controlled and Uncontrolled Environments for AMDR S-Band with Main Beam Scanning

Exposure	Controlled Environment Separation Distance feet (meters)	Uncontrolled Environment Separation Distance feet (meters)
Main Beam	127 (39)	284 (86)
Side lobe ≤ 5° below main beam axis	37 (11)	83 (25)
Side lobe ≤ 15° below main beam axis	26 (8)	60 (18)
Side lobe ≤ 20° below main beam axis	24 (7)	53 (16)
Source: Navy 2009		

Table 3.8-3: HERP Separation Distances in Controlled and Uncontrolled Environments for AMDR X-Band with Main Beam Scanning

Exposure	Controlled Environment Separation Distance feet (meters)	Uncontrolled Environment Separation Distance feet (meters)
Main Beam	27 (8)	37 (11)
Peak Side Lobe	0.03 (0.01)	0.04 (0.01)
Source: Navy 2009		

Hazards of Electromagnetic Radiation to Fuel (HERF)

HERF analysis evaluates the possibility of fuel vapors being accidentally ignited by RF-induced arcs during fuel handling operations in proximity to high-powered radio and radar transmitting antennas. The hazards from such arcs potentially associated with EMR from the proposed AN / SPY-6 system are primarily related to the making and breaking of metal-to-metal contact during the insertion and removal of fuel nozzles during fuel handling operations defined as the act of transferring fuel from one container to another, such as fueling aircraft, vehicles, or equipment from a pump or a portable container; transferring fuel from a storage container to a fuel truck; and transferring fuel from a pump to a portable container.

To prevent a hazard, HERF separation distances must be maintained between EMR sources and fuel handling activities. HERF separation distances represent the minimum separation distances required to ensure that EMR hazards to fuel handling activities would not be exceeded. Table 3.8-4 presents HERF separation distances for the AN / SPY-6 radar system calculated for the minimum elevation angles of each sector of the antenna's operational azimuth coverage (Navy 2009). However, it should be noted that the AN / SPY-6 radar system would not operate below 0 degrees elevation."

Table 3.8-4: Calculated Maximum HERF Separation Distances for AN / SPY-6 AMDR Suite

Separation Distance for 0-degree Elevation Angle feet (meters)	Separation Distance for 5-degree Elevation Angle feet (meters)	Separation Distance for 15-degree Elevation Angle feet (meters)	Separation Distance for 20-degree Elevation Angle feet (meters)
1373 (418)	398 (121)	282 (86)	254 (77)
Source: Navy 2009			

Hazards of Electromagnetic Radiation to Ordnance (HERO)

HERO analysis evaluates the possibility of accidentally causing electro-explosive devices contained in ordnance systems to actuate prematurely as result of the RF from the AMDR Suite. To prevent the susceptibility of electro-explosive devices to radiated or conducted EM energy, HERO limits are imposed. Ordnance is classified based on its susceptibility to EM radiation as HERO SAFE, HERO SUSCEPTIBLE, or HERO UNSAFE/UNRELIABLE.

Worst-case safe separation distances of 4,007 feet (1,222 meters) and 16,035 feet (4,889 meters) were calculated for HERO SUSCEPTIBLE ordnance and HERO UNSAFE / UNRELIABLE ordnance, respectively for the AN / SPY-6 radar system (Navy 2009).

3.8.3 Environmental Consequences

Public Health and Safety Potential Impacts:
- **No Action:** No impacts.
- **Alternative 1:** No significant impacts.
- **Alternative 2:** No significant impacts.

3.8.3.1 No Action Alternative

Under the No Action Alternative, the AN / SPY-1 radar system would continue to be used following existing protocols. There would be no impact on health and safety.

3.8.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

The construction of a four-story addition to the south elevation of Building V-003 above the existing two-story extension to allow an upgrade to the AN / SPY-6 radar system would follow all health and

safety protocols applicable to construction activities at WFF. There would be no construction-related impacts on public health and safety.

The operation of the AN / SPY-6 radar system involves the use of EM energy, as does the operation of the existing AN / SPY-1 system. Standard operating procedures would be followed for AN / SPY-6 operations. These procedures identify and incorporate safe operating parameters with respect to HERP, HERO, HERF, and electromagnetic interference with electronic equipment.

EM hazard safety distances were mapped from Building V-003 to determine if additional safety protocols are required during operation of the radar system. The radar array would be installed 60 feet (18 meters) above ground on the outside of the building and would not scan the area inside the building where personnel would be located. There would be no individuals within the minimum separation distance of 127 feet (39 meters) from the AN / SPY-6 radar system calculated for personnel present in a controlled environment (Navy 2009). In addition, personnel operating the AN / SPY-6 radar would be in a controlled environment and follow procedures to ensure that PELs are not exceeded and separation distances are maintained.

HERF and HERO safety arcs described in the previous sections were mapped for each of the alternatives to determine what buildings or structures are within the radii. It should be noted that the radar would be operating above ground level (i.e., above the height of most buildings), so even buildings within the radii are unlikely to have overlap with the AN / SPY-6 radar system.

Figure 3.8-1a shows areas within the EM safety zone under Alternative 1. The following buildings are within the HERF and HERO radii:

- Building W-020: Blockhouse #3;
- Building W-032: Utility Building;
- Building W-035: Terminal Building Launch Area No. 4;
- Building W-035B: Cable Term Building;
- Building W-036: Camera Platform with 15' Astrodome;
- Building W-040: Assembly Shop No. 5;
- Building W-049: Terminal Cubical Building;
- Building W-050: Cable Terminal Building Launch Area;
- Building W-051: Flammables Storagehouse (outside of radius, but considered due to approximation of origin point).

There are no ordnance or fuel storage or handling concerns associated with any of the buildings within the radii (Bunting, pers. comm., 2015) and EMI risks could be effectively mitigated.

Additionally, an EM rail gun will be installed on Pad 5, to the southeast of Building V-003. This facility will involve the use of EM energy and explosives. Pad 5 is partly within the HERF and HERO radii. However, as noted above, interference from the proposed radar with ground-level facilities and materials would be minimal due to the elevation of the radar. EM railgun and AN / SPY-6 radar operations would be coordinated, as needed, to consider and address any risks from EM to personnel or materials during rail gun operations, which would occur approximately 20 days per year during the first years to testing, expanding to 30 then 50 days in later years (Navy 2014).

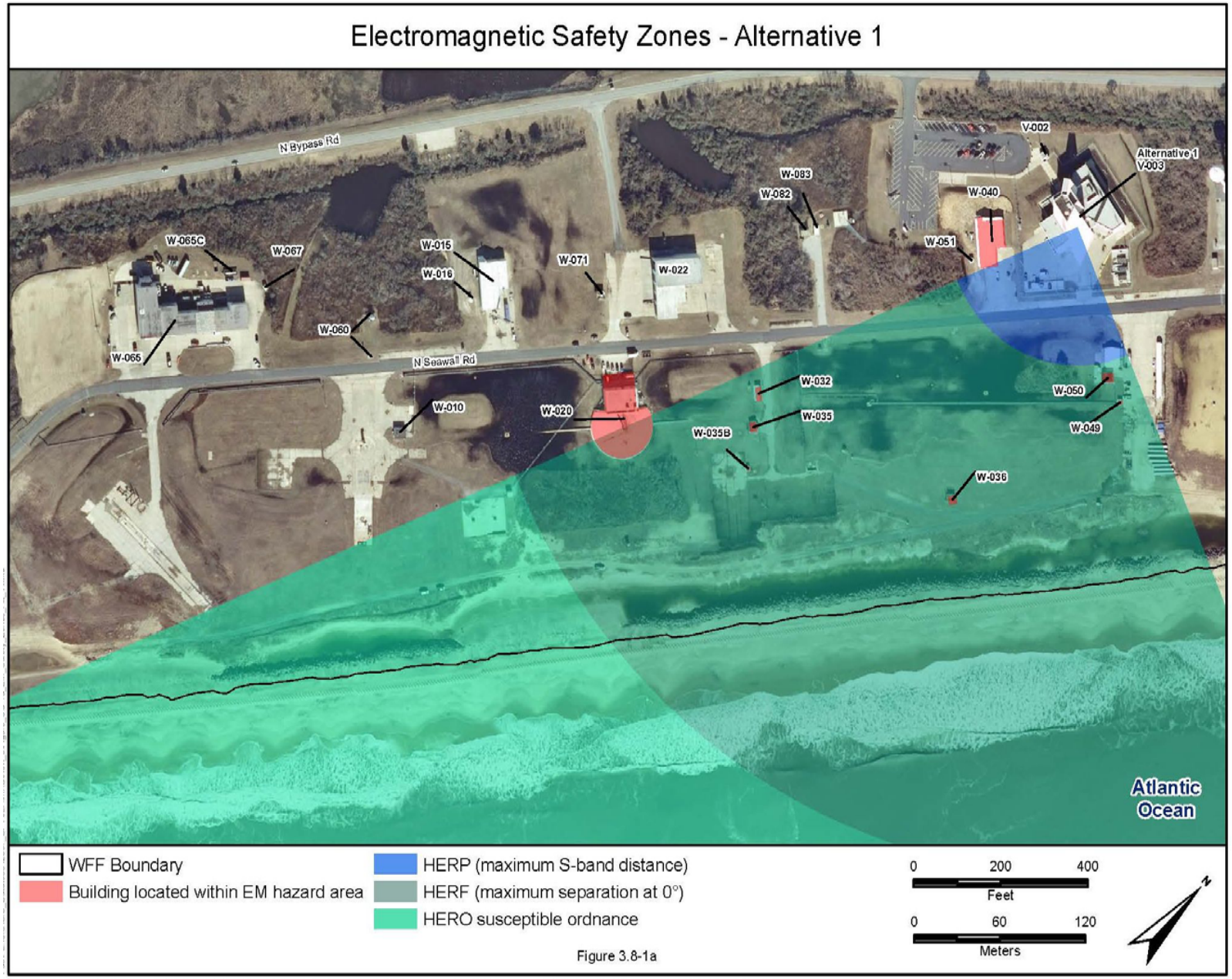

Figure 3.8-1a

Note: HERP = Hazards of EM Radiation to Personnel; HERF = Hazards of EM Radiation to Fuel; HERO = Hazards of EM Radiation to Ordnance.
Source: Navy 2009.

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In general, all activities would comply with all applicable federal and state, NASA, DoD, and Navy occupational safety and environmental regulations to ensure protection of the public and WFF / Navy personnel.

Based on the buildings and operations conducted within the radii, there would be no significant operational impacts on health and safety under Alternative 1.

3.8.3.3 Alternative 2 – Build New Facility Potential Impacts

Under Alternative 2, operation of the AN / SPY 6 would be identical to Alternative 1, except that it would be built on a site currently occupied by an observation tower (Facility V-095) and several trailers located about 1.5 miles (2.4 kilometers) to the northeast of Building V-003. Demolition of V-095 and construction of the AN / SPY-6 facility would follow all health and safety protocols applicable to demolition and construction activities at WFF. There would be no construction-related impacts on public health and safety.

Figure 3.8-1b shows the area within the EM safety zones under Alternative 2. As can be seen, this area is currently undeveloped. Therefore, there are no buildings within the EM safety radii. Thus, there would be no significant operational impacts on health and safety under Alternative 2.

3.9 Hazardous Materials and Wastes

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

3.9.1 Regulatory Setting

Hazardous materials are defined by 49 C.F.R. section 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table, and materials that meet the defining criteria for hazard classes and divisions" in 49 C.F.R. Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). The manufacture of PCBs and LBP was banned in 1979 and 1978, respectively. However, asbestos continues to be used in a variety of products such as insulation materials and automotive parts. The USEPA is authorized to regulate special hazard substances under the Toxic Substances Control Act (TSCA). Asbestos is also regulated by USEPA under the Clean Air Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Hazardous materials, toxic substances, and hazardous waste used on WFF are regulated by the USEPA and the VDEQ under CERCLA, RCRA, the Clean Water Act, the TSCA, and the Clean Air Act.

The WFF Integrated Contingency Plan (October 2015) serves as the facility's primary guidance document for the prevention and management of oil, hazardous material, and hazardous waste releases. The guidance in the plan minimizes hazards to human health and the environment from any accidental release of oil or hazardous substance to the air, soil, surface water, storm water, or sanitary sewer system at WFF. The WFF Mainland and Wallops Island are regulated under a single USEPA hazardous waste generator number (VA7800020888) and the site is classified as a large quantity generator, meaning that it can generate more than 2,205 pounds (1,000 kilograms) of hazardous waste per month. SCSC maintains a small quantity generator number, VAR000518837, meaning it can generate more than 220.5 pounds (100 kilograms) but less than 2,205 pounds (1,000 kilograms) of hazardous waste a year.

NASA's Environmental Office carries out the WFF Environmental Compliance and Restoration Program and is responsible for the planning, implementation, and oversight of past site activities to ensure the protection of human health and the environment.

3.9.2 Affected Environment

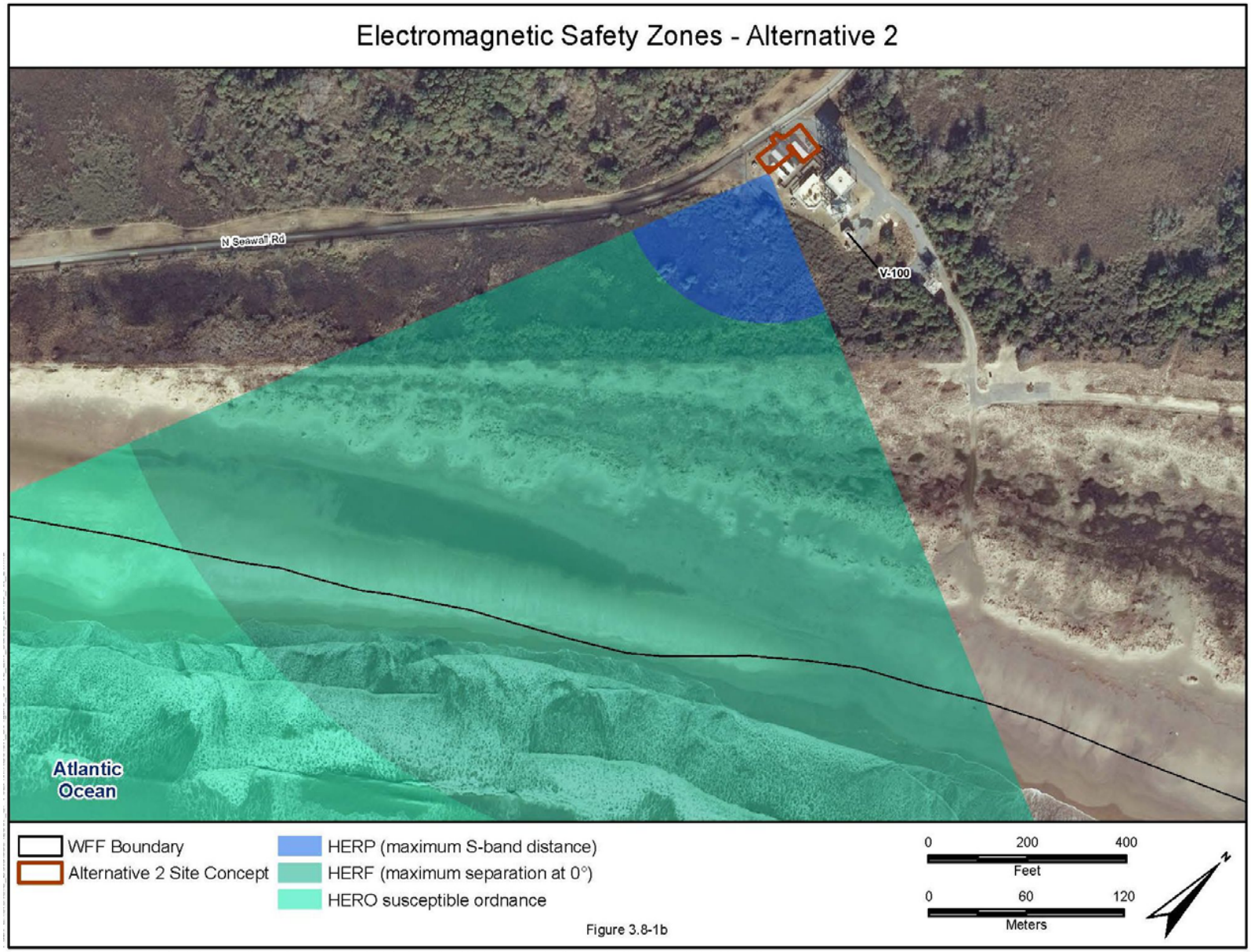
Construction activities and project operations occurring on Wallops Island can generate hazardous waste, and construction sites can generate hazardous materials or waste, or disturb past hazardous waste sites. Typical hazardous waste generated on Wallops Island includes rags containing lead or petroleum byproducts, crushed fluorescent bulbs, acetic acid, chemicals associated with tank cleaning, paint, and paint thinners.

Beginning in 1988, a series of facility-wide surveys, assessments, and inspections of existing and past hazardous materials and waste sites performed by NASA under the oversight of the USEPA and the VDEQ identified several areas of concern that may pose a risk to human health or the environment. NASA has actively taken actions under the appropriate environmental and regulatory programs to address risks at these sites. The US Army Corps of Engineers is addressing risks to human health or the environment at sites resulting from former Navy activities at WFF under the Formerly Used Defense Site (FUDS) program.

There are no areas of concern underlying or adjacent to the Alternative 1 site. A Munitions Response Site, MRS 5, is located adjacent to the Alternative 2 site. The US Army Corps of Engineers completed a site inspection in 2012 (USACE 2012). Numerous subsurface anomalies were detected. However, detailed investigations of the subsurface anomalies were not conducted. A remedial investigation / feasibility study was recommended for MRS 5.

Due to its relatively recent year of construction (2010), it is unlikely that Building V-003 contains LBP or equipment containing PCBs. The presence of ACM is unknown.

The outbuildings, trailers and other support facilities at the Alternative 2 site appear to be of relatively recent construction (i.e., the last 15 to 20 years) and are unlikely to contain LBP or PCBs. The presence of ACM is unknown. The date of construction of the observation towers on the Alternative 2 site, and its potential to be painted with LBP, is also unknown. As applicable, the presence of LBP or ACM would be established prior to beginning construction activities in compliance with relevant federal and state regulations.



Note: HERP = Hazards of EM Radiation to Personnel; HERF = Hazards of EM Radiation to Fuel; HERO = Hazards of EM Radiation to Ordnance.
Source: Navy 2009.

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3.9.3 Environmental Consequences

Hazardous Materials and Wastes Potential Impacts:

- **No Action:** No impacts.
- **Alternative 1:** No significant impacts. Impacts would be negligible.
- **Alternative 2:** No significant impacts. Impacts would be negligible.

3.9.3.1 No Action Alternative

Existing conditions at Wallops Island would continue under the No Action Alternative. This would have no impacts on or from hazardous materials and wastes.

3.9.3.2 Alternative 1 (Preferred Alternative) – Modify Building V-003 Potential Impacts

The construction of the addition to Building V-003 would involve the use of hazardous substances such as paints, thinners, solvents, and petroleum-based lubricants. Such materials would be handled and applied only by authorized personnel and would be kept in a secure container or storage area when not in use. The construction contractor would maintain onsite safety data sheets describing the safe use, handling, storage, and first aid requirements for all hazardous substances used during the project. Discarded packaging containing hazardous substances would be collected onsite in accordance with WFF's hazardous waste management program and disposed of at a permitted facility outside WFF in accordance with all NASA, Navy, federal, state and local regulations.

Access to the project site would be restricted by fencing, signage, and other physical barriers and limited to construction workers and other authorized personnel. Such precautions would minimize the potential for members of the general public to be exposed to hazardous substances.

Worker exposure to LBP or PCBs is not anticipated during the project's demolition phase. Any materials in Building V-003 suspected of containing ACM that would be disturbed during the project, such as pipe insulation or fireproofing, would be inspected and removed by a qualified contractor in accordance with applicable NASA, Navy, federal, state and local regulations. Generally, construction and renovation activities associated with Alternative 1 would be conducted in accordance with 40 C.F.R. Subpart 61.145 and construction contracts would include language requiring compliance with all applicable NASA, NAVY, federal, state and local laws and regulations pertaining to hazardous substances and hazardous wastes.

The increased use and generation of hazardous materials and wastes during the project's construction phase would be typical of a small- to medium-size project and would not exceed the capability of WFF to manage and dispose of them. For these reasons, Alternative 1 would have negligible construction-related impacts from hazardous materials and wastes at Wallops Island. These impacts would not be significant.

Alternative 1 would result in small increases in the quantities of hazardous substances used to maintain the expanded Building V-003 and the AN / SPY-6 system, as well as discarded packaging containing such substances. These additional hazardous materials and wastes would be handled, applied, and disposed of in accordance with all applicable NASA and Navy policies and procedures. The operation of the expanded Building V-003 and AN / SPY-6 system would not create a new source of soil or groundwater contamination.

Therefore, Alternative 1 would have negligible operational impacts on hazardous materials and wastes at Wallops Island. These impacts would not be significant.

3.9.3.3 Alternative 2 – Build New Facility Potential Impacts

The demolition of the V-095 facility and construction of a new facility from the ground up under Alternative 2 would involve the use of somewhat greater quantities of hazardous substances and

generate larger quantities of hazardous wastes than described for Alternative 1. Procedures concerning the handling, use, and storage of hazardous substances would be the same as those described for Alternative 1, and the generation of discarded packaging containing hazardous substances would not exceed the capacity of WFF to manage and dispose of hazardous wastes. Access to the project site would be restricted by fencing, signage and other physical barriers and would be limited to construction workers and other authorized personnel, thereby limiting the potential for members of the general public to be exposed to hazardous materials and wastes.

Prior to the demolition of the V-095 facility, the Navy would coordinate with WFF to determine the potential for ACM, LBP, and PCBs to be present on or in structures at the site. Any such materials determined to be present would be removed and disposed of in accordance with all NASA, Navy, federal, and state regulations and procedures. While Alternative 2 would potentially generate greater quantities of hazardous wastes than described for Alternative 1, the removal and disposal of any such substances would not exceed the capabilities of WFF's hazardous waste management program. Generally, demolition and construction activities associated with Alternative 2 would be conducted in accordance with 40 C.F.R. Subpart 61.145, and construction contracts would include language requiring compliance with all applicable NAVY, NASA, federal, state and local laws and regulations pertaining to hazardous substances and hazardous wastes.

Similarly, the Navy would coordinate with WFF to determine the nature and extent of hazards from MRS 5 adjacent to the project site. As necessary, NASA and the Navy would establish procedures to minimize the exposure of workers on the site to potential hazards (e.g., munitions and explosives of concern) that may underlie the project site.

For the reasons described above, construction-related impacts from hazardous materials and wastes resulting from Alternative 2 would be negligible and would not be significant.

Alternative 2 would result in small increases in the quantities of hazardous substances used to maintain the new facility and the AN / SPY-6 system, as well as discarded packaging containing such substances. These additional hazardous materials and wastes would be handled, applied, and disposed of in accordance with all applicable NASA and Navy policies and procedures. The operation of the new facility and AN / SPY-6 system would not create a new source of soil or groundwater contamination.

Therefore, Alternative 2 would have negligible operational impacts from hazardous materials and wastes at Wallops Island. These impacts would not be significant.

3.10 Summary of Potential Impacts to Resources and Impact Avoidance and Minimization

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative and impact avoidance and minimization measures are presented in Tables 3.10-1 and 3.10-2, respectively. Table 3.10-2 provides a comprehensive list of all mitigation requirements associated with the Proposed Action.

Table 3.10-1: Summary of Potential Impacts on Resource Areas

Resource Area	No Action Alternative	Alternative 1 (Preferred Alternative) – Modify Building V-003	Alternative 2 – Build New Facility
Air Quality	No impacts on any resources. Existing conditions would continue.	No significant impacts. Negligible construction-related impacts from emissions of criteria pollutants and greenhouse gases from diesel and gasoline-powered equipment and workers' vehicles during construction. Operational impacts would be negligible, as the expansion of Building V-003 would not create a new source of emissions, but only generate a very small increase in emissions from heating the expanded facility.	No significant impacts. Negligible impacts from emissions of criteria pollutants and greenhouse gases from construction equipment and workers' vehicles; these emissions would be somewhat greater than under Alternative 1, but would remain well below significance. Similarly, while the new facility would generate additional emissions, such emissions would be minimal and would not be significant because of the facility's small size.
Water Resources		No significant impacts. No impacts on groundwater, surface water, or wetlands, as all construction and operations would take place within an existing structure. Project site is within the 100-year floodplain but there is no practicable alternative outside the floodplain. Water-sensitive equipment and supplies associated with the AN / SPY-6 system would be located above the freeboard flood level (approximately 13 feet [4 meters] above mean sea level). The addition to Building V-003 would be above the flood elevation and thus have no effect on floodways or flood levels.	No significant impacts. No impacts on groundwater. No direct impacts on surface water or wetlands. Negligible indirect construction-related impacts on surface water and no indirect to wetlands due to use of sediment and erosion control best management practices during construction. The new facility would be in the 100-year floodplain as there are no practicable alternatives outside the floodplain. Because of its small size and because it would replace existing structures, the facility would not significantly affect floodways or flood levels. Impacts on the floodplain would be minor. They would not be significant.
Geological Resources		No impacts on geological resources.	No significant impacts. No impacts on geologic strata or topography. Negligible impacts on soils from erosion during construction (minimized by application of best management practices) and because the new facility would be partly built on currently open soils. These soils are not prime farmland.
Biological Resources		No significant impacts. No loss of vegetation and habitat, and minimal, negligible disturbance of wildlife during construction activities. No risk of exposure to electromagnetic energy below approximately 60 feet (18 meters) from ground level; only flying species (birds and bats) could possibly be exposed. Because of the way the radar operates, exposure would be extremely brief and not likely to adversely affect the animals. Alternative 1 may affect, but is not likely to adversely affect the following threatened or endangered species: red knot (*Calidris canutus rufa*), piping plover (*Charadrius melodus*), and northern long-eared bat (*Myotis septentrionalis*). No effect on any other protected species.	No significant impacts. Loss of a small amount of low-quality habitat (maintained vegetation). No clearing of trees. Potential for disturbance from construction activities, including noise and lighting, somewhat greater than under Alternative 1; the small scale of the project, limitation of construction to daylight hours, and compliance with the WFF Turtle Lighting Management Plan would ensure that these impacts, including those to sea turtles and piping plovers that could be nesting in the general vicinity remain minimal. Impacts from radar operation would be the same as under Alternative 1. Alternative 2 may affect, but is not likely to adversely affect the following threatened or endangered species: nesting loggerhead sea turtle (*Caretta caretta*), red knot, piping plover, and northern long-eared bat. No effect on any other protected species.
Land Use		No significant impacts. No change in land use on the site.	No significant impacts. Change in land use would not be consistent with the future land use plan presented in the 2008 NASA Goddard Space Flight Center Master Plan. This would affect only a small area and is not anticipated to have effects on future land uses outside of this area.
Noise		No significant impacts. Minor impacts from construction-related noise. Noise-producing activities would take place indoors and there are no sensitive noise receptors nearby. No operational impacts: no new permanent source of noise would be created.	No significant impacts. Minor impacts from construction-related noise. Greater construction noise than under Alternative 1 but the site's remote location would aid in attenuating impacts. No operational impacts: no new permanent source of noise would be created.

Resource Area	No Action Alternative	Alternative 1 (Preferred Alternative) – Modify Building V-003	Alternative 2 – Build New Facility
Infrastructure		No significant impacts. Construction activities would have some impacts on stormwater collection, solid waste management, and energy systems. Existing systems would be able to absorb these impacts, which would be negligible. In the long term, additional demand for energy and utilities (from the temporary presence of rotating testing staff) would also be easily absorbed.	No significant impacts. Construction activities would have some impacts on stormwater collection, solid waste management, and energy systems. These impacts would be somewhat greater than under Alternative 1, but existing systems would be able to absorb them and the impacts would be negligible. In the long term, additional demands for energy and utilities (from the temporary presence of rotating testing staff) would also be easily absorbed.
Public Health and Safety		No significant impacts on public health and safety. No ordnance or fuel storage or handling concerns associated with any of the buildings within the Hazards of Electromagnetic Radiation to Fuel (HERF) and Hazards of Electromagnetic Radiation to Ordnance (HERO) radii associated with the AN / SPY-6 system. With respect to Hazards of Electromagnetic Radiation to Personnel (HERP), measures would be taken to control exposure within the estimated 127-foot-radius (38.7-meter-radius) for personnel in a controlled environment. Activities would comply with applicable federal and state, NASA, DoD, and Navy occupational safety and environmental regulations to ensure protection of the public and WFF / Navy personnel.	Same as Alternative 1.
Hazardous Materials and Wastes		No significant impacts. Construction activities would involve the use of hazardous substances and generate corresponding quantities of hazardous wastes. Such materials would be handled, stored, and disposed of in accordance with applicable federal, state, and local regulations, policies, and procedures, including those promulgated and enforced by NASA and the Navy. Generation of hazardous wastes during construction activities would not exceed WFF's capacity to manage and dispose of them. Small permanent increases in the quantity of hazardous substances used to maintain the expanded or new facility, as well as resulting wastes. These additional hazardous materials and wastes would be handled, stored, and disposed of in accordance with applicable NASA and Navy policies and procedures. Impacts would be negligible.	No significant impacts. Construction activities would involve the use of hazardous substances and generate hazardous wastes in somewhat greater quantities than under Alternative 1, but still well within WFF's capacity to manage and dispose of them. Same with the increases from maintenance and operation of the new facility. Impacts would be negligible.

Table 3.10-2: Impact Avoidance and Minimization Measures

Measure	Anticipated Benefits	Evaluating Effectiveness	Implementing and Monitoring	Responsibility	Estimated Completion Date
Alternative 1 (Preferred Alternative) – Modify Building V-003					
Non Applicable	Non Applicable	Non Applicable	Non Applicable	Non Applicable	Non Applicable
Alternative 2 – Build New Facility					
Use exterior lighting in accordance with WFF Lighting Management Plan.	Minimize effects on loggerhead turtles potentially nesting on beach near new facility.	No substantial decline in successful loggerhead turtle nesting following completion of new facility.	Type and position of lighting determined during facility planning and design; modify if necessary once facility is operational.	Navy in coordination with WFF	Upon completion of facility; monitor and adjust as necessary on an ongoing basis.

4 Cumulative Impacts

This section 1) defines cumulative impacts, 2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts, 3) analyzes the incremental interaction the Proposed Action may have with other actions, and 4) evaluates cumulative impacts potentially resulting from these interactions.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of NEPA, CEQ regulations, and CEQ guidance. Cumulative impacts are defined in 40 C.F.R. section 1508.7 as the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

To determine the scope of EISs, agencies shall consider cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

In addition, CEQ and USEPA have published guidance addressing implementation of cumulative impact analyses—*Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ 2005) and *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (USEPA 1999). CEQ guidance entitled *Considering Cumulative Impacts under NEPA* (1997) states that cumulative impact analyses should

> "…determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

Cumulative impacts are most likely to arise when a relationship or synergism exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

4.2 Scope of Cumulative Impacts Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the study area delimits the geographic extent of the cumulative impacts analysis. In general, the study area will include those areas previously identified in Chapter 3 for the respective resource areas. The time frame for cumulative impacts centers on the timing of the Proposed Action (construction in 2016-2018).

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions are interrelated with the Proposed Action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for EISs and EAs, management plans, land use plans, and other planning related studies.

Unless otherwise noted, information on cumulative projects presented in the following sections is drawn from *Environmental Assessment, U.S. Navy Testing of Hypervelocity Projectiles and an Electromagnetic Railgun at Wallops Flight Facility, Wallops Island, Virginia* (Navy 2014).

4.3 Past, Present, and Reasonably Foreseeable Actions

This section focuses on past, present, and reasonably foreseeable future projects at and near Wallops Island. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in Section 4.1, it was determined if a relationship exists such that the affected resource areas identified in this EA for the Proposed Action (included in this EA) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance, these actions considered but excluded from further cumulative effects analysis are not catalogued here, as the intent is to focus the analysis on the meaningful actions relevant to decision-making. Projects included in this cumulative impacts analysis are listed in Table 4-1 and briefly described in the following sub-sections.

Table 4-1: Cumulative Action Evaluation

Action	Level of NEPA Analysis Completed
Past Actions	
NASA – Shoreline Restoration and Infrastructure Protection Program	EIS (2010)
NASA – Wallops Island Post-Hurricane Sandy Shoreline Repair	EA (2013)
NASA – Expansion of the WFF Launch Range	EA (2009)
NASA – North Wallops Island Unmanned Aerial Systems Airstrip	EA (2012)
U.S. Army Corps of Engineers – Permanent Danger Zone Amendment	EA (2012)
Present And Reasonably Foreseeable Future Actions	
Navy – Testing of Hypervelocity Projectiles and an Electromagnetic Railgun	EA (2014)
Antares 200 Configuration Operations	Final Supplemental EA (2015)
NASA Proposed Projects and Mission Activities	Not applicable
Navy – Atlantic Fleet Training and Testing	EIS / OEIS (2013)
Navy - Field Carrier Landing Practice Operations	EA (2013)
Air Force - Instrumentation Tower	EA (ongoing)
Public recreation (ongoing)	Not applicable

4.3.1 Past Actions

4.3.1.1 Shoreline Restoration and Infrastructure Protection Program (SRIPP)

A Record of Decision for the NASA SRIPP EIS was signed on December 13, 2010. The alternative selected (Alternative 1) entailed extending the existing rock seawall / dune on Wallops Island a maximum of 4,600 feet (1,400 meters) south of its southernmost point. A length of shoreline was to be filled with beach quality sand dredged from an offshore sand shoal, approximately 1,500 feet (460 meters) north of the Wallops Island-Assawoman Island property boundary and extending north for 3.7 mi (6.0 km).

An initial seawall / dune extension of approximately 1,430 feet (435 meters) was implemented in 2011, prior to the placement of the initial beach fill. Further seawall / dune extension may be completed in the future as funding becomes available. In addition, between April and August 2012, approximately 3,200,000 cubic yards (2,446,000 cubic meters) of fill were placed along the Wallops Island shoreline starting approximately 1,500 feet (460 meters) north of the Wallops Island-Assawoman Island property boundary and extending north to the terminus of the existing rock seawall / dune, creating an approximately 100-foot- (30-meter-) wide beach and dune.

The scope of the SRIPP Programmatic EIS included the project's 50-year design life. As such, it considered the effects of regularly scheduled beach re-nourishment at an approximate frequency of every five years. Accordingly, over the next 20 years, approximately three to four re-nourishment activities may occur. As a component of re-nourishment, NASA may dredge additional sand from the offshore shoals or may remove sand, as needed, from the north end of Wallops Island and bring it to the south end of the island.

4.3.1.2 Wallops Island, Post-Hurricane Sandy Shoreline Repair

NASA prepared a Final EA June 2013 for restoration of their shoreline after Hurricane Sandy, which severely eroded the recently restored beach. The Proposed Action, which was completed in summer 2014, repaired the Wallops Island rock seawall and placed approximately 650,000 cubic yards (496,961 cubic meters) of sand along the southern two-thirds of the Wallops Island shoreline.

4.3.1.3 Expansion of the WFF Launch Range

An EA was prepared in 2009 to address the proposed expansion of the launch range at WFF. Under the Proposed Action, the preferred alternative, NASA and the Mid-Atlantic Regional Spaceport (MARS) expanded and upgraded facilities to support medium to large class suborbital and orbital Expendable Launch Vehicle (ELV) launch activities from WFF. Components of the Proposed Action included site work required to support launch operations (such as facility construction and infrastructure improvements); testing, fueling, and processing operations; up to two static fire tests per year; and launching of up to six ELVs and associated spacecraft annually from Pad 0-A, in addition to the 12 existing launches from Pad 0-B. The first mission of the largest ELV launched thus far from WFF, an Antares, took place on September 18, 2013, when it was launched from WFF to the International Space Station.

4.3.1.4 North Wallops Island, Unmanned Aerial Systems Airstrip

In 2012, NASA prepared an EA to analyze the potential environmental consequences resulting from the construction and operation of a new unmanned aerial systems (UAS) airstrip on the north end of Wallops Island. The project includes construction of an asphalt airstrip measuring approximately 3,000 feet (900 meters) long and 75 feet (25 meters) wide. UAS operations would typically be conducted year-round during WFF's normal air traffic control tower hours (i.e., Monday through Friday, 6:00 a.m. to

6:00 p.m.). UAS use of the airstrip would be limited to the Viking 300, which has a 25 horsepower motor, and the largest UAS, a Viking 400, which has a 20-foot (6-meter) wingspan and is 14.7 feet (4.5 meters) long. The Commonwealth of Virginia is in the early stages of constructing the project. Work began in early 2016.

4.3.1.5 Permanent Danger Zone Amendment

In October 2012, the U.S. Army Corps of Engineers expanded the Atlantic Ocean danger zone around Wallops Island and Chincoteague Inlet, Virginia, to a 30-nautical-mile sector necessary to protect the public from hazards associated with WFF's rocket launch operations (33 C.F.R. part 334.130). An EA was prepared for this action.

4.3.2 Present and Reasonably Foreseeable Actions

There are ongoing and reasonably foreseeable projects that have been considered in evaluating cumulative effects on resources within the region. Known projects locations are shown on Figure 4-1.

4.3.2.1 Navy Actions

- **U.S. Navy Testing of Hypervelocity Projectiles and an Electromagnetic Railgun at Wallops Island.** The Navy intends to install and operate a 5" powder gun, EM railgun and supporting facilities and infrastructure at a site along the Wallops Island shoreline to test and further develop hypervelocity projectiles. Testing would advance the development of hypervelocity projectiles and the EM railgun, which will allow future Navy ships to fire guns farther, from beyond the range of enemy shore-based guns. The Navy prepared an EA for this action and a FONSI was signed in May 2014. The guns and supporting facilities would be built on Pad 5, which is located along Seawall Road immediately east of Building V-003. As of summer 2016, construction of the facility had not yet begun.
- **Directed Energy.** DoD and the Navy are pursuing a variety of high-energy laser and high-power microwave weapon system technologies that are in various stages of development. Wallops Island is being considered for future experiments and tests. Specific test scenarios are dependent on actual test requirements and are currently unknown. As shown on Figure 4-1, a site located immediately south of the Alternative 2 site has been identified for this activity.
- **DoD Standard Missile Rocket Launcher-3 (SM-3).** The Navy's SCSC could construct a dedicated launch pad to support a land-based vertical launch training system using a DoD SM-3 interceptor missile system. The SM-3 rocket launcher is being developed as part of the Aegis Ballistic Missile Defense System used by DoD to detect, track, and destroy ballistic missiles of all ranges. Although not currently in place at WFF, the SM-3 is used by the Navy as part of missile training exercises in conjunction with UAS or drone targets. Both the SM-3 and the drone target are compatible with the vertical launching system found aboard many Navy surface ships. If constructed, the launch pad would measure approximately 105 square feet (10 square meters) and would be located near the Navy's Aegis facility (Buildings V-010 and V-020) on Pad 4 along with a blockhouse with electric and water connections. This permanent launch pad is considered a connected action to MISSILEX (surface-to-air) training operations presented in the Atlantic Fleet Testing and Training EIS / OEIS (see Section 4.3.2.4 for additional discussion). Drone targets could be either launched from WFF or air-launched from military aircraft in the Virginia Capes (VACAPES) Operational Area (OPAREA) controlled airspace.

Figure 4-1

Source: Preliminary Draft NASA WFF Site-wide Programmatic Environmental Impact Statement, June 2013.

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- **Evolved Sea Sparrow Missile (ESSM) Pad**. The Navy's SCSC could construct a launch pad and block house to support a land-based guided missile launching system for the ESSM. If constructed, this 144-square-foot (13-square-meter) pad would replace a mobile launch system currently used for this activity at WFF.
- **Broad Area Maritime Surveillance Triton UAS.** The Navy Triton UAS is a high-altitude, long-endurance UAS that can be used to conduct continuous open-ocean and nearshore surveillance of targets as small as exposed submarine periscopes. The Navy would conduct operational flights of the Triton UAS on a weekly basis for an indefinite period beginning in 2017. Triton would take off from the WFF airfield and transit through R-6604 en route to W-386 in the VACAPES Range Complex. Triton operations would not lead to an increase in current WFF airfield operations, which are limited to 61,000 annually.
- **Navy Atlantic Fleet Training and Testing (AFTT).** The Navy prepared an EIS / OEIS in 2013 to evaluate the potential environmental effects associated with military readiness training and research, development, testing, and evaluation activities conducted within the AFTT study area. The AFTT study area pertinent to this EA includes the VACAPES Range Complex, including special use airspace with associated warning and restricted areas and surface and subsurface sea space of the VACAPES OPAREA. The VACAPES Range Complex also includes established mine warfare training areas located within the lower Chesapeake Bay and off the coast of Virginia. The EIS / OEIS was prepared to renew and combine current regulatory permits and authorizations; address evolving training and testing requirements; and obtain those permits and authorizations necessary to support force structure changes and emerging and future training and testing requirements, including those associated with the introduction of new ships, aircraft, and weapons systems.
- **Field Carrier Landing Practice Operations for E-2 / C-2 Aircraft.** The Navy prepared an EA and FONSI for conducting regular, scheduled E-2C Hawkeye, E-2D Advanced Hawkeye, and C-2A Greyhound (E-2 / C-2) field carrier landing practice operations at two alternative locations, including WFF (Main Base). Operations could use either Runway 04/22 or Runway 10/28. A total of 45,000 operations would be conducted annually

4.3.2.2 NASA Actions

- **Institutional support projects.** Construction and demolition of facilities and routine site activities.
- **Operational missions and activities.** Scientific and research programs, mission operations, airfield and airfield operations, piloted aircraft, unmanned aerial systems, rocket operations, rocket-boosted projectile testing, payloads, tracking and data systems, balloons, and autonomous underwater vehicles.
- **Antares 200 Configuration Operations.** NASA issued a Final EA in September 2015 that analyzes the impacts resulting from the launching of and associated supporting operations for the Antares 200 Configuration ELV in comparison to the version of the Antares ELV analyzed in the 2009 Final EA and currently operating at WFF (NASA 2015) (see additional description in Section 4.3.1.3). This EA supplements the 2009 *Final Environmental Assessment Expansion of the Wallops Flight Facility Launch Range*. The introduction of the Antares 200-Configuration ELV was necessitated by the catastrophic failure of the fifth attempted Antares launch in October 2014. The primary difference between the Antares

200 Configuration and the rocket analyzed in the 2009 Final EA is the 200 Configuration would employ a different set of first stage engines with slightly greater thrust (NASA 2015).

- **Expendable Launch Vehicle (ELV) Launch Pad 0-C.** MARS currently operates two ELV pads at the south end of Wallops Island. As rocket technology advances and new business opportunities present themselves, launch activity on Wallops Island is expected to increase. Stand-off distances are vital for safety, and, to minimize scheduling conflicts, reduce operational impact to concurrent activities at WFF, and accommodate new ELV technology, NASA may build a third ELV pad at the current location of the UAS airstrip at the south end of Wallops Island.
- **NASA Flat Pads.** In response to ELV rocket technology advances and new business opportunities as noted above, NASA could construct two flat pads on the southern end of Wallops Island measuring approximately 240 square feet (20 square meters) each. Construction of the new pads would allow flexibility in the size and launch frequency of sounding rockets.
- **Expanded Space Program**. NASA could expand their programs involving the potential for intermediate-class launch vehicles capable of delivering supplies to the International Space Station and Human Spaceflight Missions. WFF could make their facilities available for commercial customers for research, development, and operation of human spaceflight systems. These may include horizontal launch and landing vehicles; vertical launch and landing vehicles; and orbital vehicles.
- **Expansion of Restricted Airspace R-6604.** NASA owns and operates restricted airspace R-6604A / B, which covers the entire Wallops Island region and part of the northern portion of runway 4 / 22, one of the three existing runways on the Main Base. Current and forecast experimental aircraft test and evaluation activities, specifically, UAS, have provided challenges for the airspace surrounding WFF. Therefore, WFF proposes to expand the area by adding R-6604C / D / E. This expansion is considered a risk mitigation measure that would help protect general aviation from unavoidable hazards associated with experimental test flights. A Federal Aviation Administration (FAA) Notice of Proposed Rulemaking was published in the *Federal Register* for this action on September 10, 2015, and the Final EA has been released by NASA and the FAA.

4.3.2.3 US Air Force Action

- **Instrumentation Tower**. The United States Air Force is proposing to build, operate, and maintain a 750-foot tall, guyed instrumentation tower at WFF. The tower would be a typical three-sided lattice structure, approximately 42 inches wide on each side, constructed of galvanized steel. Steel guy wires would be installed along three radii from the tower at angles of 120 degrees from each other, and would extend out a distance of up to 590 feet from the tower base. The proposed tower would be used to conduct testing in collaboration with other DoD services and government agencies. The tower would have a service life of at least 20 years. The Air Force is in the process of preparing an EA for this action with NASA as a cooperating agency.

4.3.2.4 Public Recreation

Although Wallops Island is closed to public access, the adjacent waterways and marshes to the north and west are regularly used by the public for activities such as boating, waterfowl hunting, fishing, and

harvesting shellfish. Details regarding level and frequency of use are not available. However, it is assumed that most of these activities take place year-round, with hunting only taking place during fall and winter months.

4.4 Cumulative Impact Analysis

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

4.4.1 Air Quality

4.4.1.1 Description of Geographic Study Area

The region of influence (ROI) for the analysis of cumulative impacts on air quality is the Northeastern Virginia Intrastate air quality control region. This air quality control region is in attainment / unclassifiable for all criteria pollutants regulated by the CAA.

4.4.1.2 Relevant Past, Present, and Future Actions

To varying degrees, the implementation of multiple projects and activities described in Sections 4.3.1 and 4.3.2 would result in emissions of criteria pollutants regulated by the CAA. In all cases, emissions from those projects and activities would be intermittent and / or infrequent, and none of the projects would create new permanent sources of emissions of criteria pollutants. None have affected or are anticipated to affect the attainment status of the area. Projects and activities included in Sections 4.3.1 and 4.3.2 and subject to NEPA analysis either have been or would be determined to result in less than significant impacts on regional air quality or, if determined to have significant impacts, have been or would be subject to mitigation measures that have or would render such impacts as less than significant.

4.4.1.3 Cumulative Impact Analysis

The Proposed Action analyzed in this EA would cause negligible, temporary construction-related impacts and negligible operational impacts on air quality with no potential to significantly affect regional air quality in the Northeastern Virginia Intrastate air quality control region. When considered with the past, present, and reasonably foreseeable future projects described in Sections 4.3.1 and 4.3.2, the Proposed Action has no potential to result in significant cumulative impacts on air quality in the ROI.

4.4.2 Water Resources

4.4.2.1 Description of Geographic Study Area

The geographic study area for the analysis of cumulative impacts on water resources is Wallops Island.

4.4.2.2 Relevant Past, Present, and Future Actions

None of the projects described in Sections 4.3.1 and 4.3.2 would involve the re-channelization of surface water bodies. Any new point sources of pollutant discharges that would be established by the projects

would be regulated in accordance with the terms of WFF's existing and future VPDES permit, thereby ensuring that discharges of pollutants do not exceed applicable regulatory levels.

The majority of projects and activities described in Sections 4.3.1 and 4.3.2 would occur in the 100-year floodplain. In all cases, there is no practicable alternative to implementing these projects in the 100-year floodplain because the infrastructure necessary to support them is already established at WFF. In the context of the Atlantic shoreline, the development of additional facilities would be small and would not substantially displace flood waters.

Some of the projects described in Sections 4.3.1 and 4.3.2 would require additional withdrawals of groundwater at WFF. As applicable, WFF would analyze the anticipated water usage of these projects against existing quantities of withdrawals and make adjustments as necessary so as not to exceed withdrawal thresholds.

Any impacts on wetlands resulting from the projects and activities described in Sections 4.3.1 and 4.3.2 would be minimized to less than significant levels by the implementation of, and adherence to, mitigation measures set forth in applicable FONSIs and Records of decisions.

4.4.2.3 Cumulative Impact Analysis

The Proposed Action analyzed in this EA would have no or negligible impacts on water resources at Wallops Island. When considered with past, present, and reasonably foreseeable future actions described in Sections 4.3.1 and 4.3.2 occurring within the study area, the impacts of the Proposed Action would be too small to result in significant cumulative impacts on water resources in the study area.

4.4.3 Geological Resources

4.4.3.1 Description of Geographic Study Area

The geographic study area for the analysis of cumulative impacts on geological resources is Wallops Island.

4.4.3.2 Relevant Past, Present, and Future Actions

Most of the projects discussed in Sections 4.3.1 and 4.3.2 would involve varying degrees of soil disturbance such as excavation to install utilities, footings, and foundations; and grading to level sites. Generally, ground-disturbing projects would occur in previously disturbed areas of WFF. As applicable, contractors would use BMPs to minimize soil erosion during construction, and areas of project sites remaining undeveloped would be re-vegetated to minimize erosion in the long-term. Any piles installed as part of these projects would not be deep enough to penetrate geologic strata underlying Wallops Island. None of the projects would involve ongoing disturbance of geological resources as part of their operations.

4.4.3.3 Cumulative Impact Analysis

The Proposed Action analyzed in this EA would have no or negligible impacts on geological resources at Wallops Island. When considered with other past, present, and reasonably foreseeable future projects and activities at Wallops Island, the impacts of the Proposed Action would be too small to result in significant cumulative impacts on geological resources.

4.4.4 Biological Resources

4.4.4.1 Description of Geographic Study Area

The geographic study area for cumulative impacts on biological resources is Wallops Island.

4.4.4.2 Relevant Past, Present and Future Actions

Most of the projects described in Sections 4.3.1 and 4.3.2 would be implemented in previously disturbed areas of Wallops Island. Some would involve the removal of common species of vegetation providing habitat for common wildlife species. While individual specimens of plants and less-mobile wildlife would be destroyed, such impacts would occur on the individual rather than population level. More-mobile wildlife specimens would relocate to other suitable areas of habitat on Wallops Island. One proposed project – the Air Force Instrumentation Tower – may result in increased mortality of migratory and sea birds. WFF would continue to monitor wildlife populations on the island and adhere to measures outlined in its wildlife management plan. Potential effects to ESA-listed species would be avoided or, if unavoidable, mitigated through compliance with Section 7 of the ESA.

4.4.4.3 Cumulative Impact Analysis

The Proposed Action analyzed in this EA would have negligible impacts on biological resources at Wallops Island, including ESA-listed species. When considered with other past, present, and reasonably foreseeable future activities occurring at Wallops Island, the anticipated impacts of the Proposed Action are too small to result in significant cumulative impacts on biological resources.

4.4.5 Land Use

4.4.5.1 Description of Geographic Study Area

The geographic study area for cumulative impacts on land use is Wallops Island.

4.4.5.2 Relevant Past, Present and Future Actions

As applicable, the projects and activities described in Sections 4.3.1 and 4.3.2 would be implemented in a manner that is consistent with underlying land use designations at Wallops Island and compatible with adjacent land uses. Similarly, the proposed projects and activities would be consistent with current and future planning documents and policies applicable to Wallops Island. Coordination would be conducted as necessary to ensure that conflicts between proposed and ongoing operations and activities at Wallops Island are minimized or eliminated. None of the proposed projects and activities would impede or inhibit the continued or future use of existing land uses at Wallops Island for their intended function.

For these reasons, impacts on land use resulting from the proposed projects and activities described in Sections 4.3.1 and 4.3.2 would not be significant.

4.4.5.3 Cumulative Impact Analysis

The Proposed Action would have no or negligible impacts on land use at Wallops Island. When considered with past, present, and reasonably foreseeable future actions at Wallops Island, these impacts would be too small to result in significant cumulative impacts on those resources.

4.4.6 Noise

4.4.6.1 Description of Geographic Study Area

The geographic study area for cumulative impacts on noise is Wallops Island.

4.4.6.2 Relevant Past, Present, and Future Actions

A number of the past, present, and reasonably foreseeable projects described in Sections 4.3.1 and 4.3.2 involve the launching and use of aircraft, rockets, and other aerial vehicles. Although the implementation of these projects would cumulatively increase ambient noise levels at Wallops Island, the additional occurrences of aerial vehicles operating in the vicinity of the installation would remain intermittent, with operations lasting for periods of a few minutes to several hours at any given time. Noise from such operations is already common at Wallops Island, and the implementation of these projects would not result in significant increases in annoyance or discomfort to receptors. No noise-sensitive receptors exist or would be established at Wallops Island as part of the proposed projects and activities.

4.4.6.3 Cumulative Impact Analysis

The Proposed Action would not establish a new permanent source of noise at Wallops Island, nor would it create a noise-sensitive receptor. Construction-related noise would be limited to the vicinity of the project. For these reasons, the Proposed Action has no potential to contribute to significant cumulative impacts on the ambient noise environment at Wallops Island.

4.4.7 Infrastructure

4.4.7.1 Description of Geographic Study Area

The geographic study area for cumulative impacts on infrastructure and utilities is Wallops Island.

4.4.7.2 Relevant Past, Present, and Future Actions

A number of projects described in Sections 4.3.1 and 4.3.2 would increase demands on utility systems and infrastructure to varying degrees at Wallops Island. WFF would coordinate with project proponents and analyze utility and infrastructure requirements to ensure adequate capacities are available or to modify existing systems or project plans to meet projected demands. The implementation of the proposed projects and activities over a period of several years would further minimize impacts on utility systems and infrastructure at Wallops Island.

4.4.7.3 Cumulative Impact Analysis

The Proposed Action is anticipated to have negligible impacts on infrastructure systems at Wallops Island. The Navy would coordinate with WFF as planning for the Proposed Action continues to ensure that additional demands on utility systems and infrastructure at Wallops Island remain insignificant. Thus, when considered with other past, present and reasonably foreseeable future actions at Wallops Island, the Proposed Action has no potential to contribute to significant cumulative impacts on utility systems and infrastructure.

4.4.8 Public Health and Safety

4.4.8.1 Description of Geographic Study Area

The geographic study area for cumulative impacts on public health and safety is Wallops Island.

4.4.8.2 Relevant Past, Present, and Future Actions

As applicable, the proposed projects and activities described in Sections 4.3.1 and 4.3.2 would be implemented in accordance with all relevant federal, state, and local regulations, policies and procedures pertaining to the protection of human health and safety. Such regulations, policies and procedures would include those promulgated and enforced by NASA and its tenants at WFF.

4.4.8.3 Cumulative Impact Analysis

The Proposed Action would be implemented in compliance with applicable operating procedures and safety requirements designed to avoid adverse impacts on human health and safety from EM energy. This would ensure that it does not result in significant cumulative impacts on public health and safety when considered with other past, present, and reasonably foreseeable future actions occurring at Wallops Island.

4.4.9 Hazardous Materials and Wastes

4.4.9.1 Description of Geographic Study Area

The geographic study area for hazardous materials and wastes is Wallops Island.

4.4.9.2 Relevant Past, Present, and Future Actions

Some of the projects described in Sections 4.3.1 and 4.3.2 would involve the use of hazardous substances, such as paints, solvents, oils, fuels, and lubricants, and generate hazardous wastes. The handling, use, storage, and disposal of such materials would be in accordance with all applicable federal, state, and local regulations, policies, and procedures, including the regulations promulgated and enforced by WFF. WFF would coordinate with the project proponents to ensure that the quantities of hazardous materials used and hazardous wastes generated do not exceed the facility's capacity to manage them. None of the proposed projects and activities would create a new source of soil, surface water, or groundwater contamination at WFF.

4.4.9.3 Cumulative Impact Analysis

Impacts from hazardous materials and hazardous wastes resulting from the Proposed Action would be negligible. When considered with other past, present, and reasonably foreseeable future projects occurring at Wallops Island, these impacts are too small to have any potential to result in significant cumulative impacts on hazardous materials and hazardous wastes.

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5 Other Considerations Required by NEPA

5.1 Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations

In accordance with 40 C.F.R. section 1502.16(c), analysis of environmental consequences shall include discussion of possible conflicts between the Proposed Action and the objectives of federal, regional, state, and local land use plans, policies, and controls. Table 5-1 identifies the principal federal and state laws and regulations that are applicable to the Proposed Action, and describes briefly how compliance with these laws and regulations would be accomplished.

Table 5-1: Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local And Regional Land Use Plans, Policies And Controls	Status Of Compliance
NEPA (42 U.S.C. section 4321 et seq.); CEQ NEPA implementing regulations (40 C.F.R. parts 1500-1508; Navy procedures for Implementing NEPA (32 C.F.R. part 775 and OPNAVINST 5090.1D)	Compliant.
Clean Air Act (42 U.S.C. section 7401 et seq.)	Compliant; EA qualitatively analyzed impacts on air quality; project site is in an area designated as in attainment / unclassifiable and a General Conformity Applicability Analysis is not required.
Clean Water Act (33 U.S.C. section 1251 et seq.)	Compliant; Proposed Action would not create a new point source of pollutant discharge; construction contractor will obtain coverage under VPDES General Permit and implement SWPPP if land disturbance equals or exceeds one acre (0.4 hectares).
Coastal Zone Management Act (16 U.S.C. section 1451 et seq.)	Compliant; the Navy submitted a consistency determination to the Virginia Coastal Zone Management Program for review and concurrence. In a letter dated January 17, 2017, the Virginia Department of Environmental Quality concurred with the consistency determination.
National Historic Preservation Act (Section 106, 16 U.S.C. section 470 et seq.)	Compliant; the Navy completed consultation with the Virginia State Historic Preservation Office under Section 106. In a memorandum dated August 28, 2015, the Virginia State Historic Preservation Office concurred that no historic properties would be affected by the Proposed Action.
Endangered Species Act (16 U.S.C. section 1531 et seq.)	Compliant; The Navy completed consultation with the USFWS under Section 7. In an email dated October 19, 2015, the USFWS concurred with the Navy's finding that the Proposed action would either have no effect or is not likely to adversely affect threatened and endangered species.
Migratory Bird Treaty Act (16 U.S.C. sections 703-712)	Compliant; the Proposed action would have no effect on migratory birds; no takes of migratory birds protected under the MBTA would occur.

Federal, State, Local And Regional Land Use Plans, Policies And Controls	Status Of Compliance
Bald and Golden Eagle Protection Act (16 U.S.C. section 668-668d)	Compliant; the Proposed Action would not involve disturbance to bald eagle nests or habitat; no takes of bald eagles would occur.
Executive Order 11988, Floodplain Management; Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input	Compliant; opportunity for public review of the Draft EA was provided.
Executive Order 12088, Federal Compliance with Pollution Control Standards	Compliant; the Proposed Action would not create a significant source of pollution.
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments	Compliant; the Proposed Action has no potential to affect resources of interests to any tribal government.
Executive Order 13693, Planning for Federal Sustainability in the Next Decade	Compliant; the Proposed Action incorporates sustainability principles to the maximum extent practicable.

Coastal Zone Management

The federal Coastal Zone Management Act (CZMA) of 1972 establishes a federal-state partnership to provide for the comprehensive management of coastal resources. Coastal states and territories develop site-specific coastal management programs based on enforceable policies and mechanisms to balance resource protection and coastal development needs. The Virginia Coastal Zone Management Program (VCP) lays out the policy to guide the use, protection, and development of land and ocean resources within the state's coastal zone. Any federal agency proposing to conduct or support an activity within or outside the coastal zone that will affect any land or water use or natural resource of the coastal zone is required to do so in a manner consistent with the CZMA or applicable state coastal zone programs to the maximum extent practicable. However, Federal lands, which are "lands the use of which is by law subject solely to the discretion of…the Federal Government, its officers, or agents," are statutorily excluded from the State's "coastal zone". If, however, the proposed federal activity affects coastal resources or uses beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies. As a federal agency, the Navy is required to determine whether its proposed activities would affect the coastal zone. This takes the form of either a Negative Determination or a Consistency Determination.

Based on the analyses contained in this EA, the Navy determined that the Preferred Alternative (Alternative 1) has the potential to affect air quality, a coastal resource. Therefore, a Federal Coastal Zone Consistency Determination was prepared (Appendix D). The Navy found that the Preferred Alternative (Alternative 1) would be fully consistent with the applicable enforceable policies of the VCP. VDEQ provided concurrence with this finding by letter dated January 17, 2017 (copy in Appendix D).

5.2 Irreversible or Irretrievable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Implementation of the Proposed Action would involve human labor; the consumption of fuel, oil, and lubricants for construction vehicles; and loss of natural resources such as metals and other elements

that would be used to construct the addition to Building V-003 under the Preferred Alternative or the new facility under Alternative 2, and to assemble the components of the AN / SPY-6 system that would be installed at Wallops Island. Generally, the Proposed Action would involve the use of common, readily available resources and would not result in significant irreversible or irretrievable commitment of resources.

5.3 Unavoidable Adverse Impacts

This EA has determined that the alternatives considered would not result in any significant impacts. Implementing the alternatives would result in the following unavoidable environmental impacts:

- Preferred Alternative:
  - Air quality (negligible);
  - Biological resources (negligible);
  - Noise (minor);
  - Infrastructure and utilities (negligible);
  - Hazardous materials and wastes (negligible).
- Alternative 2:
  - Air quality (negligible);
  - Floodplains (minor);
  - Soils (negligible);
  - Biological resources (negligible);
  - Land use (negligible);
  - Noise (minor);
  - Infrastructure and utilities (negligible);
  - Hazardous materials and wastes (negligible).

5.4 Relationship between Short-Term Use of the Environment and Long-Term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development site reduces future flexibility in pursuing other options, or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

In the short term, effects to the human environment with implementation of the Proposed Action would primarily relate to the construction activity itself. Air quality and noise would be affected in the short term. In the long term, the Proposed Action would affect the resources listed in Section 5.3. However, most long-term impacts would remain negligible and would not be significant. The Proposed Action would not result in any impacts that would significantly reduce environmental productivity or permanently narrow the range of beneficial uses of the environment.

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CHAPTER 2

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CHAPTER 3

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Appendix A
Public Review of the Draft EA

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The public review period for the draft EA ran from 01 March 2017 through 03 April 2017.
No public comments were received.

Some names and signatures have been redacted for privacy.

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DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY
NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT FOR THE INSTALLATION & OPERATION OF AIR & MISSILE DEFENSE RADAR AN / SPY-6 SYSTEM AT WALLOPS FLIGHT FACILITY AT WALLOPS ISLAND, VIRGINIA

Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality Regulations, the U.S. Department of the Navy gives notice that a Draft Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts that may result from the Navy's proposal to install & operate an AN / SPY-6 air & missile defense radar system to enable the integration & testing of the AN / SPY-6 system with the other components of the Aegis Weapons System Advanced Capability Build 20 & fulfill specific testing objectives. The proposed action would be sited on Wallops Island, which is part of the National Aeronautics & Space Administration's (NASA's) Wallops Flight Facility (WFF) in Accomack County, Virginia. As the landowner, NASA has served as a cooperating agency in the development of this document. The Draft EA evaluates the potential environmental impacts associated with 2 action alternatives, & the No-Action Alternative on the following resource areas: air quality, water resources, geological resources, biological resources, land use & coastal zone management, noise, infrastructure, public health & safety, & hazardous materials & wastes. The Draft EA concludes that the implementation of the alternatives would not result in significant direct, indirect, or cumulative impacts to the quality of the human environment.

The Draft EA is available electronically at:
http://www.navsea.navy.mil/Portals/103/Documents/SCSC/IO%20SPY6%20Radar%20SCSC_V5d_Dec16_Optimized.pdf

The Draft EA is also available in hardcopy for public review at the following repositories:

- NASA WFF Visitor Center at Building J-20, Wallops Island, VA 23337
- Chincoteague Island Library, 4077 Main Street, Chincoteague Island, VA 23336
- Eastern Shore Public Library, 23610 Front Street, P.O. Box 360, Accomack, VA 23301

Public input is very important in order for the Navy to fully understand community concerns & relevant issues. Individuals interested in the project are encouraged to provide their comments on the document. Comments should be postmarked no later than 30 calendar days from the publication of this notice. No return replies will be provided. All comments will be addressed within the EA. Identifying information (names, addresses, eMail addresses, etc.) will be withheld to the extent permitted by law.

Comments may be either be eMailed to: jill.jester@navy.mil Or mailed to: Ms. Jill Jester, Dept. 1000, Public Affairs Officer, Surface Combat Systems Center Wallops Island, Building R30, 30 Battle Group Way, Wallops Island, Virginia 23337

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3101 WILSON BOULEVARD
ARLINGTON, VA 22201
ATTN: Lacey Lumpkin

Certificate of Publication

This is to certify that the attached notice has been published in CHINCOTEAGUE BEACON on:

03/02/17,

EASTERN SHORE NEWS, a biweekly paper of general circulation in Accomack County, published in Accomac, VA on:

03/01/17,

[redacted]
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Ocean Pines, Maryland 21811

Chincoteague Beacon
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Delaware Wave
33000 Coastal Highway,
Bethany Beach, Delaware 19930

Somerset Herald
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Salisbury, MD 21801

Wicomico Weekly
618 Beam Street

Eastern Shore News
23079 Courthouse Avenue,
Accomac, VA 23301

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The Daily Times
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DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY
NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT FOR THE INSTALLATION & OPERATION OF AIR & MISSILE DEFENSE RADAR AN / SPY-6 SYSTEM AT WALLOPS FLIGHT FACILITY AT WALLOPS ISLAND, VIRGINIA

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AFFIDAVIT

Eastern Shore Post, Inc.
P.O. Box 517
Onley, Va. 23418

We, Eastern Shore Post, Inc., publishers of the Eastern Shore Post, a weekly newspaper published in Onley, State of Virginia, do hereby certify that the enclosed notice has been published.

Published on 3/3/17

In the said Eastern Shore Post aforementioned.

Attest: [redacted]

Dated today 3/6/17

Total Printer's Fee $ 288.04

Phone: 757-789-7678
Fax: 757-789-7681

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY
NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT FOR THE INSTALLATION & OPERATION OF AIR & MISSILE DEFENSE RADAR AN/SPY-6 SYSTEM AT WALLOPS FLIGHT FACILITY AT WALLOPS ISLAND, VIRGINIA

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Legal Notices

D APPLICATION

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APPLICATION

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APPLICATION

ARLES NATHAN

Legal Notices

**DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY
NOTICE OF AVAILABILITY OF A DRAFT
ENVIRONMENTAL ASSESSMENT FOR THE
INSTALLATION & OPERATION OF AIR & MISSILE
DEFENSE RADAR AN / SPY-6 SYSTEM AT WALLOPS
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3/1, 2 ' 17

0001958884-01

NOTICE OF OYSTER GROUND APPLICATION

Justin Annis, (2017007) has applied for approximately 10-+ acres of oyster planting ground in Killmon Cove s i t u a t e d i n Northampton City/County and described as follows:

North by: Vacant
East by: MLW
South by: Vacant
West by: MLW
Lat/Long: N37-32.3928 W75-55.9480
Notes: May be subject to SAV

Legal Notices

**NOTICE OF TRUSTEE'S SALE OF
18402 Dogwood Drive
Onancock, Virginia 23417 (Accomack County)
Tax Map #92A-3-4**

In execution of a Deed of Trust in the name of Ruth Ann Brown dated June 26, 1991 and recorded in Deed Book 0600, at page 00745 in the Clerk's Office of the Circuit Court of Accomack County, Virginia, which Noteholder is United States of America, acting through the Rural Housing Service, Department of Agriculture, the undersigned Substitute Trustees, either of whom may act, will offer for sale at public auction to the highest bidder, at the front entrance of the Accomack County Circuit Court, 23316 Courthouse Avenue, Accomack, Virginia on March 16, 2017, at 12:05 p.m., the following property:

ALL those certain lots, strips or parcels of land situate near the Village of Savageville, Lee Magisterial District, Accomack County, Virginia, designated as Lot 4 and a Twenty Foot (20 ft.) wide strip of land on a certain plat dated March 13, 1969, recorded in the Clerk's Office of the Circuit Court of Accomack County, Virginia, in Plat Book 15, page 57.

In addition, sale shall be made subject to all existing easements and restrictive covenants as the same may lawfully affect the real estate. Property to be sold **"AS IS" WITHOUT REPRESENTATION OR WARRANTY OF ANY KIND.** Property shall be conveyed to the purchaser by special warranty deed.

Terms of Sale: **Cash, Cashier's or Certified Check at sale made payable to Hill and Rainey Attorneys.** Certified funds must be presented to Trustee for inspection at the start of sale in order to be qualified to bid. Bidding Increments: Not less than $100.00. A deposit of $4,000.00, or 10% of the purchase price, whichever is less, will be required at the time of sale with settlement within thirty (30) days from the date of sale. Additional terms may be announced at the time of sale.

Pursuant to the Federal Fair Debt Collection Practices Act, we advise you that this communication is from a debt collector attempting to collect the indebtedness referred to herein and any information we obtain will be used for that purpose.

Robert B. Hill, T. O. Rainey, III, Shelley K. Richardson and Nathaniel A. Scaggs, Substitute Trustees

This is a communication from a debt collector.
FOR INFORMATION PLEASE REFER TO:
www.hillandrainey.com

Hill and Rainey Attorneys
2425 Boulevard, Suite 9
Colonial Heights, Virginia 23834
(804) 526-8300, Ext. 117
Also see USDA's website @ www.resales.usda.gov
2/22, 3/1, 8, 15 ' 17

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Legal Notices

Legal Notices
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DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY
NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT FOR THE INSTALLATION & OPERATION OF AIR & MISSILE DEFENSE RADAR AN / SPY-6 SYSTEM AT WALLOPS FLIGHT FACILITY AT WALLOPS ISLAND, VIRGINIA

Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality Regulations, the U.S. Department of the Navy gives notice that a Draft Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts that may result from the Navy's proposal to install & operate an AN / SPY-6 air & missile defense radar system to enable the integration & testing of the AN / SPY-6 system with the other components of the Aegis Weapons System Advanced Capability Build 20 & fulfill specific testing objectives. The proposed action would be sited on Wallops Island, which is part of the National Aeronautics & Space Administration's (NASA's) Wallops Flight Facility (WFF) in Accomack County, Virginia. As the landowner, NASA has served as a cooperating agency in the development of this document. The Draft EA evaluates the potential environmental impacts associated with 2 action alternatives, & the No-Action Alternative on the following resource areas: air quality, water resources, geological resources, biological resources, land use & coastal zone management, noise, infrastructure, public health & safety, & hazardous materials & wastes. The Draft EA concludes that the implementation of the alternatives would not result in significant direct, indirect, or cumulative impacts to the quality of the human environment.

The Draft EA is available electronically at: http://www.navsea.navy.mil/Portals/103/Documents/SCSC/IO%20SPY6%20Radar%20SCSC_V5d_Dec16_Optimized.pdf

The Draft EA is also available in hardcopy for public review at the following repositories:

- NASA WFF Visitor Center at Building J-20, Wallops Island, VA 23337
- Chincoteague Island Library, 4077 Main Street, Chincoteague Island,VA 23336
- Eastern Shore Public Library, 23610 Front Street, P.O. Box 360, Accomack, VA 23301

Public input is very important in order for the Navy to fully understand community concerns & relevant issues. Individuals interested in the project are encouraged to provide their comments on the document. Comments should be postmarked no later than 30 calendar days from the publication of this notice. No return replies will be provided. All comments will be addressed within the EA. Identifying information (names, addresses, eMail addresses, etc.) will be withheld to the extent permitted by law.

Comments may be either be eMailed to: jill.jester@navy.mil Or mailed to: Ms. Jill Jester, Dept. 1000, Public Affairs Officer, Surface Combat Systems Center Wallops Island, Building R30, 30 Battle Group Way, Wallops Island, Virginia 23337

3/1, 2 ' 17

0001958884-01

NOTICE OF PUBLIC HEARING ON PROPOSED BOUNDARY LINE ADJUSTMENT AGREEMENT BETWEEN THE COUNTY OF NORTHAMPTON AND THE TOWN OF EASTVILLE

Notice is hereby given, pursuant to Section 15.2-3107 of the Code of Virginia (1950), as amended, that the Board of Supervisors of Northampton County, Virginia ("Board of Supervisors") and the Town Council of the Town Of Eastville, Virginia ("Town Council") (together, "Parties"), will hold a joint public hearing on a proposed Boundary Line Adjustment Agreement Between The County Of Northampton And The Town Of Eastville ("Agreement"). Following the public hearing, the Board of Supervisors and the Town Council each intend to adopt a resolution approving the Agreement. The public hearing and meeting at which each governing body intends to take such action will be held at 7:00 p.m. on Tuesday, March 14, 2017, in the Board Room of the County Administration Building, 16404 Courthouse Road, Eastville, Virginia.

The Agreement is authorized by Section 15.2-3106 et seq. of the Code of Virginia (1950), as amended, and provides that the Town's boundary line will be voluntarily adjusted (i) by incorporating into the Town all or portions of 148 parcels of land and adjacent public roads and rights-of-way that currently lie within the unincorporated portion of the County and (ii) by relocating from the Town into the unincorporated portion of the County two parcels of land. A survey plat attached to the Agreement depicts the modified boundary line of the Town as proposed by the Board of Supervisors and the Town Council.

The territory to be incorporated into the Town consists of four areas. One area lies to the north of the existing boundary of the Town and includes parcels along Selma Estates, Church Street, and Fox Court and ending with the Peirson property. A second area lies to the south of the existing boundary of the Town and includes the parcels ending north of the properties along Stump Town Drive. A third area lies to the east of the existing boundary of the Town and includes the parcels lying east of Canonie Atlantic Co., and along Rockefellow Lane and Station Lane. A fourth area lies to the northeast of the existing boundary of the Town and includes the parcels of E. Garrison Drummond and Douglas and Audrey Coburn.

The two parcels to be relocated from the Town into the unincorporated portion of the County lie within the Town along its existing southeastern boundary and include the parcels of Eastern Shore Associates, II and Robert P. Nottingham.

The proposed Agreement provides that the Parties, after approving the Agreement, shall promptly petition the Circuit Court of Northampton County to relocate and establish the boundary line as agreed upon, and that the new boundary line shall become effective at midnight on June 30, 2017. In the event a final court order has not been entered by that date, the new boundary line shall become effective at midnight on December 31st or at midnight on June 30th following entry of the final court order, whichever date occurs first. The Agreement further provides that the Board of Supervisors and the Town Council shall each bear one-half of the costs of newspaper publication.

A copy of the proposed Agreement, including the survey plat, and a map depicting the modified boundary line of the Town as proposed by the Board of Supervisors and the Town Council is on file in the office of the Clerk of the County Board of Supervisors located in the County Administration Building, 16404 Courthouse Road, Eastville, Virginia and in the office of the Clerk of the Town Council of the Town of Eastville, located in the Town Municipal Building, 5248 Willow Oak, Eastville, Virginia. Any person interested in the proposed Agreement may appear at the public hearing and present his or her views.

Legal Ads (Cont'd)

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY
NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT FOR THE INSTALLATION & OPERATION OF AIR & MISSILE DEFENSE RADAR AN/SPY-6 SYSTEM AT WALLOPS FLIGHT FACILITY AT WALLOPS ISLAND, VIRGINIA

Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality Regulations, the U.S. Department of the Navy gives notice that a Draft Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts that may result from the Navy's proposal to install & operate an AN/SPY-6 air & missile defense radar system to enable the integration & testing of the AN/SPY-6 system with the other components of the Aegis Weapons System Advanced Capability Build 20 & fulfill specific testing objectives. The proposed action would be sited on Wallops Island, which is part of the National Aeronautics & Space Administration's (NASA's) Wallops Flight Facility (WFF) in Accomack County, Virginia. As the landowner, NASA has served as a cooperating agency in the development of this document. The Draft EA evaluates the potential environmental impacts associated with 2 action alternatives, & the No-Action Alternative on the following resource areas: air quality, water resources, geological resources, biological resources, land use & coastal zone management, noise, infrastructure, public health & safety, & hazardous materials & wastes. The Draft EA concludes that the implementation of the alternatives would not result in significant direct, indirect, or cumulative impacts to the quality of the human environment.

The Draft EA is available electronically at: http://www.navsea.navy.mil/Portals/103/Documents/SCSC/IO%20SPY6%20Radar%20SCSC_V5d_Dec16_Optimized.pdf

The Draft EA is also available in hardcopy for public review at the following repositories:

- NASA WFF Visitor Center at Building J-20, Wallops Island, VA 23337
- Chincoteague Island Library, 4077 Main Street, Chincoteague Island, VA 23336
- Eastern Shore Public Library, 23610 Front Street, P.O. Box 360, Accomac, VA 23301

Public input is very important in order for the Navy to fully understand community concerns & relevant issues. Individuals interested in the project are encouraged to provide their comments on the document. Comments should be postmarked no later than 30 calendar days from the publication of this notice. No return replies will be provided. All comments will be addressed within the EA. Identifying information (names, addresses, eMail addresses, etc.) will be withheld to the extent permitted by law.

Comments may be either be eMailed to: jill.jester@navy.mil, or mailed to: Ms. Jill Jester, Dept. 1000, Public Affairs Officer, Surface Combat Systems Center Wallops Island, Building R30, 30 Battle Group Way, Wallops Island, Virginia 23337

TO THE RESIDENTS OF T
The 2017 Town decals will b
2017, for the amounts of $2
and $25.00 for motorcycles.
decals) at Ward's Service C
during normal business hour
at the Town Hall (23401 Fron
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TOWN OF WAC
License Tags/Decals for Veh
2017 Tags/Decals will be
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Monday through Wednesd
Saturday 9:00 a.m
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should be registered at www.abc

Date 3/2/2017

I acknowledge receipt of the "Draft Environmental Assessment for Installation and Operation of Air and Missile Defense Radar AN-SPY-6 at Wallops Island, wallops Flight Facility, VA" dated December 2016.

Signed,

[redacted]

NASA Wallops Visitors Center

[redacted]

witness

Date 3/2/2017

I acknowledge receipt of the "Draft Environmental Assessment for Installation and Operation of Air and Missile Defense Radar AN-SPY-6 at Wallops Island, wallops Flight Facility, VA" dated December 2016.

Signed,

Eastern Shore Public Library

witness

Date 3/2/2017

I acknowledge receipt of the "Draft Environmental Assessment for Installation and Operation of Air and Missile Defense Radar AN-SPY-6 at Wallops Island, wallops Flight Facility, VA" dated December 2016.

Signed,

[redacted]

Chincoteague Library

Library Volunteer

witness [redacted]

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Appendix B
Endangered Species Act Documentation

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Some names and contact information of government personnel have been redacted.

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From: Nystrom, Sarah
To: Johnson, Orlando L CIV NAVFAC MIDLANT, EV
Subject: Proposed Installation and Operation of Air and Missile Defense Radar AN/SPY-6 at Wallops Island
Date: Monday, October 19, 2015 2:57:07 pm

We have reviewed the project package received on September 22, 2015 for the referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended.

We concur with the determinations provided in the Species Conclusion Table dated July 9, 2015 and have no further comments. Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. If you have any questions, please contact me at [redacted], or via email at Sarah_Nystrom[redacted].

--

Sarah Nystrom

Fish and Wildlife Biologist
Virginia Field Office - Ecological Services
6669 Short Lane
Gloucester, Virginia 23061
[redacted]

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From: [redacted]
To: Johnson, Orlando L CIV NAVFAC MIDLANT, EV
Cc: [redacted]
Subject: Re: Proposed Installation and Operation of Air and Missile Defense Radar AN/SPY-6 at Wallops Island, Wallops Flight Facility, Accomack County, Virginia
Date: Tuesday, September 22, 2015 3:43:28 pm

Orlando,
I received your project submission. In the future, please send your project review packets to: virginiafieldoffice@fws.gov. I have forwarded your project so it can be assigned to one of our office biologists.
Thanks,
[redacted]

On Tue, Sep 22, 2015 at 1:26 PM, Johnson, Orlando L CIV NAVFAC MIDLANT, EV <orlando.johnson[redacted]> wrote:

Ms. [redacted],

The Department of the Navy (Navy), in cooperation with the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility (WFF), has reviewed the referenced project using the Virginia Field Office's online project review process and has followed relevant guidance and instructions in completing the review. We have completed our review and are submitting this project review package in accordance with the instructions for further review.

The Navy is proposing to install and operate an AN/SPY-6 radar system in Building V-003 on Wallops Island at WFF (see enclosed Figures 1 and 2). AN/SPY-6 is the Navy's next generation of shipboard, multi-function, phased-array radar intended for integration with the Aegis Combat System to be deployed on the DDG 51 Flight III series of Arleigh Burke-class destroyers. The purpose and need for the proposed action is to integrate and test the AN/SPY-6 system with Aegis Advanced Capability Build (ACB) 20. ACB 20 is the next generation of the Aegis system, scheduled for deployment on Navy ships in fiscal year 2021.

Building V-003 is currently used for radar operations as part of the DDG-1000 program. This program is nearing completion, after which the building will become available for the integration and testing of the AN/SPY-6 system. The proposed action involves the construction of additional decks above an existing two-story extension of the building (see enclosed Exhibit 1), which will allow for the modification of the south-facing inclined carbon composite panel supporting the radar arrays so it can accommodate the AN/SPY-6 system. Modifications would include a change in the inclination of the panel (from 20 to 15 degree) and a rotation of the radar face by 34 degrees counterclockwise to optimize radar coverage. All work would take place within the existing footprint of the facility. A rendering of the finished building is enclosed as Exhibit 2.

Radar operations would be conducted 24/7 using targets of opportunity only. The proposed action does not include the launching or firing of any missiles or other projectiles for the purpose of testing the radar. Unlike traditional radars, which use a rotating beam, a fixed phased-array radar like the AN/SPY-6 emits beams of electromagnetic energy in all directions, allowing for the detection and tracking of multiple targets simultaneously. Electromagnetic waves are emitted in a series of short pulses separated by non-transmission intervals. Pulses are generated when the transmitter is active; when the transmitter is off, the radar only receives echoes from the sent pulse. Radars typically operate in receive mode more frequently than in transmit mode. The duration of the transmission of a pulse is usually measured in microseconds.

The AN/SPY-6 system includes an S-band radar, operating at frequencies between 2 and 4 gigahertz (GHz) and an X-band radar, operating at frequencies between 8 and 12 GHz. Horizontally, the radar would scan an area bounded by the 114.3 degrees and 204.3 degrees azimuths (see enclosed Figure 3). Vertically, no scanning would occur at less than 0 degree angle. Therefore, because the radar array would be located approximately 60 feet above ground level, there is no risk of exposure to electromagnetic energy between ground level and approximately 60

feet above this level.

The enclosed project review package provides the information about the species, critical habitat, and bald eagles considered in our review, and the species conclusions table included in the package identifies our determinations for the resources that may be affected by the project.

This email is also intended to satisfy any ESA Section 7 requirements for this proposed action applying to NASA as the federal land owner at WFF. If you have any questions or require additional information, do not hesitate to contact me at [redacted].

Orlando Johnson
Environmental Planner
Environmental Planning and Conservation
[redacted]

--

NOTE: MY EXTENSION HAS CHANGED
****
[redacted]
US Fish & Wildlife Service
6669 Short Lane
Gloucester, VA 23061

Tel: [redacted]
Fax: [redacted]
Visit us at http://www.fws.gov/northeast/virginiafield/

Wallops Flight Facility

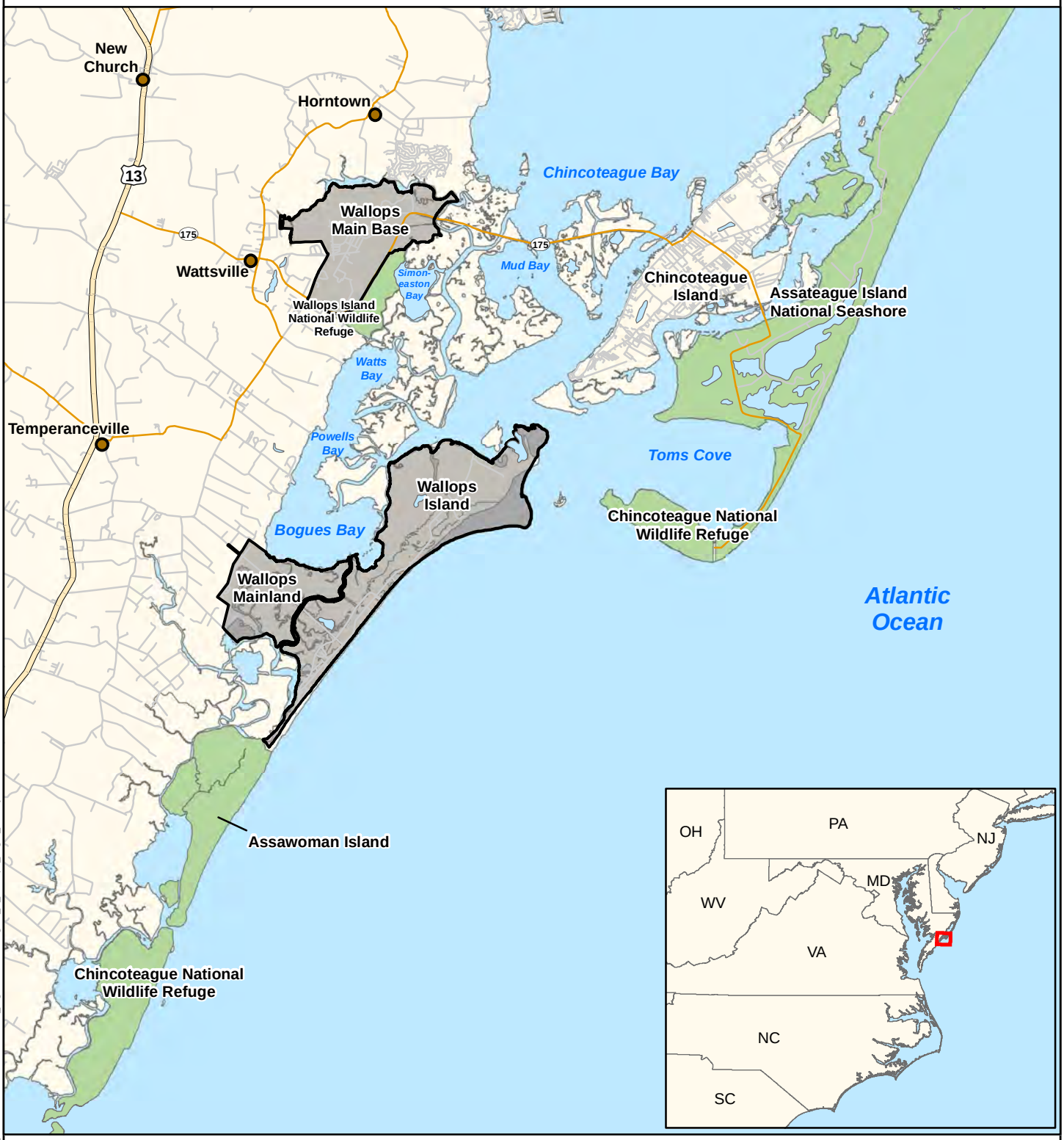


Figure 1

Path: L:_Common\GIS_Data\60342567_SPY6EA\MXDs\Coordination_Figures\SHPO\Figure_1_Wallops_Flight_Facility.mxd

Location of Building V-003

WFF Boundary

0 500 1,000
Feet

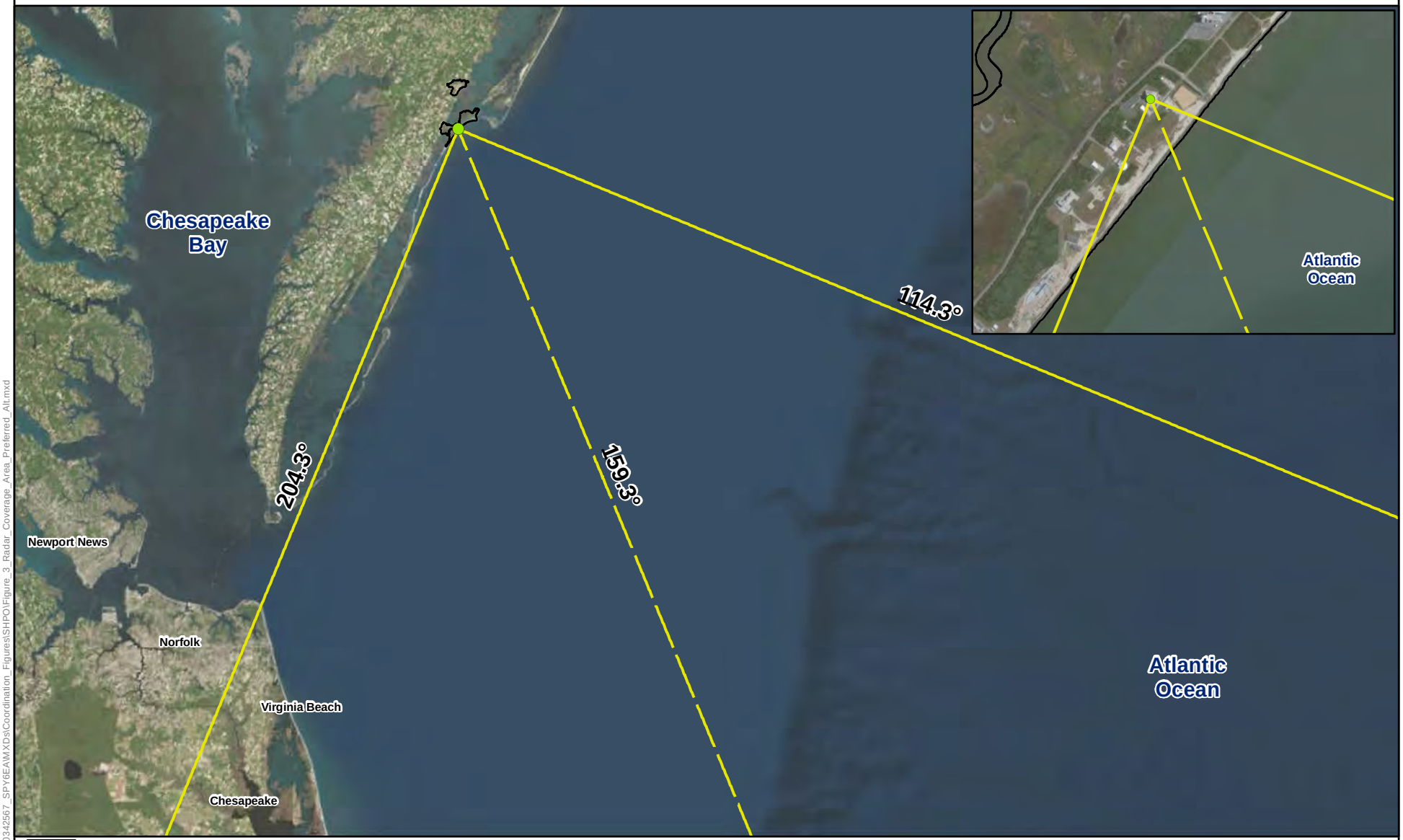
0 150 300
Meters

N

Figure 2

Path: L:_Common\GIS_Data\60342567_SPY6EA\MXDs\Coordination_Figures\SHPO\Figure_2_Bldg_V-003.mxd

Radar Coverage Area: Preferred Alternative



WFF Boundary
AN/SPY-6 Preferred Alternative
Radar Boresight
Radar Scan Area Limit

0 25 50
Miles
0 40 80
Kilometers
N

Figure 3

Path: L:_Common\GIS_Data\60342567_SPY6EAIMXDs\Coordination_Figures\SHPO\Figure_3_Radar_Coverage_Area_Preferred_Alt.mxd

Exhibits

Exhibit 1: Building V-003, south façade/radar array, existing conditions

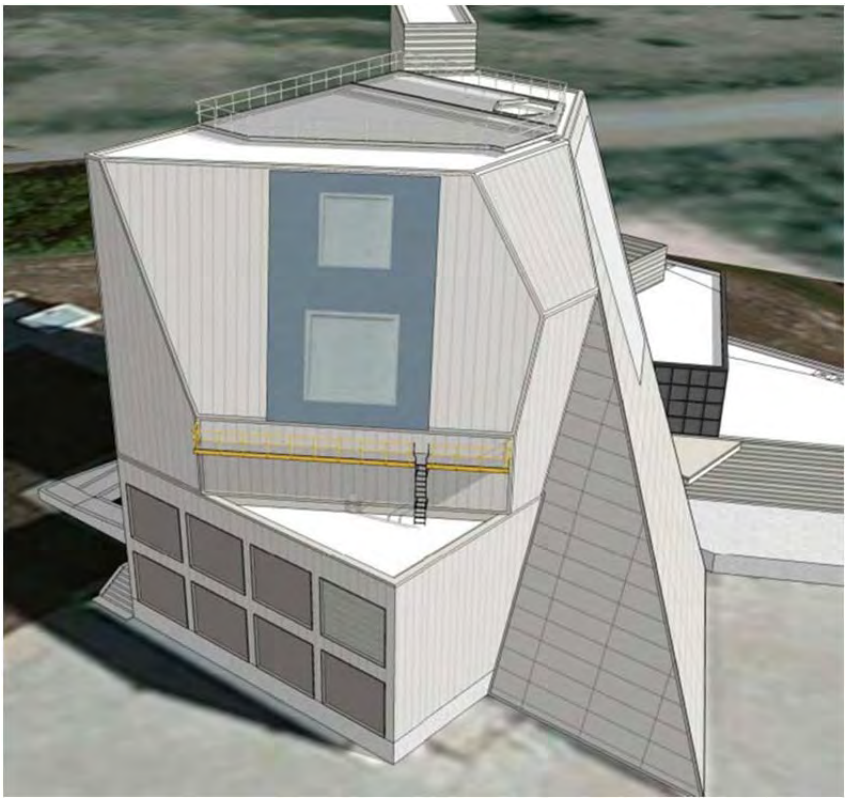


Exhibit 2: Building V-003, south façade/radar array, proposed configuration

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Code: 05E2VA00-2015-SLI-1902 May 06, 2015
Event Code: 05E2VA00-2015-E-01906
Project Name: Installation and operation of SPY-6 radar

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Installation and operation of SPY-6 radar

Official Species List

Provided by:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

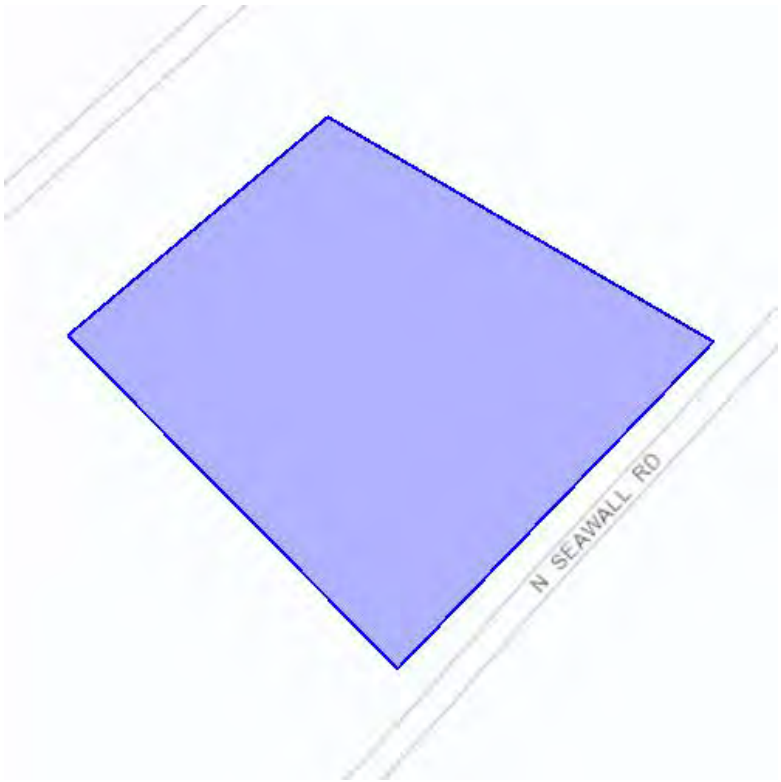
Consultation Code: 05E2VA00-2015-SLI-1902
Event Code: 05E2VA00-2015-E-01906

Project Type: DEVELOPMENT

Project Name: Installation and operation of SPY-6 radar
Project Description: U.S. Navy would modify Building V-003 at Wallops Flight Facility (WFF) to accommodate SPY-6 radar system, and conduct testing of the radar system following the completion of the modifications and installation of the system. Building modifications would occur entirely within the existing footprint of V-003. It is anticipated that testing of SPY-6 radar would have minimal potential to adversely impact wildlife.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-75.4694102704525 37.8528904042764, -75.47030612826347 37.853606231549286, -75.46959802508353 37.854076386508915, -75.4685465991497 37.85359352461687, -75.4694102704525 37.8528904042764)))

Project Counties: Accomack, VA

Endangered Species Act Species List

There are a total of 10 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

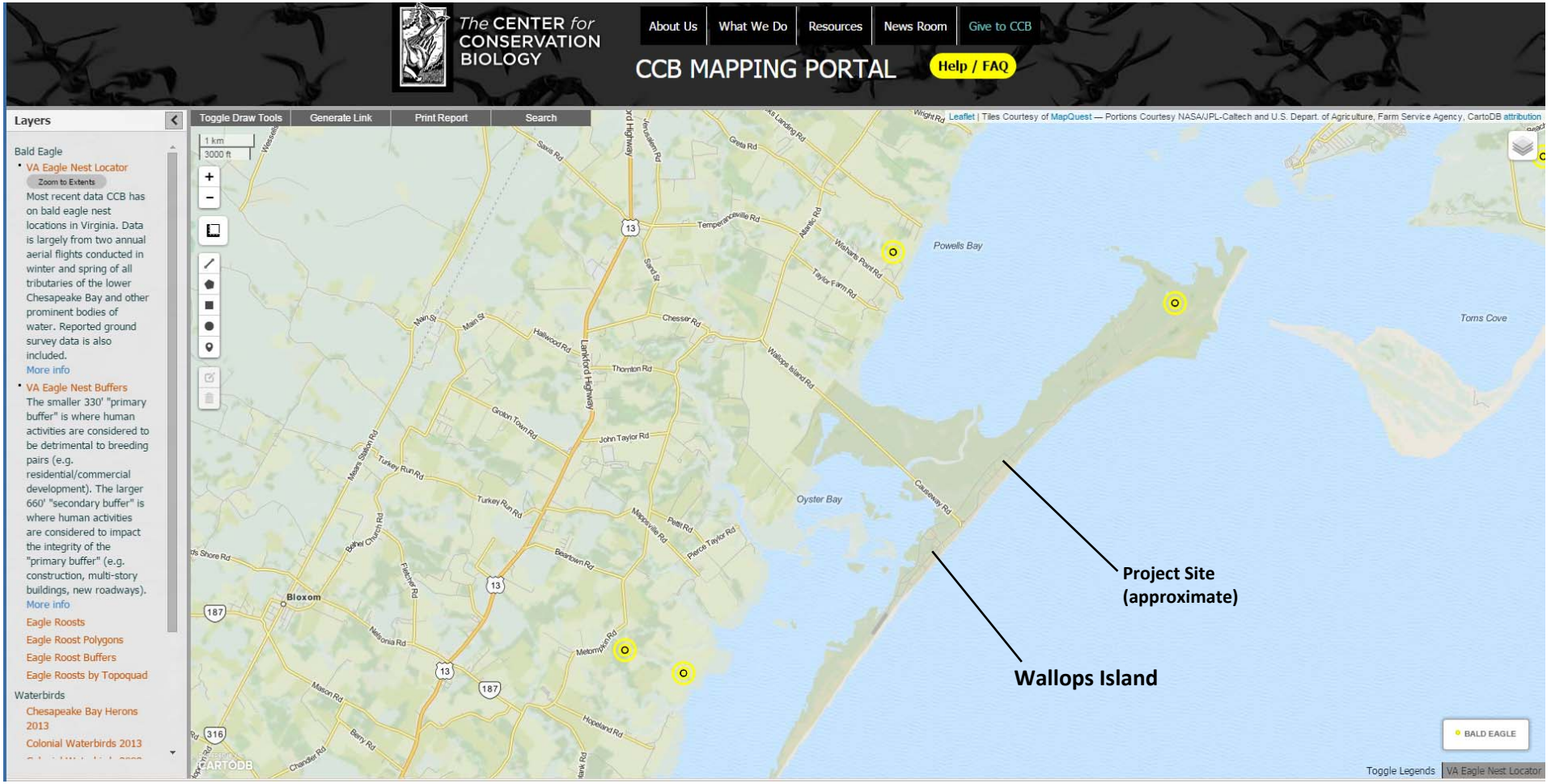
Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
Piping Plover *(Charadrius melodus)* Population: except Great Lakes watershed	Threatened	Final designated	
Red Knot *(Calidris canutus rufa)*	Threatened		
Roseate tern *(Sterna dougallii dougallii)* Population: northeast U.S. nesting pop.	Endangered		
Flowering Plants			
Seabeach amaranth *(Amaranthus pumilus)*	Threatened		
Mammals			
Northern long-eared Bat *(Myotis septentrionalis)*	Threatened		
Reptiles			
Green sea turtle *(Chelonia mydas)* Population: Except where endangered	Threatened	Final designated	
Hawksbill sea turtle *(Eretmochelys imbricata)*	Endangered	Final designated	

Population: Entire			
Kemp's Ridley sea turtle *(Lepidochelys kempii)* Population: Entire	Endangered		
Leatherback sea turtle *(Dermochelys coriacea)* Population: Entire	Endangered	Final designated	
Loggerhead sea turtle *(Caretta caretta)* Population: Northwest Atlantic Ocean DPS	Threatened	Proposed, Final designated	

Critical habitats that lie within your project area

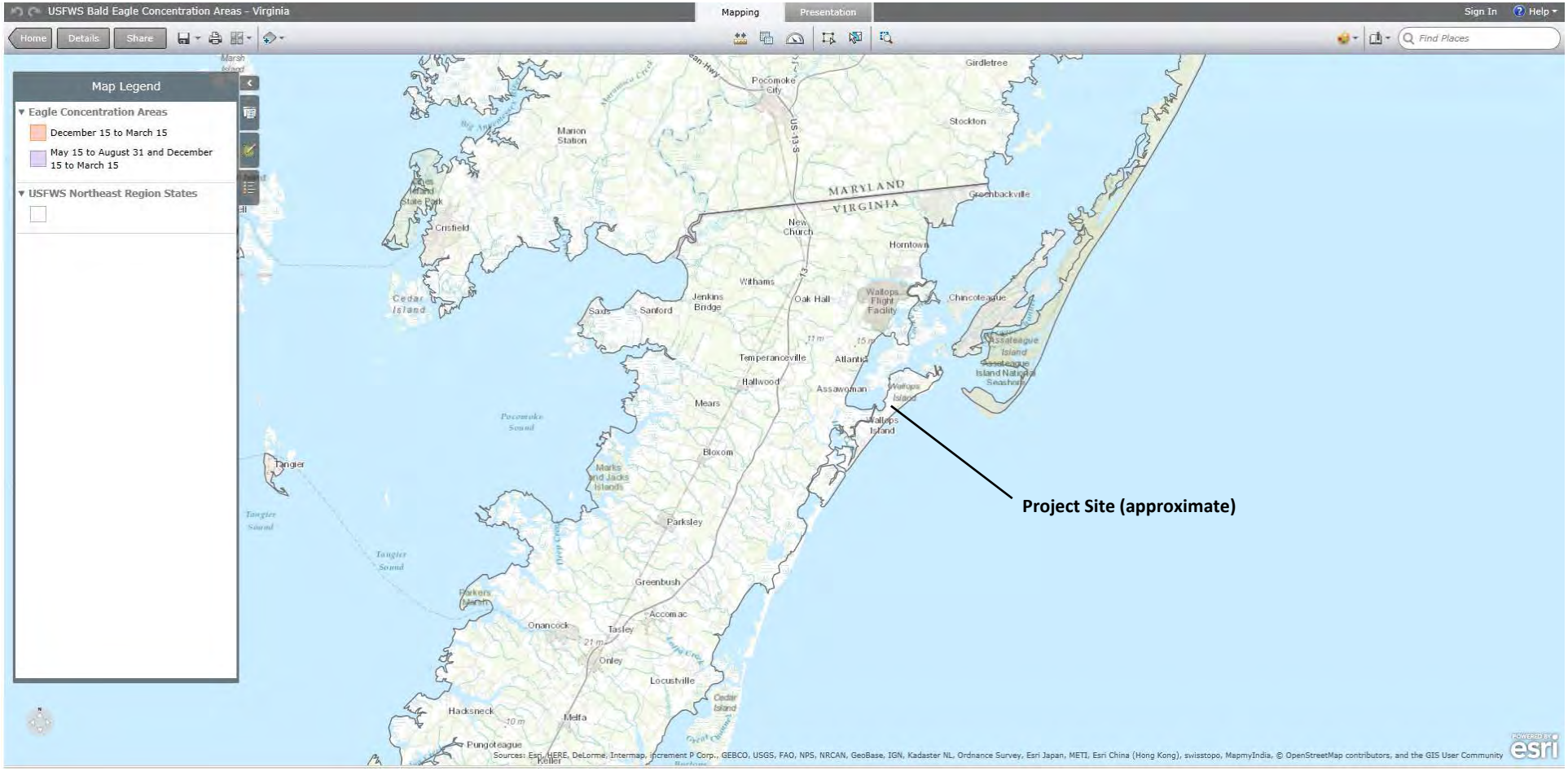
There are no critical habitats within your project area.

Bald Eagle Nests with 330-foot and 660-foot Buffers near Project Site



Source: http://www.ccbbirds.org/maps/#eagles

Bald Eagle Concentration Areas near Wallops Island



Source: http://www.arcgis.com/explorer/?open=8fa548ea54f543a2b2dbe9c9853a81d1 as accessed from http://www.fws.gov/northeast/virginiafield/endangered/projectreviews_step6b.html

Species Conclusions Table

Project Name: Installation and Operation of Air and Missile Defense Radar AN/SPY-6 at Wallops Island, Wallops Flight Facility, Accomack County, Virginia

Date: July 9, 2015

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Birds			
Piping Plover (*Charadrius melodus*)	Species present	May affect, not likely to adversely affect	Atlantic coast piping plovers overwinter on beaches from North Carolina south (Nicholls & Baldassarre 1990), arriving in the general project area by mid-March. All project construction activities would take place within the footprint of an existing building and the radar beam would not intersect with suitable nesting or foraging habitat (e.g., sand beach). However, the radar beam could intersect with flight paths over the beach or nearshore environment. Although it is possible that an individual could be exposed to the radar beam, this is very unlikely and would not result in adverse effects for the following reasons: The AN/SPY-6 radar emits a focused directional beam that is steered in multiple directions at a very rapid rate, with each directional pulse duration being generally measured in microseconds. The likelihood of a bird's flight path intersecting with a beam is thus very unlikely. If it happened, exposure would be for a vanishingly small time and unlikely to be repeated in the short or medium term. The fact that there is no potential for exposure below 60 feet above ground (because the radar would

			emit only at a positive angle from its elevation, which is approximately 60 feet) further reduces the likelihood of exposure. While field studies of the effects of radiofrequency electromagnetic fields in the range of 10 MHz–3.6 GHz on birds have shown anomalies and deviations from normality in the behavior of exposed subjects (Cucurachi et al., 2013), these studies focused on situations characterized by ongoing exposure of foraging and nesting areas, which would not occur as a result of the proposed project.
Red Knot (*Calidris canutus rufa*)	Species present	May affect, not likely to adversely affect	Red knots regularly forage on Wallops, Assateague, and Assawoman Island beaches during northerly spring migration (NASA 2013). However, this species does not arrive at the Virginia barrier islands in large numbers until at least late April. Additionally, the red knots tend to concentrate on north Wallops Island, away from the project site (e.g., NASA 2013). For the same reasons as stated above for the piping plover, adverse effects from exposure to the proposed AN/SPY-6 radar beam are very unlikely.
Roseate tern (*Sterna dougallii dougallii*)	Species not present	No effect	Individuals are rarely observed along the U.S. east coast south of New Jersey. They may transit through oceanic areas during seasonal migration (Nisbet 1984).
Bald Eagle (*Haliaeetus leucocephalus*)	Unlikely to disturb nesting bald eagles Does not intersect with bald eagle concentration area	No Eagle Act permit required	An active nest exists on north Wallops Island, well north of the project site and outside the radar's scanning area.

Flowering Plants			
Seabeach amaranth (*Amaranthus pumilus*)	Species not present	No effect	There have been no documented occurrences of the species on Wallops Island (NASA 2013). All construction activities would take place within the footprint of an existing building. The radar beam would not intersect with potential suitable habitat (e.g., sand beach) for the species.
Mammals			
Northern long-eared Bat (*Myotis septentrionalis*)	No suitable habitat present	May affect, not likely to adversely affect	Northern long-eared bats likely do not spend the winter near the general project area, as they prefer hibernating in caves and mines (USFWS 2015). During the fall months, individuals enter hibernacula and remain there until spring or early summer (Caceres & Barclay 2000). In summer, individuals disperse throughout their range, roosting in tree cavities, crevices, and under exfoliated bark (Foster & Kurta 1999). The species is insectivorous, foraging nocturnally on prey both while in flight as well as gleaning prey items from surfaces (e.g., leaves, standing water) under the forest canopy (Faure et al. 1993). Breeding occurs prior to winter hibernation, and females give birth to a single pup the following summer (Caceres & Barclay 2000). All project-related construction activities would take place within the footprint of an existing building surrounded mostly by pavement and an open beach environment to the east. The lack of significant vegetation cover combined with the elevation of the radar beam (approximately 60 feet above ground level) and its orientation

			toward the nearby beach and open ocean make it very unlikely that bats would be exposed to electromagnetic energy from radar operations.
Reptiles			
Green sea turtle (*Chelonia mydas*)	Species not present No suitable habitat present	No Effect	All project-related construction activities would take place within the footprint of an existing building and the radar beam would not intersect with suitable nesting habitat (e.g., sand beach).
Hawksbill sea turtle (*Eretmochelys imbricata*)	Species not present No suitable habitat present	No Effect	Same as above.
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	Species not present No suitable habitat present	No Effect	Same as above.
Leatherback sea turtle (*Dermochelys coriacea*)	Species not present No suitable habitat present	No Effect	Same as above.
Loggerhead sea turtle (*Caretta caretta*)	Species not present No suitable habitat present	No Effect	Same as above.

References:

Caceres, M. C., & Barclay, R. M. (2000). Myotis septentrionalis. *Mammalian Species*, 1-4.

Cucurachi, S., Tamis, W.L.M., Vijver, M.G., Peijnenburg, W.J.G.M., Bolte, J.F.B, and de Snoo ,G.R. (2013). A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF), *Environment International*, 51, 116–140.

Faure, P. A., Fullard, J. H., & Dawson, J. W. (1993). The gleaning attacks of the northern long-eared bat, *Myotis septentrionalis*, are relatively inaudible to moths. *Journal of Experimental Biology*, 178(1), 173-189.

Foster, R. W., & Kurta, A. (1999). Roosting ecology of the northern bat (*Myotis septentrionalis*) and comparisons with the endangered Indiana bat (*Myotis sodalis*). *Journal of Mammalogy*, 80(2), 659-672.

NASA. (2013). Wallops Island Protected Species Monitoring Report. December.

Nicholls, J. L., & Baldassarre, G. A. (1990). Winter distribution of piping plovers along the Atlantic and Gulf Coasts of the United States. *The Wilson Bulletin*, 400-412.

Nisbet, I. C. (1984). Migration and winter quarters of North American Roseate Terns as shown by banding recoveries. *Journal of Field Ornithology*, 1-17.

USFWS (U.S. Fish and Wildlife Service). (2015). Northern long-eared Bat (*Myotis septentrionalis*). Retrieved from: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0JE

Appendix C
National Historic Preservation Act
Section 106 Documentation

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COMMONWEALTH of VIRGINIA

Department of Historic Resources

Molly Joseph Ward
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

MEMORANDUM

DATE: 28 August 2015 **DHR File #** 2015-3573

TO: Ms Katherine Childs
Navy

FROM: Marc E. Holma, Architectural Historian (804) 482-6090
Office of Review and Compliance

PROJECT: Proposed Installation and Operation of Air and Missile Defense Radar AN/SPY-6 Wallops Island, Accomack County, Virginia

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___ This project will have an effect on historic resources. Based on the information provided, the effect will not be adverse.

___ This project will have an adverse effect on historic properties. Further consultation with DHR is needed under Section 106 of the NHPA.

___ Additional information is needed before we will be able to determine the effect of the project on historic resources. **Please see attached sheet.**

_X_ No further identification efforts are warranted. No historic properties will be affected by the project. Should unidentified historic properties be discovered during implementation of the project, please notify DHR.

___ We have previously reviewed this project. Attached is a copy of our correspondence.

___ Other (Please see comments below)

COMMENTS:

Administrative Services
10 Courthouse Ave.
Petersburg, VA 23803
Tel: (804) 862-6408
Fax: (804) 862-6196

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

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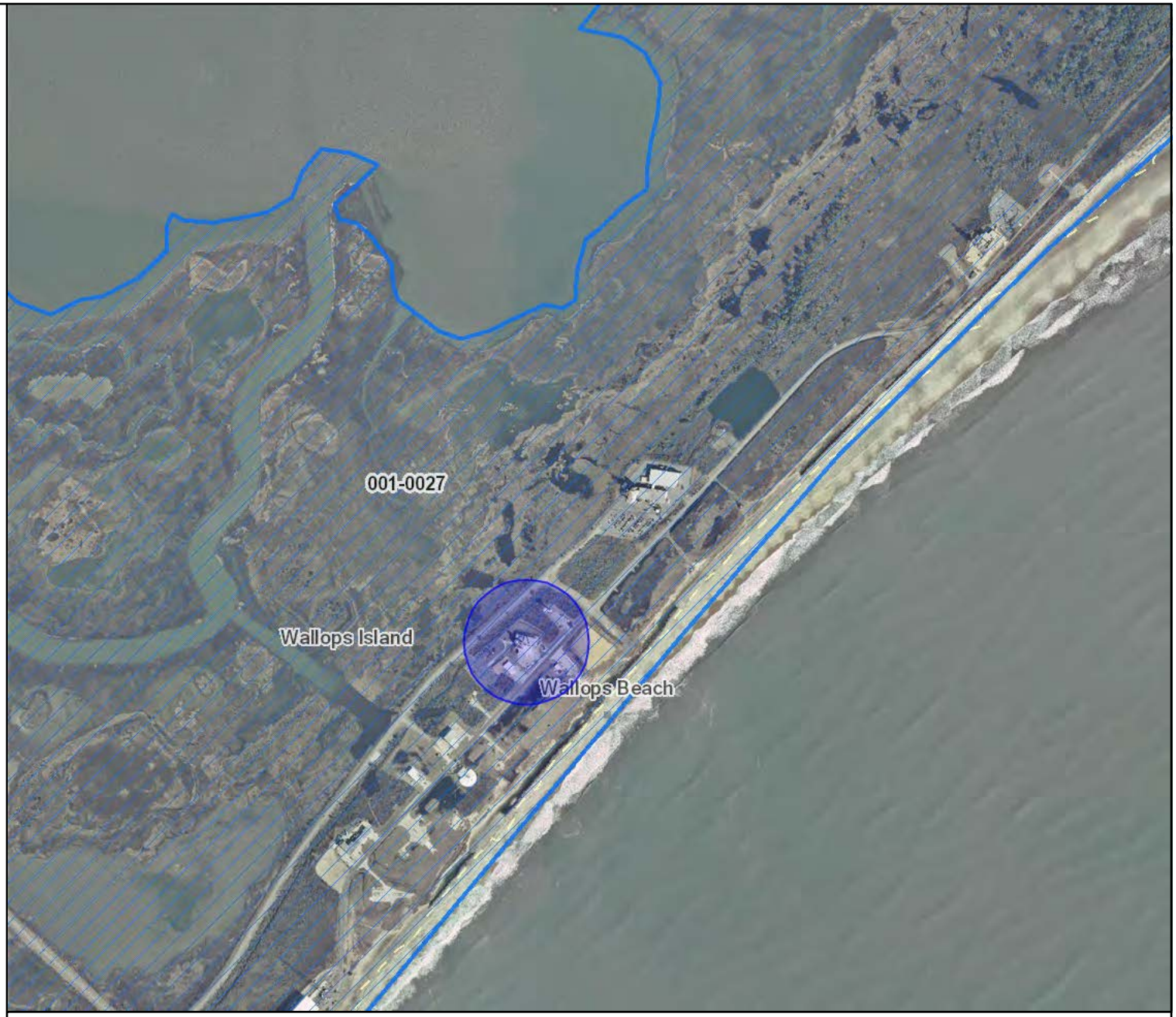
Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

Legend

- Architecture Resources
- Architecture Labels
- Individual Historic District Properties
- Archaeological Resources
- Archaeology Labels
- DHR Easements
- USGS GIS Place names
- County Boundaries



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Feet

0 500 1000 1500 2000

1:18,056 / 1"=1,505 Feet

Title: SPY 6 Archives Search

Date: 8/19/2015

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Property Information

Property Names

Name Explanation	Name
Historic/Current	Wallops Island Flight Facility Historic District (NASA)

County/Independent City(s): Accomack (County)
Incorporated Town(s): *No Data*
Zip Code(s): 23337
Magisterial District(s): *No Data*
Tax Parcel(s): *No Data*
USGS Quad(s): BLOXOM, CHINCOTEAGUE WEST, WALLOPS ISLAND

Property Evaluation Status

DHR Staff: Not Eligible

This Property is associated with the Wallops Island Flight Facility Historic District (NASA).

Additional Property Information

Architecture Setting: Rural
Acreage: 6,500

Site Description:

Jan 2011: WFF is in a rural part of northern Accomack County. The Main Base is west of Chincoteague. The other two components of the facility, Wallops Mainland and Wallops Island, are approximately 5 miles south of the Main Base off of State Route 679. The Main Base is fairly densely developed along the south and west sides of the installation's three runways. A network of asphalt-paved and concrete roads traverse the Main Base, which is also characterized by large open expanses of grass and dense forested areas. Designed landscaping is minimal, comprised of foundation plantings around primary buildings. Wallops Mainland and Wallops Island feature wide areas of open land with primarily sparse development. Other than just south of the junction of Causeway and North Seawall Roads on Wallops Island, buildings and structures are widely dispersed. Causeway Road links the mainland to the island across a broad expanse of marshland. Water features predominate the area, most notably Bogues Bay and the Atlantic Ocean.

Jan 2011: WFF includes numerous secondary resources. These resources are primarily small ready issue storage buildings (different than large supply warehouses); infrastructure for utilities such as terminal buildings, water pump houses, and sewage lift stations; and oil tanks set on elevated concrete platforms. The Main Base and Wallops Island also feature water towers with the NASA logo on one side of them. A flag pole array is on the west side of Stubbs Boulevard on the Main Base.

Surveyor Assessment:

One of the oldest ranges in the world, Wallops has been conducting rocketborne experiments for 40 years. The first research rocket, a 17-foot Tiamat, was launched on July 4, 1945. See pamphlets in VDHR Survey File and associated CRM Reports for more information.

Jan 2011: The Main Base of WFF is the site of the former Chincoteague Naval Auxiliary Air Station (CNAAS). During World War II, the Navy developed the CNAAS with three runways and numerous buildings for training two different types of naval aviation squadrons. After the war, the Navy expanded the mission of the CNAAS to include the Naval Air Ordnance Test Station (NAOTS), which was charged with research and testing of naval aviation weapons and ordnance. NAOTS joined CNAAS on the Main Base and used the north end of Wallops Island as a target range. Simultaneously, the National Advisory Committee for Aeronautics (NACA) leased land on the south end of Wallops Island to conduct pilotless aircraft (i.e., rockets) testing there. NACA was a precursor to NASA, which was created with the signing of the Space Act in 1958. In 1959, CNAAS closed and NASA acquired the land and facilities on the Main Base and north half of Wallops Island from the Navy. NASA also purchased land on the Mainland to add to the newly organized Wallops Station (a historical name of WFF). Wallops Station's new mission under NASA was to develop and test various components related to manned space flight, including for Project Mercury in the late 1950s. This mission was short-lived, however, as Wallops became a test range and launch site for suborbital and orbital rockets and satellites beginning in the early 1960s.

Surveyor Recommendation: *No Data*

Ownership

Ownership Category	Ownership Entity
Federal Govt	U.S. National Aeronautics & Space Administration

Primary Resource Information

Resource Category: Other
Resource Type: Historic District
Date of Construction: 1945
Historic Time Period: World War I to World War II (1917 - 1945)
Historic Context(s): Technology/Engineering

Architectural Style: *No Data*
Form: *No Data*
Number of Stories: *No Data*
Condition: Good
Interior Plan: *No Data*
Threats to Resource: None Known
Architectural Description:

2011: The majority of buildings constructed between 1959 and 1965 at WFF are one- or two-story structures of concrete or concrete block, flat roofs, and concrete foundations. The buildings are plain, with no ornament. WFF includes numerous communications towers. These include multi-story steel lattice towers or concrete pedestals supporting parabolic antennas. Refer to the CRM report (TEC Inc. 2011; DHR File No. 2010-2274) for descriptions of individual resources

Secondary Resource Information

Secondary Resource #1

Resource Category: *No Data*
Resource Type: *No Data*
Architectural Style: *No Data*
Form: *No Data*
Date of Construction: *No Data*
Condition: *No Data*
Threats to Resource: *No Data*
Architectural Description:

No Data

Historic District Information

Historic District Name: Wallops Island Flight Facility Historic District (NASA)
Local Historic District Name: *No Data*
Historic District Significance: *No Data*

CRM Events

Event Type: Survey:Phase I/Reconnaissance

Project Review File Number: 2010-2274
Investigator: TEC Inc.
Organization/Company: Unknown (DSS)
Sponsoring Organization: *No Data*
Survey Date: 1/1/2011
Dhr Library Report Number: AC-046
Project Staff/Notes:

Section 110 survey completed by Lori Thursby, Kimberly Martin, and Jen Bryant.

Event Type: DHR Staff: Not Eligible

DHR ID: 001-0027
Staff Name: Holma, Marc
Event Date: 11/4/2004
Staff Comment

No Data

Event Type: Other

Project Review File Number: *No Data*
Investigator: VA Landmarks Register Committee
Organization/Company: Unknown (DSS)
Sponsoring Organization: *No Data*
Survey Date: 3/21/1972
Dhr Library Report Number: AC-046
Project Staff/Notes:

Was found eligible in 1972.

Bibliographic Information

Bibliography:

No Data

Property Notes:

Name: Unknown
Company 1: NASA Wallops Flight Facility
Address 1: Wallops Flight Facility
City: Wallops Island
State: Virginia
ZIP: 23337
Phone 1: 757-824-1000
Ext: 0000
Phone 2: 000-000-0000
Ext: 0000
Owner Relationship: Owner of property

Project Bibliographic Information:

Name: New South Associates
Record Type: Report
Bibliographic Notes: AC-058: Phase I Archaeological Survey of the Mainland Security Fence Replacement, Wallops Flight Facility, Accomack County, Virginia, October 2006. #2011-1731

Name: New South Associates
Record Type: Report
Bibliographic Notes: AC-056: Archaeological Survey of the MLCC Tract, Wallops Flight Facility, Accomack County, Virginia, October 18, 2011. #2011-1731

Name: New South Associates
Record Type: Report
Bibliographic Notes: AC-057: Archaeological Survey of the U-012 Tract, Wallops Flight Facility, Accomack County, Virginia, October 12, 2011. #2011-1731

Record Type: Local Records
Bibliographic Notes: WFF real property records, as-built drawings, and master plans. Wallace, Harold D., 1997, Wallops Station and the Creation of an American Space Program, NASA History Office, Washington D.C. Shortal, Joseph Adams, 1978, A New Dimension Wallops Island Flight Test Range: The First Fifteen Years, NASA Scientific and Technical Information Office, Washington D.C.

Name: JRIA, Inc.
DHR CRM Report Number: AC-046
Record Type: Report
Bibliographic Notes: Phase I Cultural Resources Survey of Approximately 100 Acres for a Proposed Research Park at Wallops Island in Accomack County, Virginia. October 2007. (PR #2007-1229)

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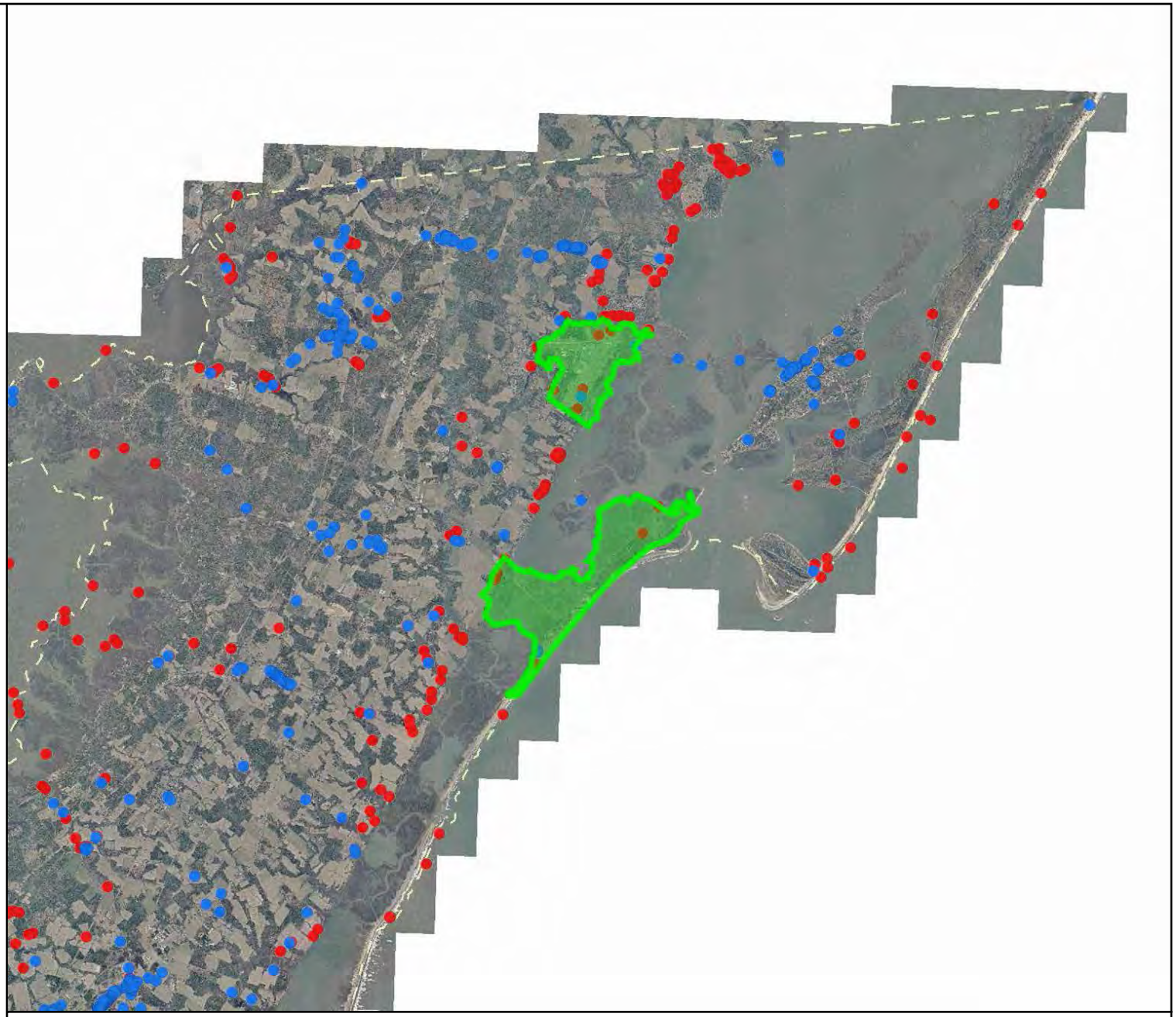
Virginia Dept. of Historic Resources

V-CRIS

Virginia Cultural Resource Information System

Legend

- Architecture Points
- Archaeology Points
- County Boundaries



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Miles

0 1 2 3 4

1:288,895 / 1"=5 Miles

Title: Architecture Labels

Date: 8/19/2015

DISCLAIMER:Records of the Virginia Department of Historic Resources (DHR) have been gathered over many years from a variety of sources and the representation depicted is a cumulative view of field observations over time and may not reflect current ground conditions.The map is for general information purposes and is not intended for engineering, legal or other site-specific uses. Map may contain errors and is provided "as-is". More information is available in the DHR Archives located at DHR's Richmond office.

Notice if AE sites:Locations of archaeological sites may be sensitive the National Historic Preservation Act (NHPA), and the Archaeological Resources Protection Act (ARPA) and Code of Virginia §2.2-3705.7 (10). Release of precise locations may threaten archaeological sites and historic resources.

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Wallops Flight Facility

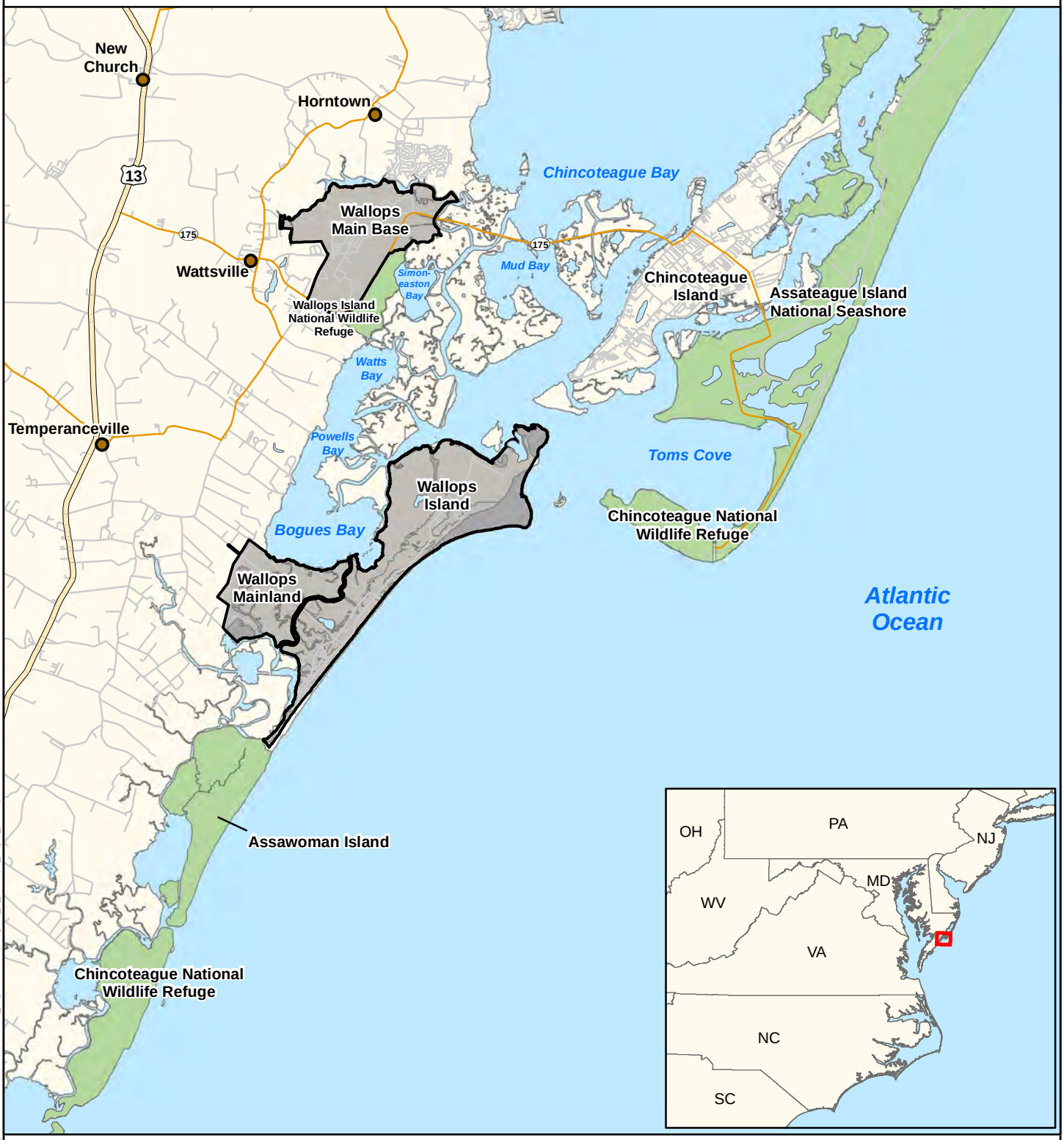

Figure 1

Path: L:_Common\GIS_Data\60342567_SPY6EA\MXDs\Coordination_Figures\SHPO\Figure_1_Wallops_Flight_Facility.mxd

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Location of Building V-003

WFF Boundary

0 500 1,000
Feet

0 150 300
Meters

N

Figure 2

Path: L:_Common\GIS_Data\60342567_SPY6EA\MXDs\Coordination_Figures\SHPO\Figure_2_Bldg_V-003.mxd

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Exhibits

Exhibit 1: Building V-003, south façade/radar array, existing conditions

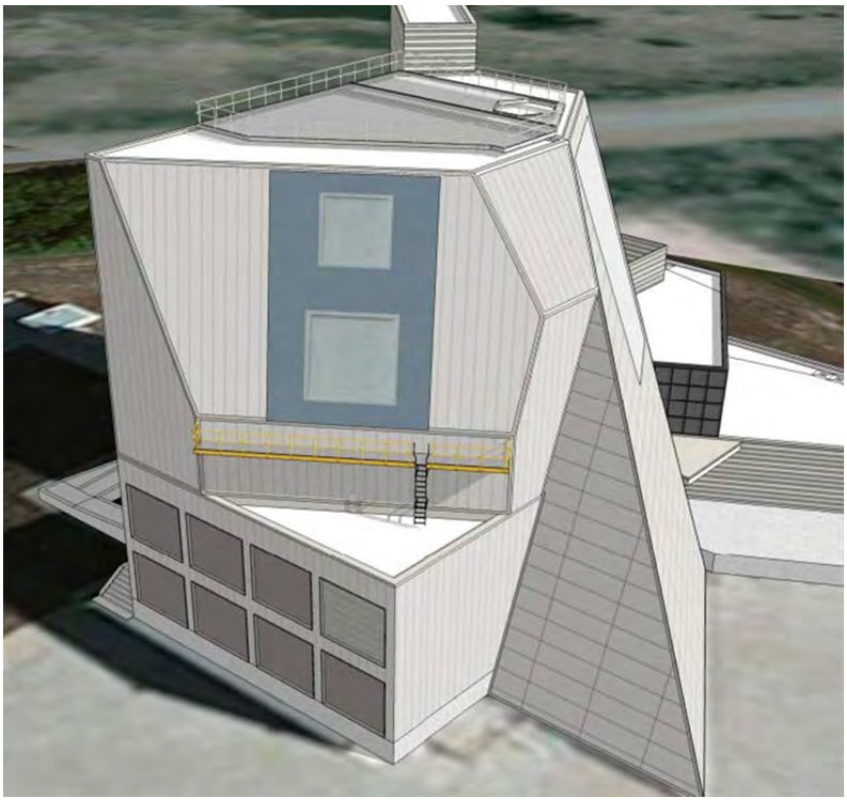

Exhibit 2: Building V-003, south façade/radar array, proposed configuration

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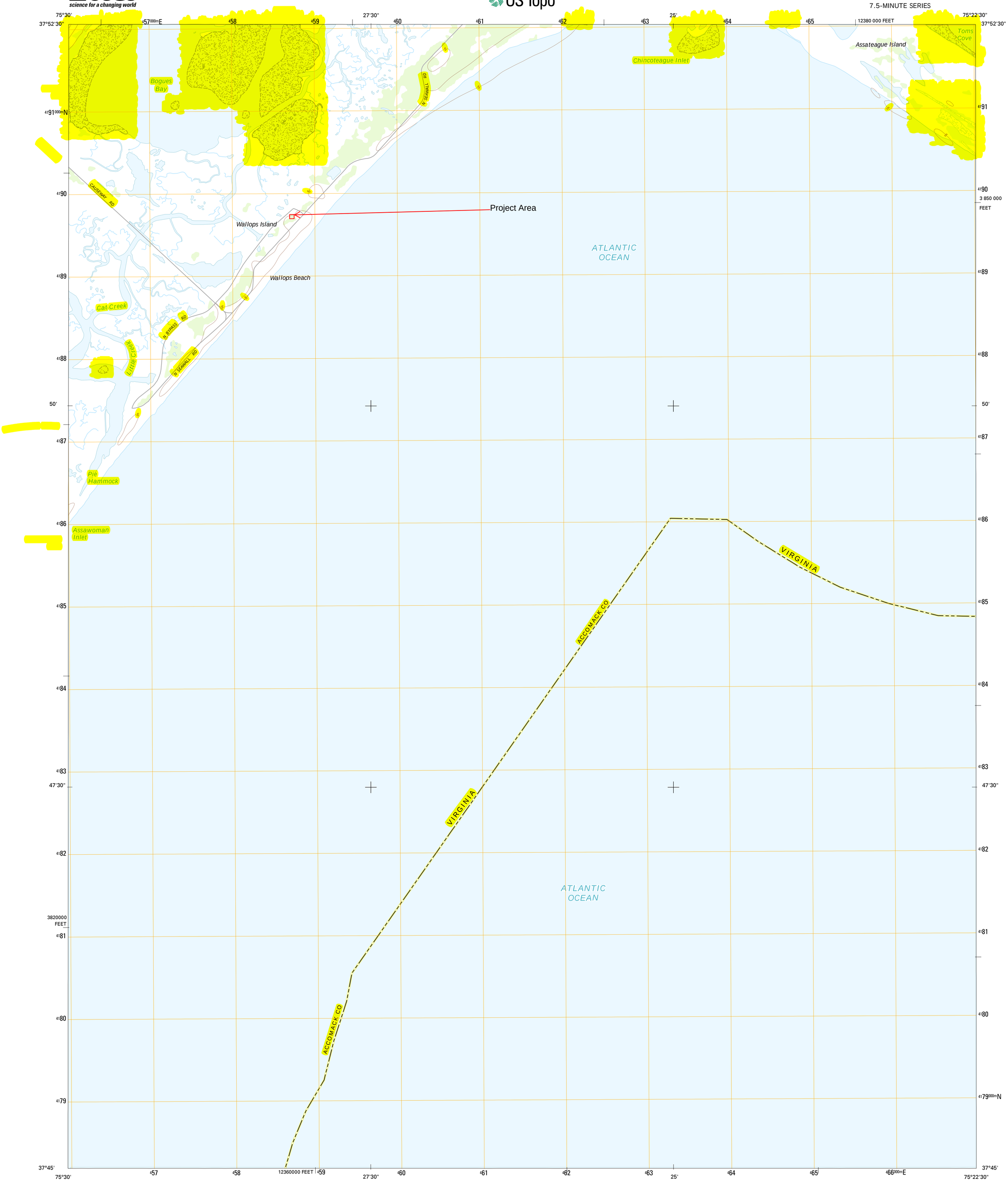
U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

The National Map US Topo

WALLOPS ISLAND QUADRANGLE
VIRGINIA-ACCOMACK CO.
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 18S
10 000-foot ticks: Virginia Coordinate System of 1983 (south zone)

Imagery.....NAIP, May 2012
Roads.....©2006-2012 TomTom
Names.....GNIS, 2013
Hydrography.....National Hydrography Dataset, 2012
Contours.....Not Available
Boundaries.....Census, IBWC, IBC, USGS, 1972 - 2012

MN
11° 31´
205 MILS
0° 16´
5 MILS
GN
UTM GRID AND 2013 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
VG
Grid Zone Designation
18S

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOURS NOT PRESENT BECAUSE AVAILABLE ELEVATION DATA DO NOT MEET ACCURACY REQUIREMENTS

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.11

QUADRANGLE LOCATION

Hallwood	Chincoteague West	Chincoteague East
Bloxom	Wallops Island	Chincoteague East OE S
Metompkin Inlet		

ADJOINING 7.5' QUADRANGLES

ROAD CLASSIFICATION

Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD

Interstate Route US Route State Route

WALLOPS ISLAND, VA
2013

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Print

Create New Application

This electronic form is to be used for the submission of new projects only. If you wish to submit addtional information in support of an existing project, please contact the reviewer assigned to that project.

Before using this form, please understand that the information being requested is important to our review. Incomplete information may lead to delays in the review of your project. Please read all questions carefully and respond as completely as possible. For security purposes, *your ePIX session will timeout after 20 minutes of inactivity* and any unsaved changes will be discarded. To ensure that no information is lost, we recommend saving your application after the completion of each section. If you have questions concerning the completion of this application, please contact DHR staff at ePIX@dhr.virginia.gov.

SECTION I. CONTACT INFORMATION

Submitted By
Mrs. Katherine Childs
9324 VIRGINIA AVENUE
Norfolk, Virginia 23511-3095
757-341-2058
katherine.childs@navy.mil

Please indicate what your role in this project is:

Applicant RoleEmployee of federal or state agency responsible for compliance

If Other, please specify

SECTION II. GENERAL PROJECT INFORMATION

Project NameProposed Installation and Operation of Air and Missile Defense Radar AN/SPY-6 at Wallops Island

Agency Project Number15-38-00

Associated DHR File Number

Project Street Address

Independent Cities and/or Counties (multiple cities/counties are allowed):

City/County Name
Accomack

Town/Locality, if applicable

Agency Involvement

Please select one of the following options as they relate to the project you are submitting:

◉ My project involves a federal or state agency and requires review by DHR under the National Historic Preservation Act (Sections 106 or 110), Virginia Environmental Impact Reports Act or other provision of state or federal law.

○ I am seeking Technical Assistance from DHR in the assessment of potential impacts of my project on historic resources (e.g. federal or state involvement anticipated, initial project scoping, local government proffer or ordinance).

It is important that you know the nature of the federal or state involvement in your project. Please note that there are a number of state-managed programs that are federally funded (e.g. Transportation Enhancement Grants, some recreational trail grant programs, and many DHCD programs). Understanding the involvement of the agency and the program is helpful for our review.

In some cases there are multiple agencies involved in a project. In these cases, there is generally a "lead" agency. In order to help clarify this, please list the agencies in the order of their involvement in the project. If, for example, there are two agencies providing funding, please provide the contact information for the primary source of federal funding first.

Please select the agency, relationship, contact and click the **Select** button:

Agency	Relationship
Department of Defense	Federally Funded

SECTION III. PROJECT DESCRIPTION and CURRENT AND PAST LAND USE

We need to know as much as possible about the project that is being proposed as well as the current condition of the property. In the fields below, you will be required to provide descriptions that are no longer than 2000 characters. Additional and more detailed information can be uploaded and attached at the end of the application.

Overview and existing conditions

Please provide a general description of the project.

Project Description

The Department of the Navy (Navy), in cooperation with the National Aeronautics and Space Administration (NASA), is preparing an environmental assessment to evaluate the impacts of installing and operating an AN/SPY-6 radar system in Building V-003 on Wallops Island (see enclosed Figures 1 and 2). The Navy is also reviewing the proposed action under Section 106 of the National Historic Preservation Act (NHPA). AN/SPY-6 is the Navy's next generation of shipboard, multi-function, phased-array radar intended for integration with the Aegis Combat System to be deployed on the DDG 51 Flight III series of Arleigh Burke-class destroyers. The purpose and need for the proposed action is to integrate and test the AN/SPY-6 system with Aegis Advanced Capability Build (ACB) 20. ACB 20 is the next generation of the Aegis system, scheduled for deployment on Navy ships in fiscal year 2021. Building V-003 was built in 2010. The existing exterior configuration of the building is shown in enclosed Exhibit 1. To accommodate the new AN/SPY-6 radar, Building V-003 would be modified. The proposed modifications involve the construction of additional decks above an existing two-story extension to the building (visible in Exhibit 1), which will allow for the modification of the south-facing, inclined carbon composite panel supporting the radar arrays so it can accommodate the AN/SPY-6 system. Modifications would also include a change in the inclination of the panel (from 20 to 15 degree) and a rotation of the radar face by 34 degrees counterclockwise to optimize radar coverage. All work would take place within the existing footprint of the building and its total height would not change. A rendering of the finished building is enclosed as Exhibit 2. Radar operations would be conducted 24/7 using targets of opportunity only. The proposed action does not include the launching or firing of any missiles or other projectiles for the purpose of testing the radar.

How many acres does the project encompass?

Number of Acres

Please describe the current condition and/or land use of the project area (e.g. paved parking lot, plowed field).

Current Condition

Building V-003 was built in 2010. The existing exterior configuration of the building is shown in enclosed Exhibit 1.

Please describe any previous modifications to the property, including ground disturbance.

Building V-003 was built in 2010. All work would take place within the existing footprint of the building and its total height would not change.

Previous Modificationschange.

Work involving buildings or structures

Does the project involve the rehabilitation, addition to, alteration, or demolition of any building structure over 50 years of age?

Buildings Over 50 YearsNo

If yes, please describe the work that is proposed in detail. Current photographs of affected building or structure, architectural or engineering drawings, project specifications and maps may be uploaded at the end of the application.

Details

Work involving ground disturbance

Is there any ground-disturbance that is part of this project?

Ground DisturbanceNo

If yes, describe the nature and horizontal extent of ground-disturbing activities, including construction, demolition, and other proposed disturbance. Plans, engineering drawings, and maps may be uploaded on the next page at the end of the application.

Extent of Activities

What is the depth of the ground disturbance? If there are several components to the project, such as new building, utility trenches, and parking facilities, provide the approximate depth of each component.

Depth

How large is the area where ground-disturbing activities will take place? (in acres)

Area Size

SECTION IV. AREA OF POTENTIAL EFFECT (APE)

The Area of Potential Effects (APE) is defined as the geographic area or areas within which a project may directly or indirectly cause changes in the character or use of historic properties, if they exist. It is not necessary for an historic property to be present in order to define an APE.

An example of a direct effect is the demolition of an historic building while an indirect effect would be the alteration of an historic setting resulting from the construction of a communications tower or the introduction of noise as the result of the construction of factory. An area such as the footprint of a proposed building is obviously within the APE, but you must also consider visual effects on the property and the limits of all ground-disturbing activity. So, any project may have two APEs - one for direct effects and one for indirect effects.

Please see our guidance on Defining Your APE for more detailed information on defining direct and indirect APEs. If you are using DHR's Data Sharing System, you should indicate the APE on the DSS map. For instructions on how to do this, consult the DSS general use guidelines.

Please provide a brief summary of and justification for the APE and upload your APE map at the end of the application. The written boundary description must match the submitted APE map.

The proposed building modifications qualify as an undertaking as defined in 36 CFR 800.16(y). Consistent with 36 CFR 800.4(a)(1), the Navy has defined an area of potential effects (APE) for this undertaking: the APE consists of Building V-003 and all areas of Wallops Island from which the building can be seen (project viewshed). The proposed action involves no ground disturbance outside the footprint of Building V-003 and has no potential to affect archaeological resources. Building V-003 itself was constructed in 2010. As noted above, all construction work would take place within the existing footprint of the building and there is no potential for effects to known or unknown archaeological resources. Operation of the AN/SPY-6 radar would not cause any increase in noise or vibration levels that could indirectly affect the installation's eligible APEresources.

SECTION V. CONSULTING PARTIES AND PUBLIC INVOLVEMENT

The views of the public, Indian tribes and other consulting parties (e.g. local governments, local historical societies, affected property owners, etc.) that may have an interest in historic properties that may be affected by the project are essential to informed decision-making. In some cases, the public involvement necessary for other environmental reviews such as that under the National Environmental Policy Act (NEPA) may be sufficient for the Section 106 process, but the manner in which the public is involved must reflect the nature and complexity of the proposed project and its effects on historic resources.

What consulting parties have you identified that have an interest in this project? Please describe your previous and future efforts to involve consulting parties.

Consulting PartiesDHR

Please provide information on any previous or future efforts to involve the public, including public hearings, public notices, and other efforts.

Building V-003 itself was constructed in 2010. As noted above, all construction work would take place within the existing footprint of the building and there is no potential for effects to known or unknown archaeological resources. Therefore, the Navy is not planning to

Public Involvementconsult with the public or interested parties.

SECTION VI. PREVIOUSLY IDENTIFIED HISTORIC RESOURCES

In order for this application to be considered complete, you must determine if there are any known historic resources in the APE and provide this information to us. This step is generally referred to as a DHR Archives Search. More information on how to acquire this information can be found in our guidance document Obtaining an Archives Search.

Has any portion of the APE been previously surveyed for archaeological and/or architectural resources?

SurveysYes

If yes, describe and provide the names of any reports that you are aware of.

A comprehensive architectural survey and National Register evaluation of WFF was conducted in 2004. This study evaluated buildings, structures, and objects at WFF that were built before 1956. In 2011, a supplemental survey was conducted covering 76 resources built between 1965 and 1959. Your office reviewed and concurred with both surveys. The surveys identified only two resources eligible for listing in the National Register at WFF: a Coastal Guard Station (DHR #001-0027-0100) and associated tower (DHR #001-0027-0101), both located on the inland side of Wallops Island, approximately two miles to the northeast of Building V-003. Neither of these historic resources is within the project viewshed. Therefore,

Survey Reportsthey would not be affected by the proposed action.

Are there any previously recorded archaeological sites or architectural resources, including historic districts or battlefields within the APE?

Recorded ResourcesYes

You must upload in Section VIII of this application the Archives Search Map showing previously recorded resources in the APE and the DSS reports for all previously recorded resources.

SECTION VII. ADDITIONAL CONTACTS TO THE APPLICATION

Last Name	First Name	Organization
Childs	Katherine	Department of Defense

SECTION VIII. UPLOAD FILES FOR THE APPLICATION

	File Name	Note

Document Name		
Other - Blank Signature Page	Blank Signature Page_SPY6.docx	
Other - Enclosure	SPY6_SHPO_Enclosure_071015 (2).pdf	Wallops Flight Facility Location Map, Location of Building V-003 Map, Exhibits

Wallops Flight Facility

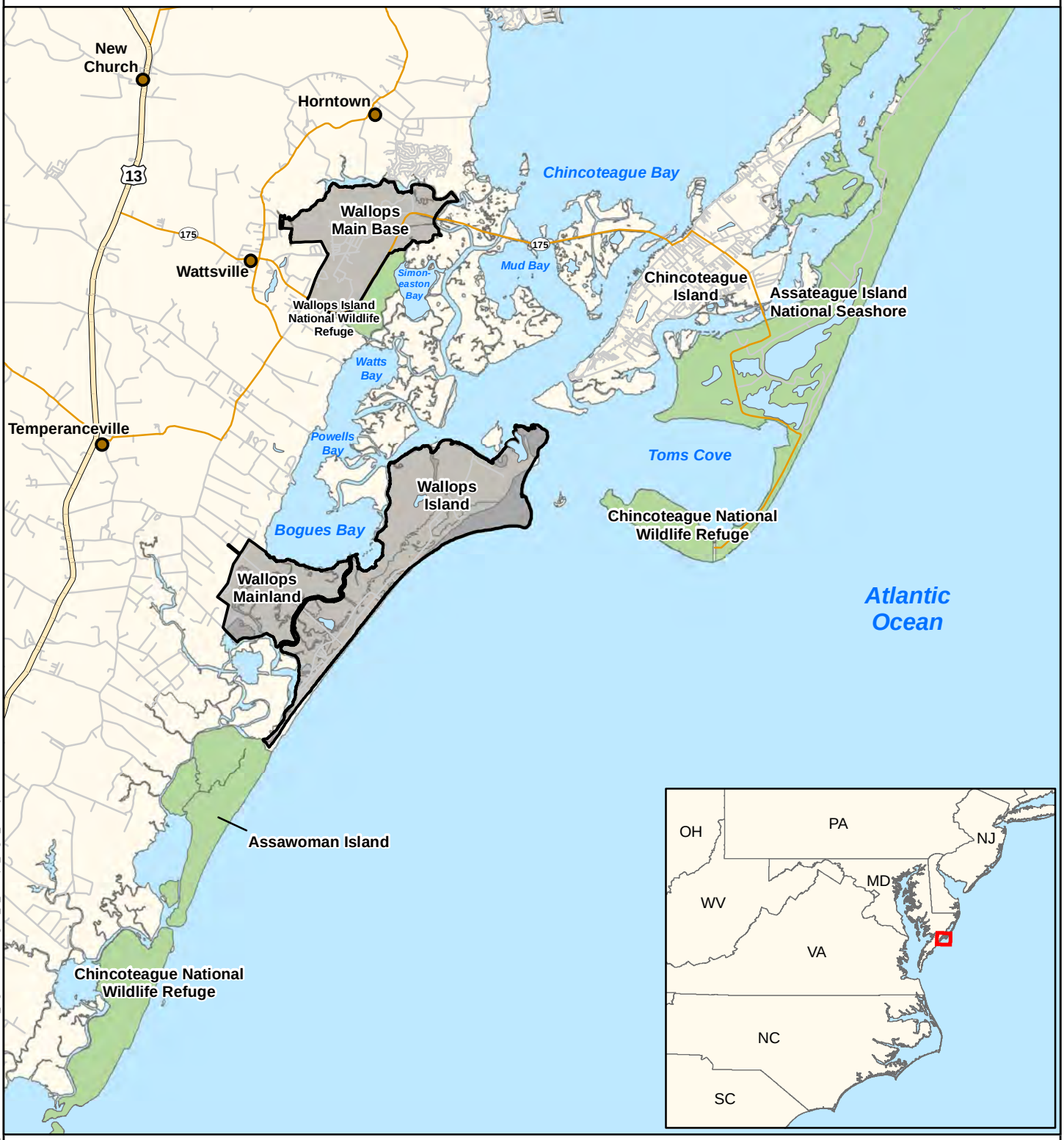

Figure 1

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Location of Building V-003

WFF Boundary

0 500 1,000
Feet

0 150 300
Meters

N

Figure 2

Path: L:_Common\GIS_Data\60342567_SPY6EA\MXDs\Coordination_Figures\SHPO\Figure_2_Bldg_V-003.mxd

Attachment

Exhibit 1: Building V-003, south façade/radar array, existing conditions

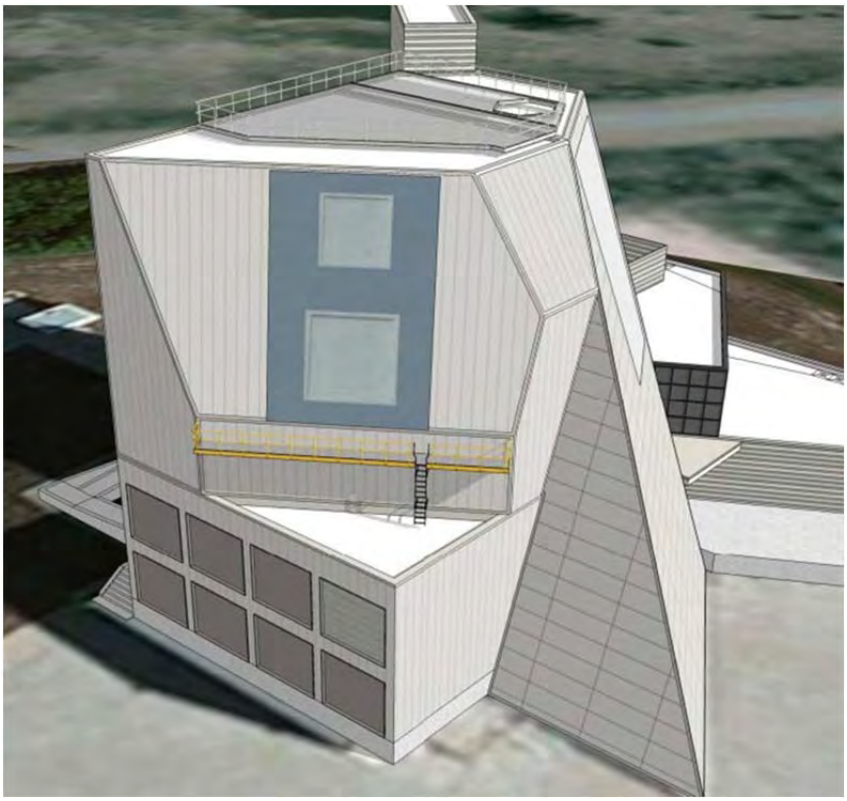

Exhibit 2: Building V-003, south façade/radar array, proposed configuration

Appendix D
Coastal Zone Management Act
Consistency Determination

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DEPARTMENT OF THE NAVY
SURFACE COMBAT SYSTEMS CENTER
30 BATTLE GROUP WAY
WALLOPS ISLAND, VIRGINIA 23337-5000

5090
Ser 9000/ 321
18 OCT 2016

Ms. Bettina Sullivan
Office of Environmental Impact Review
Department of Environmental Quality
Post Office Box 1105
Richmond, VA 23218

Dear Ms. Sullivan:

Subject: FEDERAL COASTAL CONSISTENCY DETERMINATION FOR INSTALLATION AND OPERATION OF AIR AND MISSILE DEFENSE RADAR (AN/SPY-6) AT WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

The Department of the Navy's Surface Combat Systems Center (SCSC) is proposing to install and operate an AN/SPY-6 Air and Missile Defense Radar System in Building V-003 on Wallops Island at the National Aeronautics and Space Administration's (NASA) Wallops Flight Facility in Accomack County, Virginia. The enclosed Federal Coastal Consistency Determination (CCD) and associated figures are being submitted in accordance with Section 307 (c) (1) of the Federal Coastal Zone Management Act of 1972 as amended.

The Proposed Action may result in small emissions of air pollutants, which might represent a reasonably foreseeable effect on regional air quality, a coastal zone resource. In cooperation with NASA, the Department of the Navy has determined that the Proposed Action is fully consistent with the applicable enforceable policies of the Virginia Coastal Zone Management Program.

My point of contact is Ms. Debra Ryon at (757) 824-7702, or email at Debra.Ryon@navy.mil.

Sincerely,

J.S. LOCK, SR
Commanding Officer

Enclosure: Coastal Consistency Determination (CCD) and associated figures

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FEDERAL COASTAL CONSISTENCY DETERMINATION
INSTALLATION AND OPERATION OF AIR AND MISSILE DEFENSE RADAR
AN / SPY-6
WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

This Federal Coastal Consistency Determination was prepared pursuant to Section 307 of the Coastal Zone Management Act of 1972 (CZMA), as amended, and 15 C.F.R. 930, Subpart C for the following U.S. Navy (Navy) Proposed Action: installation and operation of an AN / SPY-6 air and missile defense radar (AMDR) system in the Navy Surface Combat Systems Center's (SCSC) Building V-003 on Wallops Island at the National Aeronautics and Space Administration's (NASA) Wallops Flight Facility (WFF) in Accomack County, Virginia.

Section 307 of the CZMA requires that each federal agency activity within or outside the coastal zone that affects any land or water use, or natural resource of the coastal zone be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of approved state management programs. When applying this "effects test" for uncertain impacts, federal agencies must broadly construe the test to provide state agencies with a consistency determination and not a negative determination, per CZMA regulations, 15 C.F.R. § 930.33(d).

Accomack County is located within Virginia's designated coastal zone. However, the Proposed Action would take place at SCSC within WFF, a federal installation statutorily excluded from the state's coastal zone. The Navy has determined that the anticipated effects of the Proposed Action would be contained within WFF and would not affect coastal uses or resources of the Virginia coastal zone, with one possible exception: construction activities associated with the Proposed Action may result in small emissions of air pollutants, which might represent a reasonably foreseeable effect on regional air quality, a coastal zone resource. In the face of this uncertainty, the Navy has broadly construed the effects test to provide Virginia with this consistency determination.

Consistent with the requirements of 15 C.F.R. 930.39, this Consistency Determination establishes that the Proposed Action would be fully consistent with the applicable enforceable policies of the Virginia Coastal Zone Management Program. This finding is based upon an evaluation of the relevant enforceable policies of the program.

PROPOSED ACTION

The Proposed Action consists of installing and operating an AN / SPY-6 radar system in SCSC's Building V-003 on Wallops Island at WFF after modifying the building to accommodate the new system. The location of Wallops Island is shown on Figure 1. Integration and testing of the radar with existing computer and electronics hardware and software associated with the Navy's Aegis Weapon System (hereafter, Aegis) located in Building V-003 would follow completion of the building modifications. Integration and testing would comprise the operational component of the Proposed Action.

Building V-003 is a multi-level, steel-framed structure built in 2010 that is currently used by the Navy SCSC to test radar systems associated with the DDG-1000 program. It is located in the central portion of Wallops Island, as shown in Figure 2. The south elevation of Building V-003 and the facility's existing radar arrays are shown in Figure 3, and Figure 4. The DDG-1000 program is nearing completion, after which it is anticipated that Building V-003 will be available for the installation and testing of the AN / SPY-6 system. However, because Building V-003 cannot accommodate the AN / SPY-6 system in its current configuration, modifications to the building are needed prior to installation and testing.

Construction Activities

To accommodate the AN / SPY-6 radar, the Navy would construct a four-story addition to the south elevation of Building V-003 above an existing two-story extension. This would involve removing the existing roof deck structure and all metal siding on the two-story extension, and installing seven new steel columns and seven pile caps (foundations) to provide structural support for the addition. The new foundations would require selective demolition of the existing grade-level slab and the installation of 40 concrete piles to support the foundations. The piles would be drilled and poured. New concrete decks to be constructed on Decks 3 and 4 in the addition would be continuous with Decks 3 and 4 of the existing building. A new grating deck would be constructed on Deck 6, which would be continuous with Deck 6 of the existing building.

The new radar array face on the addition would be angled at 15 degrees off the vertical instead of the existing array's 20 degrees. It would be rotated 34 degrees counter clockwise relative to the current orientation to optimize the operational functionality of the AN / SPY-6 system. The finished exterior of the addition would be similar in appearance to the existing building. The total height of the building would not change. A rendering of the modified building is shown in Figure 5.

Construction activities would be primarily confined to areas of the building in front of the existing 20-degree south face and above the two-story extension as well as to limited interior areas behind the existing 20-degree face. There would be no construction outside the existing footprint of the facility and no change to Building V-003's footprint. Laydown and parking areas for construction-related materials and equipment would be located on parking lots and other paved surfaces adjacent to Building V-003. The Proposed Action would involve no disturbance of vegetated or permeable areas, and no new impervious surfaces would be created.

Operation of the AN / SPY-6 System

Once installed, the AN / SPY-6 system would be tested for integration with the Aegis system. The area scanned by the new radar would be defined by azimuths 114.3 and 204.3 degrees from true north, as shown in Figure 6. Vertically, the radar array would be situated approximately 60 feet above ground level and would only scan at angles above 0 degree; thus, there would be no electromagnetic exposure at ground level around the facility. Testing would be conducted using targets of opportunity such as Navy or NASA aircraft or rockets, or any targets or projectiles used for other testing or training purposes within the scanning area.

ENFORCEABLE POLICIES OF THE VIRGINIA COASTAL ZONE MANAGEMENT PROGRAM

Enforceable Policies Not Applicable to the Proposed Action

Virginia's Coastal Zone Management Program is managed by the Virginia Department of Environmental Quality (DEQ). The Navy reviewed the Virginia Coastal Management Program to identify the approved enforceable policies relevant to the Proposed Action.

Table 1 presents the policies that are not applicable to the Proposed Action. The policies in Table 1 are not addressed further in this document.

Table 1: Enforceable Policies Not Applicable To The Proposed Action

Policy	Reason for Non-applicability
Fisheries Management Virginia Code §28.2-200 through §28.2-713 and §29.1-100 through §29.1-570	No marine fish, shellfish, or organisms would be removed from the waterways or otherwise affected as a result of the Proposed Action.
Dunes and Beaches Management §28.2-1400 through § 28.2-1420	The Proposed Action includes no activities that could destroy or alter primary dunes.
Subaqueous Lands Management Virginia Code §28.2-1200 through §28.2-1213	The Proposed Action includes no activities that could affect, or require a permit to use, state-owned bottomlands.
Wetlands Management Virginia Code §28.2-1301 through §28.2-1320; Clean Water Act	The Proposed Action includes no activities that could affect tidal or non-tidal wetlands.
Non-point Source Water Pollution Control Virginia Code §62.1-44.15:51 et seq.	The Proposed Action includes no activities that could increase chemical nutrient or sediment inputs to the Chesapeake Bay or other Virginia waters.
Point Source Water Pollution Control Virginia Code §62.1-44.15; Clean Water Act	The Proposed Action would not create or affect any point pollution sources.
Shoreline Sanitation Virginia Code § 32.1-164 through § 32.1-165	The Proposed Action would not involve or affect septic tanks.
Coastal Lands Management Virginia Code § 62.1-44.15:67 through § 62.1-44.15:79; 9 VAC 25-830-10 et seq.	The Proposed Action includes no development activities that could affect the Chesapeake Bay or its tributaries.

Enforceable Policies Applicable To The Proposed Action

Point Source Air Pollution Control

The Department of Environmental Quality implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code §10.1-1301).

The Virginia Air Pollution Control Board promulgates Virginia's air regulations. These cover stationary sources, such as industrial facilities and other fixed-emission sources; mobile sources, such as vehicle emissions; and regulations to ensure that certain projects conform with federal requirements.
The Proposed Action does not involve new stationary or mobile sources of air pollution. Because it would take place within an area in attainment for all criteria pollutants regulated under the Clean Air Act, the Act's general conformity requirements do not apply.

Emissions associated with the demolition and construction activities associated with the Proposed Action would be typical of small- to medium-sized construction projects and would be minimal, as shown in Table 2 below. These emissions have no potential to affect the area's attainment designation in the short or long term. They would end when the construction of the proposed addition is complete. The net increase in operational emissions from heating the enlarged building would be negligible.

Table 2: Estimated Construction-Related Emissions From The Proposed Action

Action	Total Emissions[1]					
	SO_2	CO	PM_{10}	$PM_{2.5}$	NOx	VOC
Construction Equipment Emissions	**0.01**	**1.29**	**0.02**	**0.02**	**0.31**	**0.04**
Construction Vehicle Emissions	**0.00[2]**	**0.05**	**0.00[2]**	**0.00[2]**	**0.03**	**0.01**
Total	**0.01**	**1.34**	**0.02**	**0.02**	**0.34**	**0.05**

1. In tons per year. - - - 2. Negligible quantity.

As WFF's annual emission levels do not exceed the Title V of the Clean Air Act major source threshold of 100 tons (907,185 kilograms) per year of any criteria pollutant, WFF is regulated as a synthetic minor source (i.e., a source with annual emissions capped under the major source threshold) for air pollutants. The Proposed Action has no potential to affect WFF's permitting status or to require a separate permit.

Therefore, the Proposed Action is fully consistent with the Point Source Air Pollution Control enforceable policy.

CONCLUSION

Based on the above information and analysis, the Navy finds that the Proposed Action is fully consistent with the applicable enforceable policies of the Virginia Coastal Zone Management Program.

[redacted]

J.S. LOCK, SR

10/17/16

Date

FIGURES

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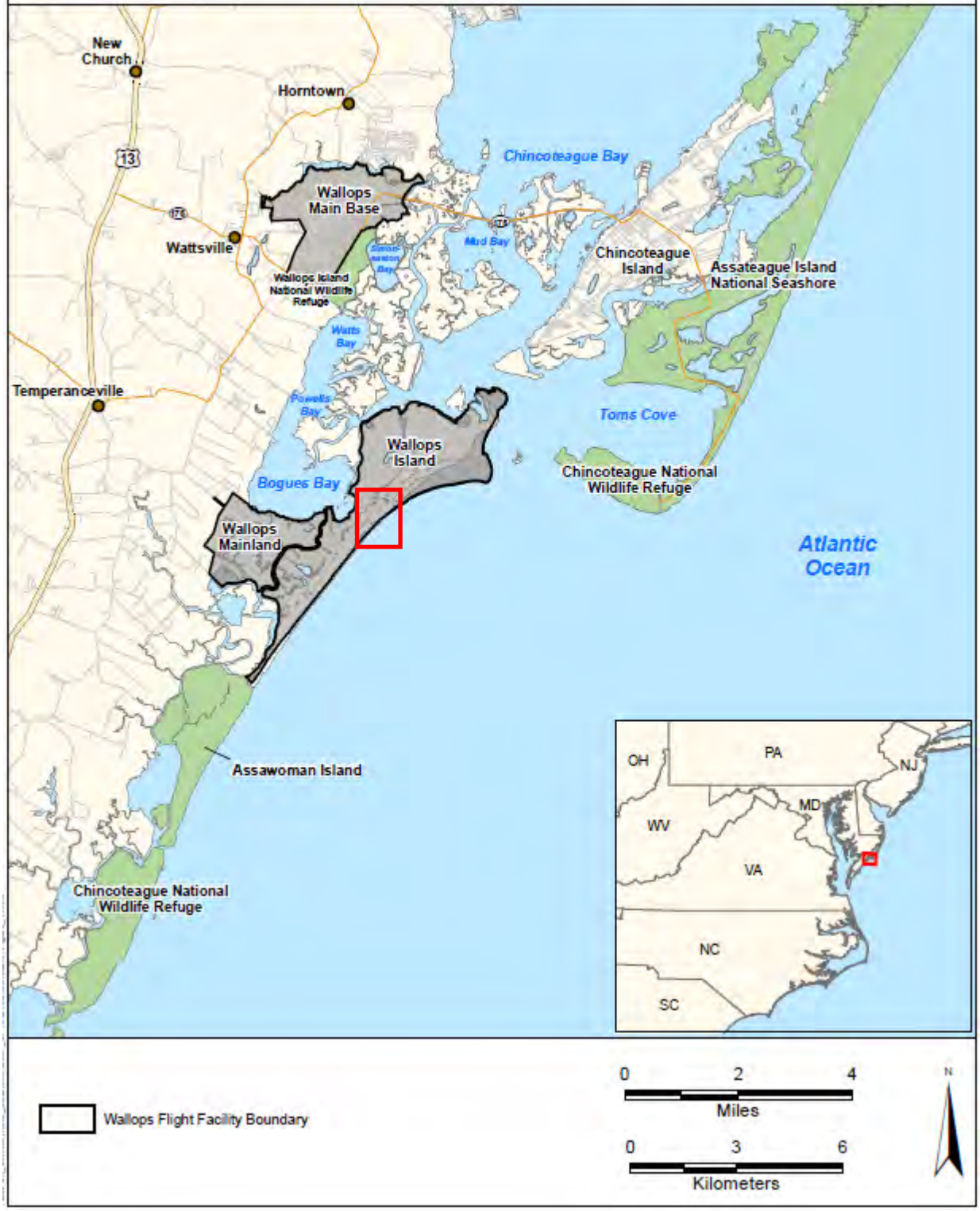
Figure 1: Wallops Flight Facility



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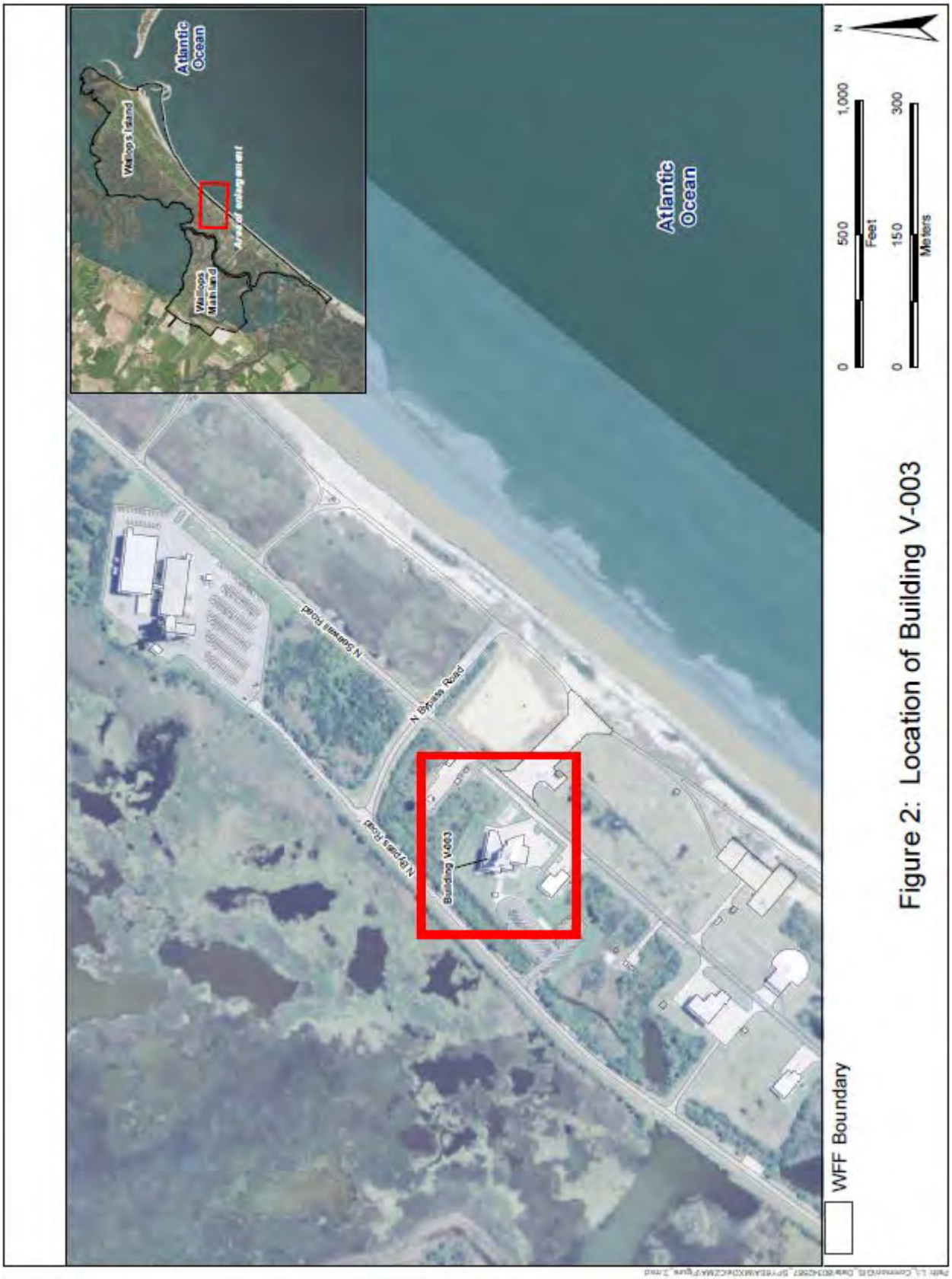

Figure 2: Location of Building V-003

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Figure 3: Existing South Elevation Of Building V-003 With Radar Array

The Two-Story Extension To The South Elevation Is Visible Directly Below The Radar Array.
(Source: Navy)

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Figure 4: Bird's Eye View Of The Proposed Addition

--- Footprint Of The Proposed Addition

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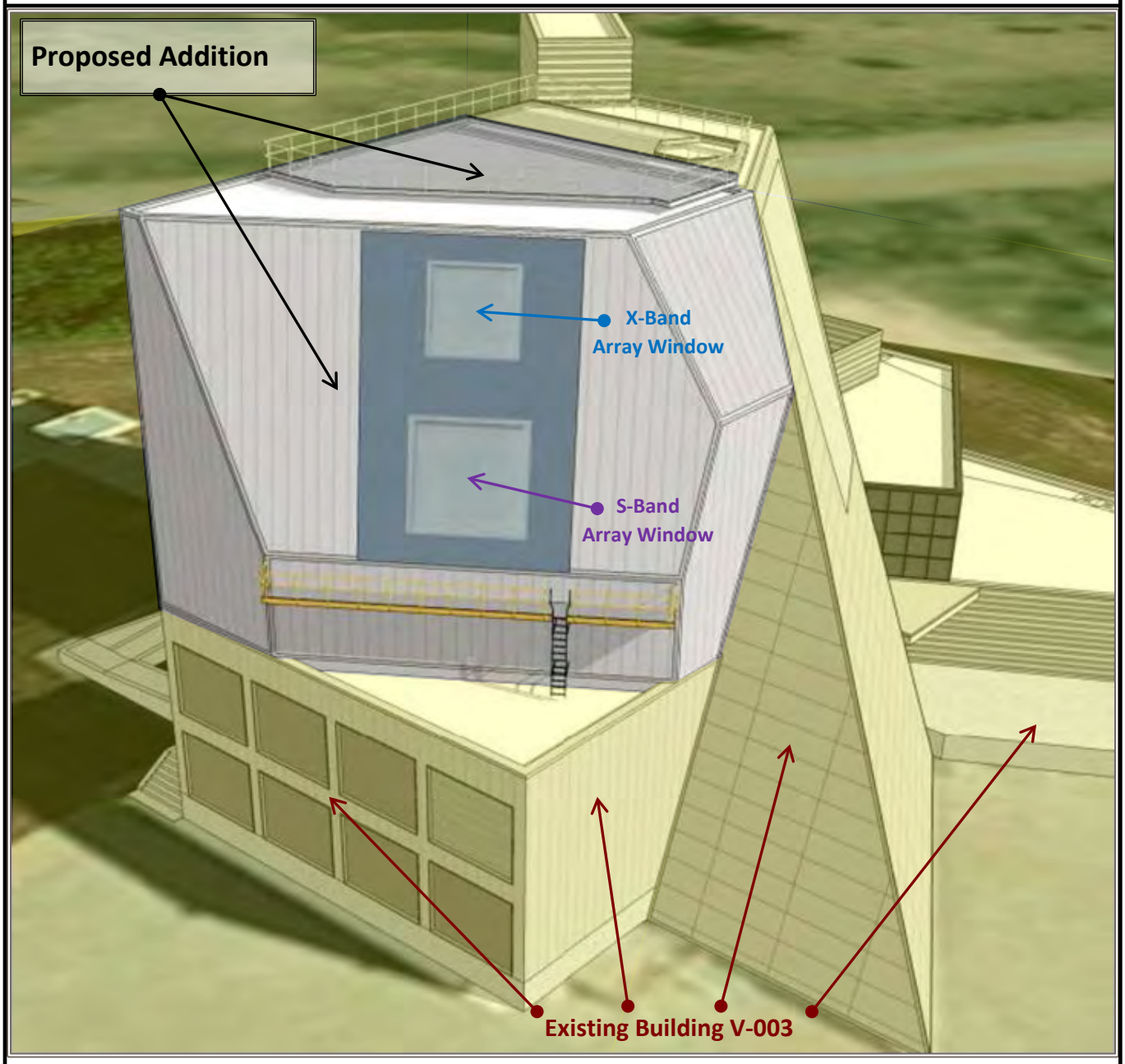
Figure 5: Exterior Configuration Of The Proposed Addition To Building V-003



(Source: NAVFAC MIDLANT 2014a)

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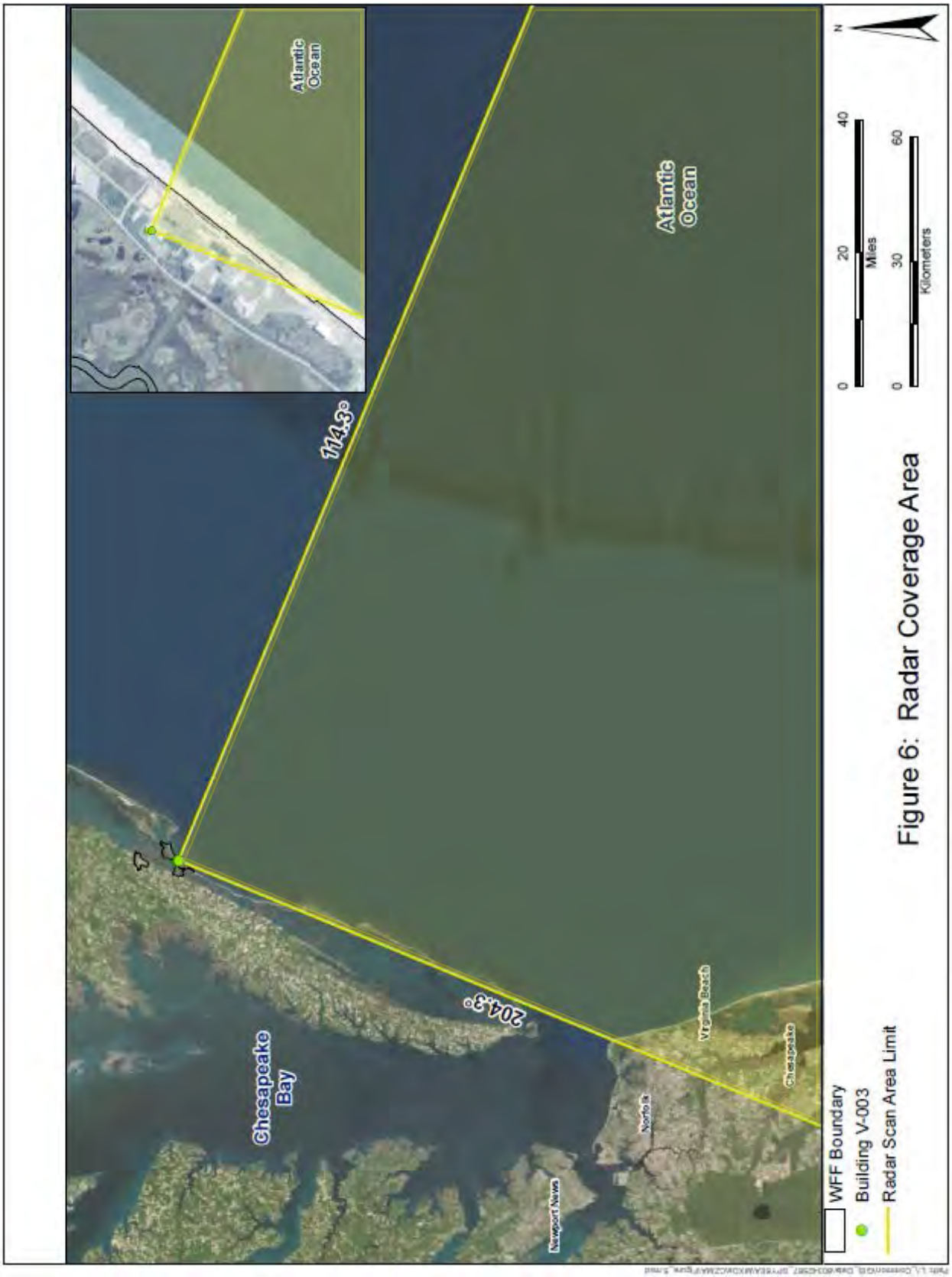

Figure 6: Radar Coverage Area

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COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

January 17, 2017

Ms. Justine Woodward
Environmental Planning and Conservation
NAVFAC MID-ATLANTIC
Building Z-144, 1st Floor
9324 Virginia Ave
Norfolk, Virginia 23511-3095

RE: Federal Consistency Determination for the Installation and Operation of Air Missile Defense Radar at Wallops Flight Facility, U.S. Department of the Navy, Accomack County, DEQ 16-229F.

Dear Ms. Woodward:

The Commonwealth of Virginia has completed its review of the Federal Consistency Determination (FCD) for the above-referenced project. The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal consistency documents and responding to appropriate officials on behalf of the Commonwealth. This letter is in response to your submission dated October 18, 2016 (received on November 21, 2016) requesting concurrence with the FCD prepared by the U.S. Department of the Navy for the proposed project. The following agencies participated in this review:

Department of Environmental Quality
Virginia Marine Resources Commission
Department of Conservation and Recreation
Department of Historic Resources
Department of Aviation

In addition, the Department of Game and Inland Fisheries, Accomack-Northampton Planning District Commission, and Accomack County were invited to comment on the proposed project.

PROJECT DESCRIPTION

The Department of the Navy (Navy) Surface Combat Systems Center (SCSC) is proposing to install and operate an AN/SPY-6 Air and Missile Defense Radar System in

Building V-003 on Wallops Island at the National Aeronautics and Space Administration's (NASA) Wallops Flight Facility in Accomack County, Virginia. Building V003 is a multi-level, steel-framed structure built in 2010 that is currently used by the Navy SCSC to test radar systems associated with the DDG-1000 program. The DDG-1000 program is nearing completion, after which it is anticipated that Building V-003 will be available for the installation and testing of the AN/SPY-6 system. To accommodate the AN/SPY-6 radar, the Navy would construct a four-story addition to the south elevation of Building V-003 above an existing two-story extension. This would involve removing the existing roof deck structure and all metal siding on the two-story extension and installing seven new steel columns and seven pile caps (foundations) on the interior of the existing structure to provide structural support for the addition. The new foundations would require selective demolition of the existing interior grade-level slab and the installation of 40 concrete piles to support the foundations. The piles would be drilled and poured. New concrete decks to be constructed on Decks 3 and 4 in the addition would be continuous with Decks 3 and 4 of the existing building. A new grating deck would be constructed on Deck 6, which would be continuous with Deck 6 of the existing building. The total height of the building would not change.

PUBLIC PARTICIPATION

In accordance with 15 CFR §930.2, the public was invited to participate in the review of the FCD. Public notice of this proposed action was published in OEIR's Program Newsletter and on the DEQ website from November 22, 2016 through December 20, 2016. No public comments were received in response to the notice.

FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT

Pursuant to the Coastal Zone Management Act of 1972 (§ 1456(c)), as amended, and the federal consistency regulations implementing the CZMA (15 CFR Part 930, Subpart C, § 930.30 *et seq.*) federal actions that can have reasonably foreseeable effects on Virginia's coastal uses or resources must be conducted in a manner which is consistent, to the maximum extent practicable, with the Virginia Coastal Zone Management (CZM) Program. The Virginia CZM Program is comprised of a network of programs administered by several agencies. In order to be consistent with the Virginia CZM Program, the federal agency must obtain all the applicable permits and approvals listed under the enforceable policies of the Program prior to commencing the project.

FEDERAL CONSISTENCY CONCURRENCE

Based on our review of the consistency determination and the comments submitted by agencies administering the enforceable policies of the Virginia CZM Program, DEQ concurs that the proposal is consistent, to the maximum extent practicable, with the Program provided all applicable permits and approvals are obtained as described below. However, other state approvals which may apply to this project are not included in this consistency concurrence. Therefore, the Navy must ensure that this project is

constructed and operated in accordance with all applicable federal, state, and local laws and regulations.

FEDERAL CONSISTENCY ANALYSIS

According to information in the FCD, the proposed project would have no effect on the following enforceable policies: fisheries management; subaqueous lands management; dunes management; wetlands management; non-point source pollution control; point source pollution control; shoreline sanitation; and coastal lands management. The agencies of the Commonwealth that are responsible for the administration of the enforceable policies of the Virginia CZM Program generally agree with the determination. The Navy must ensure that the proposed action is consistent with the aforementioned policies. In addition, DEQ encourage the Navy to consider potential project impacts on the advisory policies (Attachment 2) of the Virginia CZM Program. The analysis which follows responds to the discussion of the enforceable policies of the Virginia CZM Program that apply to this project and review comments submitted by agencies that administer the enforceable policies.

1. Fisheries Management. According to the FCD (page 3), no marine fish, shellfish, or organisms would be removed from the waterways or otherwise affected as a result of the Proposed Action.

1(a) Agency Jurisdiction. The fisheries management enforceable policy is administered by the Virginia Marine Resources Commission (VMRC) (Virginia Code §28.2-200 to §28.2-713) and the Department of Game and Inland Fisheries (DGIF) (Virginia Code §29.1-100 to §29.1-570).

1(b) Agency Findings. VMRC determined that the project would not impact any resources under its jurisdiction.

1(c) Conclusion. The project is consistent with the fisheries management enforceable policy of the Virginia CZM Program.

For further information, contact VMRC, George Badger at (757) 414-0710.

2. Subaqueous Lands Management. The FCD (page 3) states that the proposed action occurs within the confines of NAS Oceana and would not impact or require any alteration to subaqueous lands in Virginia.

2(a) Agency Jurisdiction. The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, tidal wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality. The program is administered by the Virginia Marine Resources Commission (Virginia Code §28.2-1200 to §28.2-1213).

2(b) Agency Findings. According to VMRC, the project would not impact any resources under its jurisdiction.

2(c) Conclusion. The activity is consistent with the subaqueous lands management enforceable policy of the Virginia CZM Program.

For additional information, contact VMRC, George Badger at (757) 414-0710.

3. Air Pollution Control. According to the FCD (page 3), the Proposed Action does not involve new stationary or mobile sources of air pollution. Emissions associated with the demolition and construction activities would be typical of small- to medium-sized construction projects and would be minimal. These emissions have no potential to affect the area's attainment designation in the short or long term.

3(a) Agency Jurisdiction. DEQ's Air Division, on behalf of the State Air Pollution Control Board, is responsible to develop regulations that implement Virginia's Air Pollution Control Law. DEQ is charged to carry out mandates of the state law and related regulations as well as Virginia's federal obligations under the Clean Air Act as amended in 1990. The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board at DEQ (Virginia Code §10-1.1300 through §10.1-1320).

3(b) Agency Findings. According to the DEQ Air Division, the project site is located in an ozone attainment area.

3(c) Recommendation. The Navy should take all reasonable precautions to limit emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), principally by controlling or limiting the burning of fossil fuels.

3(d) Requirements.

(i) Fugitive Dust

Fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 *et seq.* of the *Regulations for the Control and Abatement of Air Pollution*. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials; and
- Covering of open equipment for conveying materials.

(ii) Open Burning

If project activities include the burning of construction material, this activity must meet the requirements under 9 VAC 5-130 *et seq.* of the *Regulations* for open burning, and it may require a permit. The *Regulations* provide for, but do not require, the local adoption of a model ordinance concerning open burning. The Navy should contact Accomack County fire officials to determine what local requirements, if any, exist.

3(e) Conclusion. The project, as proposed, is consistent with the air pollution control enforceable policy of the Virginia CZM Program provided the applicant obtains all applicable approvals prior to implementation of the project.

ADDITIONAL ENVIRONMENTAL CONSIDERATIONS

In addition to the enforceable policies of the Virginia CZM Program, comments were also provided with respect to other applicable requirements and recommendations. The applicant must ensure that this project is constructed and operated in accordance with all applicable federal, state, and local laws and regulations.

1. Solid and Hazardous Waste Management.

1(a) Agency Jurisdiction. On behalf of the Virginia Waste Management Board, the DEQ Division of Land Protection and Revitalization (DEQ-DLPR) is responsible for carrying out the mandates of the Virginia Waste Management Act (Virginia Code §10.1-1400 *et seq.*), as well as meeting Virginia's federal obligations under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation Liability Act (CERCLA), commonly known as Superfund. DEQ-DLPR also administers laws and regulations on behalf of the State Water Control Board governing Petroleum Storage Tanks (Virginia Code §62.1-44.34:8 *et seq.*), including Aboveground Storage Tanks (9 VAC 25-91 *et seq.*) and Underground Storage Tanks (9 VAC 25-580 *et seq.* and 9 VAC 25-580-370 *et seq.*), also known as 'Virginia Tank Regulations', and § 62.1-44.34:14 *et seq.* which covers oil spills.

Virginia:

- Virginia Waste Management Act, Virginia Code § 10.1-1400 *et seq.*
- *Virginia Solid Waste Management Regulations*, 9 VAC 20-81
- (9 VAC 20-81-620 applies to asbestos-containing materials)
- *Virginia Hazardous Waste Management Regulations*, 9 VAC 20-60
- (9 VAC 20-60-261 applies to lead-based paints)
- *Virginia Regulations for the Transportation of Hazardous Materials*, 9 VAC 20-110.

Federal:

- Resource Conservation and Recovery Act, 42 U.S. Code sections 6901 *et seq.*

- U.S. Department of Transportation *Rules for Transportation of Hazardous Materials*, 49 *Code of Federal Regulations*, Part 107
- Applicable rules contained in Title 40, *Code of Federal Regulations.*

1(b) Agency Findings. DEQ-DLPR conducted a search (500-foot radius) of solid and hazardous waste databases (including petroleum releases) to identify waste sites in close proximity to the project area. DLPR search identified one CERCLA waste site in close proximity to the project:

> VAV000306905, Naval Aviation Ordnance Test Station, Route 175, Wallops Island, VA 23337. Not on the National Priorities List (NPL).

In addition, the Wallops Flight Facility is listed as a CERCLA site:

> VA8800010763, NASA Wallops Island, Route 175, Wallops Island, VA 23337. Not on the NPL.

The following petroleum release site is located in close proximity to the project area:

> PC#19952405, NASA Wallops Flight Facility-Building V10, Route 175, Wallops Island, VA 23337. Release Date: 05/03/1995. Status: Closed.

1(c) Recommendations.

(i) CERCLA Waste Sites

Detailed CERCLA hazardous waste site information may be accessed from the following Environmental Protection Agency (EPA) websites at:

- https://www3.epa.gov/enviro/;
- https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/view; and
- https://www.epa.gov/superfund.

(ii) Petroleum Release Site

The Navy should review DEQ's Pollution Complaint (PC) case file to establish the exact location, nature and extent of the petroleum release and its potential to impact the proposed project. Also, the Navy should contact DEQ-TRO, Tanks Program at (757) 518-2175 for addition information on the PC case.

(iii) Pollution Prevention

DEQ-DLRP recommends the implementation of pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

1(d) Requirements.

(i) Waste Management

Any wastes that are generated during construction must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. All construction waste must be characterized in accordance with the *Virginia Hazardous Waste Management Regulations* prior to management at an appropriate facility. It is the applicant's responsibility to determine if a solid waste meets the criteria of a hazardous waste and be managed appropriately.

(ii) Asbestos and/or Lead-based Paint

All structures being demolished or modified should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9 VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed.

(iii) Petroleum Contamination

If evidence of a petroleum release is discovered during construction of this project, it must be reported to DEQ (Virginia Code §§ 62.1-44.34.8 through 9 and 9 VAC 25-580-10 *et seq.*). Petroleum contaminated soils generated during construction of this project must be characterized and disposed of properly.

(iv) Petroleum Storage Tank Compliance and Inspections

The installation and use of an aboveground storage tank (AST) of greater than 660 gallons for temporary fuel storage of more than 120 days must follow the requirements in the *Facility and Aboveground Storage Tank Regulation* (9 VAC 25-91-10 *et seq.*)

If you have any other questions or need further information regarding waste comments, contact DEQ-DLPR, Katy Dacey at (804) 698-4274.

2. Natural Heritage Resources.

2(a) Agency Jurisdiction.

(i) Department of Conservation and Recreation

The Virginia Department of Conservation and Recreation's (DCR) Division of Natural Heritage (DNH). DNH's mission is conserving Virginia's biodiversity through inventory, protection and stewardship. The Virginia Natural Area Preserves Act (Virginia Code §10.1-209 through 217), authorizes DCR to maintain a statewide database for conservation planning and project review, protect land for the conservation of biodiversity, and protect and ecologically manage the natural heritage resources of

Virginia (the habitats of rare, threatened and endangered species, significant natural communities, geologic sites, and other natural features).

(ii) Department of Agriculture and Consumer Services

The Virginia Department of Agriculture and Consumer Services (VDACS). The Endangered Plant and Insect Species Act of 1979 (Virginia Code Chapter 39 §3.1-1020 through 1030) authorizes VDACS to conserve, protect and manage endangered and threatened species of plants and insects. Under a Memorandum of Agreement established between VDACS and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

2(b) Agency Findings.

(i) Wallops Island Causeway Marshes Conservation Site

According to the information currently in DCR files, the Wallops Island Causeway Marshes Conservation Site is located adjacent to the project site. Wallops Island Causeway Marshes Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resources of concern at this site are:

Circus cyaneus	Northern harrier	G5/S1S2B,S3N/NL/NL
Ammodramus caudacutus	Saltmarsh Sharp-tailed sparrow	G4/S2BS3N/NL/NL

See the DCR-DNH response attached for detailed information on these resources.

(ii) State-listed Threatened and Endangered Plant and Insect Species

DCR finds that the proposed activity will not affect any documented state-listed plants or insects.

(iii) State Natural Area Preserves

DCR files do not indicate the presence of any State Natural Area Preserves under the agency's jurisdiction in the project vicinity.

2(c) Recommendations.

(i) Natural Heritage Resources

Contact DCR-DNH to secure updated information on natural heritage resources if the scope of the project changes or six months pass before the project is implemented, since new and updated information is continually added to the Biotics Data System.

(ii) Wildlife Resources

The Department of Game and Inland Fisheries (DGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in DCR's response. The database may be accessed at http://vafwis.org/fwis/ or contact DGIF, Ernie Aschenbach at (804) 367-2733 or ernie.aschenbach@dgif.virginia.gov.

(iii) Protected Species

DCR notes that the project is located within 2 miles of documented occurrences of state-listed and state- and federally-listed animals. Therefore, DCR recommends coordination with the US Fish and Wildlife Service (USFWS) and DGIF to ensure compliance with protected species legislation.

3. Historic and Archaeological Resources.

3(a) Agency Jurisdiction. The Virginia Department of Historic Resources (DHR) conducts reviews of both federal and state projects to determine their effect on historic properties. Under the federal process, DHR is the State Historic Preservation Office, and ensures that federal undertakings-including licenses, permits, or funding-comply with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulation at 36 CFR Part 800. Section 106 requires federal agencies to consider the effects of federal projects on properties that are listed or eligible for listing on the National Register of Historic Places. For state projects or activities on state lands, DHR is afforded an opportunity to review and comment on (1) the demolition of state property; (2) major state projects requiring an EIR; (3) archaeological investigations on state-controlled land; (4) projects that involve a landmark listed in the Virginia Landmarks Register; (5) the sale or lease of surplus state property; (6) exploration and recovery of underwater historic properties; and (7) excavation or removal of archaeological or historic features from caves. Please see DHR's website for more information about applicable state and federal laws and how to submit an application for review: http://www.dhr.virginia.gov/StateStewardship/Index.htm.

3(b) Requirements. DHR reminds the Navy that it must directly consult with agency staff on this undertaking. While 36 CFR 800.8 allows federal agencies to coordinate Section 106 compliance with the National Environmental Policy Act (NEPA), the agency must inform the applicable SHPO (i.e. DHR) early in the process that it intends to do so. The agency must also take care that the environmental documentation prepared under NEPA does present information about historic properties and potential effects to such resources at a level of detail that allows the SHPO and other consulting parties to comment.

4. Aviation Impacts.

4(a) Agency Jurisdiction. The Virginia Department of Aviation (DoAv) is a state agency that plans for the development of the state aviation system; promotes aviation; grants aircraft and airports licenses; and provides financial and technical assistance to cities, towns, counties and other governmental subdivisions for the planning, development, construction and operation of airports, and other aviation facilities.

4(b) Agency Findings. DoAv does not anticipate any negative impacts associated with the proposed action.

For additional information, contact DoAv, Rusty Harrington at (804) 236-3632.

5. Pollution Prevention. DEQ advocates that principles of pollution prevention and sustainability be used in all construction projects as well as in facility operations. Effective siting, planning, and on-site Best Management Practices will help to ensure that environmental impacts are minimized. However, pollution prevention and sustainability techniques also include decisions related to construction materials, design, and operational procedures that will facilitate the reduction of wastes at the source.

5(a) Recommendations. We have several pollution prevention recommendations that may be helpful in the construction and maintenance of the project:

- Consider development of an effective Environmental Management System (EMS). An effective EMS will ensure that the proposed project is committed to complying with environmental regulations, reducing risk, minimizing environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes proponents with effective Environmental Management Systems through its Virginia Environmental Excellence Program (VEEP). VEEP provides recognition, annual permit fee discounts, and the possibility for alternative compliance methods.
- Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level, and amount of packaging should be considered and can be specified in purchasing contracts.
- Consider contractors' commitment to the environment when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals.
- Choose sustainable materials and practices for construction and design.
- Integrate pollution prevention techniques into maintenance and operations, to include inventory control for centralized storage of hazardous materials. Maintenance facilities should have sufficient and suitable space to allow for effective inventory control and preventive maintenance.

DEQ's Office of Pollution Prevention provides information and technical assistance relating to pollution prevention techniques and EMS. If interested, please contact Meghann Quinn at (804) 698-4021.

6. Pesticides and Herbicides. Should construction or maintenance require the use of pesticides or herbicides for landscape maintenance, these chemicals should be in accordance with the principles of integrated pest management. The least toxic pesticides that are effective in controlling the target species should be used.

Contact the Department of Agriculture and Consumer Services at (804) 786-3501 for more information.

7. Energy Conservation. The proposed project should be planned and designed to comply with state and federal guidelines and industry standards for energy conservation and efficiency. The Commonwealth encourages architectural and engineering designers to recognize and incorporate the energy, environmental, and sustainability concepts listed in the Leadership in Energy and Environmental Design (LEED) Green Building Rating System into the development and procurement of their projects.

7(a) Recommendations. The energy efficiency of the structure may be enhanced by maximizing the use of the following as applicable:

- thermally-efficient building shell components (roof, wall, floor, windows, and insulation);
- facility siting and orientation with consideration towards natural lighting and solar loads
- high efficiency heating, ventilation, air conditioning systems;
- high efficiency lighting systems and daylighting techniques; and
- energy-efficient machinery.

Contact the Department of Mines, Minerals and Energy, David Spears at (434) 951-6350, for assistance in meeting this challenge.

8. Water Conservation. The following recommendations will result in reduced water use associated with the operation of the facility.

- Grounds should be landscaped with hardy native plant species to conserve water as well as lessen the need to use fertilizers and pesticides.
- Convert turf to low water-use landscaping such as drought resistant grass, plants, shrubs and trees.
- Low-flow toilets should be installed in new homes.
- Consider installing low flow restrictors and aerators to faucets.
- Improve irrigation practices by:
    - upgrading sprinkler clock; water at night, if possible, to reduce evapotranspiration (lawns need only 1 inch of water per week, and do not need to be watered daily; overwatering causes 85% of turf problems);

  - installing a rain shutoff device; and
  - collecting rainwater with a rain bucket or cistern system with drip lines.
- Check for and repair leaks (toilets and faucets) during regular routine maintenance activities.

REGULATORY AND COORDINATION NEEDS

1. Air Pollution Control. This project is subject to air quality regulations administered by the Department of Environmental Quality. The state air pollution regulations that may apply this project are:

- fugitive dust and emissions control (9 VAC 5-50-60 *et seq.*); and
- open burning restrictions (9 VAC 5-130).

For additional information and coordination, contact DEQ-TRO, Troy Breathwaite at (757) 518-2006. If applicable, coordinate with Accomack County fire officials for any local requirements on open burning.

2. Solid and Hazardous Wastes. All solid waste, hazardous waste, and hazardous materials must be managed in accordance with all applicable federal, state, and local environmental regulations. For additional information concerning location and availability of suitable waste management facilities in the project area or if free product, discolored soils, or other evidence of contaminated soils are encountered, contact DEQ-TRO, Melinda Woodruff at (757) 518-2174.

2(a) Asbestos-Containing Material. It is the responsibility of the owner or operator of a demolition activity to thoroughly inspect the structure for the presence of asbestos, including Category I and Category II nonfriable asbestos-containing material. Upon classification as friable or non-friable, all asbestos-containing material shall be disposed of in accordance with the Virginia Solid Waste Management Regulations (9 VAC 20-81 *et seq.*) and transported in accordance with the Virginia regulations governing Transportation of Hazardous Materials (9 VAC 20-110-10 *et seq.*). Contact the DEQ-TRO, Lisa Silvia at (757) 518-2175 and the Department of Labor and Industry, Doug Wiggins (540) 562-3580 ext. 131 for additional information.

2(b) Lead-Based Paint. If applicable, this project must comply with the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) regulations and with the Virginia Lead-Based Paint Activities Rules and Regulations. For additional information regarding these requirements, contact the Department of Professional and Occupational Regulation (804) 367-8500.

2(c) Petroleum Contamination. In accordance with Virginia Code §§ 62.1-44.34.8 through 9 and 9 VAC 25-580-10 *et seq.*, contact DEQ-TRO, Lisa Silvia at (757) 518-2175 if evidence of a petroleum release is discovered during construction of this project.

2(d) Petroleum Storage Tank Compliance/Inspections. In accordance with 9 VAC 25-91-10 *et seq.*, contact DEQ-TRO, Steve Pollock at (757) 518-2014 for additional information on the use of ASTs greater than 660 gallons to be used for temporary fuel storage over120 days.

3. Natural Heritage Resources.

(i) Biotics Data System

Contact DCR-DNH, Rene Hypes at (804) 371-2708, to secure information on natural heritage resources in the project area or if six months passes before the project is implemented, since new and updated information is continually added to the Biotics Data System.

(ii) Protected Species

Coordinate with the USFWS Virginia Field Office, Cindy Schulz at (804) 824-2426 or cindy.schulz@fws.gov and/or DGIF, Amy Ewing at (804) 367-2211 regarding any potential impacts upon state- or federally-listed protected species in the project area.

4. Historic and Archaeological Resources. In accordance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR 800, the Navy must coordinate with DHR regarding potential project impacts to historic and archaeological resources. Contact DHR, Mark Holma at (804) 482-6091 for additional information and coordination.

Thank you for the opportunity to comment on the FCD for the Installation and Operation of Air Missile Defense Radar at Wallops Flight Facility. The detailed comments of reviewing agencies are attached for your review. Please contact me at (804) 698-4204 or John Fisher at (804) 698-4339 for clarification of these comments.

Sincerely,

Bettina Sullivan, Program Manager
Environmental Impact Review and Long-Range Priorities

Enclosures

Ec: [redacted]

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
Fax: 804-698-4019 - TDD (804) 698-4021
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4020
1-800-592-5482

Attachment 2

Advisory Policies for Geographic Areas of Particular Concern

a. Coastal Natural Resource Areas - These areas are vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the shoreline. Such areas receive special attention from the Commonwealth because of their conservation, recreational, ecological, and aesthetic values. These areas are worthy of special consideration in any planning or resources management process and include the following resources:

a) Wetlands
b) Aquatic Spawning, Nursery, and Feeding Grounds
c) Coastal Primary Sand Dunes
d) Barrier Islands
e) Significant Wildlife Habitat Areas
f) Public Recreation Areas
g) Sand and Gravel Resources
h) Underwater Historic Sites.

b. Coastal Natural Hazard Areas - This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are as follows:

i) Highly Erodible Areas
ii) Coastal High Hazard Areas, including flood plains.

c. Waterfront Development Areas - These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are as follows:

i) Commercial Ports
ii) Commercial Fishing Piers
iii) Community Waterfronts

Although the management of such areas is the responsibility of local government and some regional authorities, designation of these areas as Waterfront Development Areas of Particular Concern (APC) under the VCP is encouraged.

Designation will allow the use of federal CZMA funds to be used to assist planning for such areas and the implementation of such plans. The VCP recognizes two broad classes of priority uses for waterfront development APC:

i) water access dependent activities;
ii) activities significantly enhanced by the waterfront location and complementary to other existing and/or planned activities in a given waterfront area.

Advisory Policies for Shorefront Access Planning and Protection

a. Virginia Public Beaches - Approximately 25 miles of public beaches are located in the cities, counties, and towns of Virginia exclusive of public beaches on state and federal land. These public shoreline areas will be maintained to allow public access to recreational resources.

b. Virginia Outdoors Plan - Planning for coastal access is provided by the Department of Conservation and Recreation in cooperation with other state and local government agencies. The Virginia Outdoors Plan (VOP), which is published by the Department, identifies recreational facilities in the Commonwealth that provide recreational access. The VOP also serves to identify future needs of the Commonwealth in relation to the provision of recreational opportunities and shoreline access. Prior to initiating any project, consideration should be given to the proximity of the project site to recreational resources identified in the VOP.

c. Parks, Natural Areas, and Wildlife Management Areas - Parks, Wildlife Management Areas, and Natural Areas are provided for the recreational pleasure of the citizens of the Commonwealth and the nation by local, state, and federal agencies. The recreational values of these areas should be protected and maintained.

d. Waterfront Recreational Land Acquisition - It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.

e. Waterfront Recreational Facilities - This policy applies to the provision of boat ramps, public landings, and bridges which provide water access to the citizens of the Commonwealth. These facilities shall be designed, constructed, and maintained to provide points of water access when and where practicable.

f. Waterfront Historic Properties - The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Department of Historic Resources. Buildings, structures, and sites of historical, architectural, and/or archaeological interest are significant resources for the citizens of the Commonwealth. It is the policy of the Commonwealth and the VCP to enhance the protection of buildings, structures, and sites of historical, architectural, and archaeological significance from damage or destruction when practicable.

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

November 28, 2016

Mr. John E. Fisher
c/o Department of Environmental Quality
Office of the Environmental Impact Review
629 East Main Street, Sixth Floor
Richmond, Virginia 23219

Re: 16-229F (Air Missile Defense Radar)

Dear Mr. Fisher:

You have inquired regarding the installation and operation of an Air Missile Defense Radar at the Wallops Flight Facility on Wallops Island in Accomack County, Virginia. The proposed radar will be associated with the Navy's Aegis Weapon System located in building V-003.

The Marine Resources Commission requires a permit for any activities that encroach upon or over, or take use of materials from the beds of the bays, ocean, rivers and streams, or creeks which are the property of the Commonwealth.

Based upon my review of the "Proposed Action" it would appear that your proposed project will not fall within the Commission's jurisdiction, therefore, no authorization would be required from the Marine Resources Commission. If however any portion of your proposed project encroaches channelward of mean low water a permit would be required.

If I may be of further assistance, please do not hesitate to contact me at (757) 414-0710.

Sincerely,

George H. Badger, III
Environmental Engineer

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR PROGRAM COORDINATION

ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY

TO: John E. Fisher **DEQ - OEIA PROJECT NUMBER: DEQ #16-229F**

PROJECT TYPE: ☐ STATE EA / EIR **X FEDERAL EA / EIS** ☐ SCC

X CONSISTENCY DETERMINATION

PROJECT TITLE: Installation and Operation of Air Missile Defense Radar at Wallops Flight Facility

PROJECT SPONSOR: Department of the Navy

PROJECT LOCATION: **X OZONE ATTAINMENT AREA**

REGULATORY REQUIREMENTSMAY BE APPLICABLE TO:
- **X CONSTRUCTION**
- ☐ OPERATION

STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-45-760 et seq. – Asphalt Paving operations
3. **X 9 VAC 5-130 et seq. – Open Burning**
4. **X 9 VAC 5-50-60 et seq. Fugitive Dust Emissions**
5. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to_____
6. ☐ 9 VAC 5-60-300 et seq. – Standards of Performance for Toxic Pollutants
7. ☐ 9 VAC 5-50-400 Subpart_____, Standards of Performance for New Stationary Sources, designates standards of performance for the_____
8. ☐ 9 VAC 5-80-1100 et seq. of the regulations – Permits for Stationary Sources
9. ☐ 9 VAC 5-80-1605 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the _____
10. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
11. ☐ 9 VAC 5-80-800 et seq. Of the regulations – State Operating Permits. This rule may be applicable to _____

COMMENTS SPECIFIC TO THE PROJECT:

K. S. Narasimhan

(Kotur S. Narasimhan)
Office of Air Data Analysis

DATE: November 30, 2016

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

TO: John Fisher, DEQ/EIR Environmental Program Planner

FROM: Katy Dacey, Division of Land Protection & Revitalization Review Coordinator

DATE: November 29, 2016

COPIES: Sanjay Thirunagari, Division of Land Protection & Revitalization Review Manager; file

SUBJECT: Environmental Impact Review: EIR Project No 16-229F Installation and Operation of Air Missile Defense Radar at Wallops Flight Facility, Accomack County, VA

The Division of Land Protection & Revitalization (DLPR) has completed its review of the October 18, 2016 EIR Operation of Air Missile Defense Radar located at the Wallops Flight Facility at North Sewall Road in Wallops Island, VA 23337

Project Scope: installation and operation of a radar system in existing building

Solid and hazardous waste issues were not addressed in the submittal. The submittal did not indicate that a search of Federal or State environmental databases was conducted. DLPR staff conducted a search (500 foot radius) of solid and hazardous waste databases (including petroleum releases) to identify waste sites in close proximity to the project area. DLPR search did identify one waste site in close proximity which might impact the project. Additionally, the waste site itself is of possible concern to the project area. DLPR staff has reviewed the submittal and offers the following comments:

***Hazardous Waste/RCRA Facilities* – none in close proximity to the project area**

***CERCLA Sites* – the site itself**

VA8800010763, NASA Wallops Island, Route 175, Wallops Island, VA 23337. Not on NPL.

VAV000306905, Naval Aviation Ordnance Test Station, Route 175, Wallops Island, VA 23337. Not on NPL. Parent Site VA8800010763 (listed above).

The above information related to hazardous wastes/RCRA/CERCLIS sites can be accessed from EPA's websites at https://www3.epa.gov/enviro/, https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/view and https://www.epa.gov/superfund

Formerly Used Defense Sites (FUDS) *– none*

Solid Waste *– none*

Virginia Remediation Program (VRP) *– none*

Petroleum Releases *one in close proximity to project area*

PC#19952405, NASA Wallops Flight Facility – Building V10, Route 175, Wallops Island, VA 23337. Release Date: 05/03/1995. Status: Closed.

Please note that the DEQ's Pollution Complaint (PC) cases identified should be further evaluated by the project engineer or manager to establish the exact location, nature and extent of the petroleum release and the potential to impact the proposed project. Also, the project engineer or manager should contact the DEQ's Tidewater Regional Office at (757) 518-2175 (Tanks Program) for further information about the PC cases.

PROJECT SPECIFIC COMMENTS

None

GENERAL COMMENTS

Soil, Sediment, Groundwater, and Waste Management

Any soil, sediment or groundwater that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 *et seq.*; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 *et seq.*, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Part 107.

Asbestos and/or Lead-based Paint

All structures being demolished/renovated/removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed. Questions may be directed to Lisa Silva at the DEQ's Tidewater Regional Office at (757) 518-2175.

Pollution Prevention – Reuse - Recycling

Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

If you have any questions or need further information, please contact Katy Dacey at (804) 698-4274.

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

David C. Dowling
Deputy Director of Soil and Water Conservation and Dam Safety

Thomas L. Smith
Deputy Director of Operations

MEMORANDUM

DATE: December 19, 2016

TO: John Fisher, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ 16-229F, Installation and Operation of Air Missile Defense Radar at Wallops Flight Facility

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Wallops Island Causeway Marshes Conservation Site is located adjacent to the project site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Wallops Island Causeway Marshes Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resources of concern at this site are:

Circus cyaneus	Northern harrier	G5/S1S2B,S3N/NL/NL
Ammodramus caudacutus	Saltmarsh Sharp-tailed sparrow	G4/S2BS3N/NL/NL

The Northern harrier is a slender bird of prey that breeds throughout the northern parts of the northern hemisphere in Canada, the northernmost USA, and in northern Eurasia (Bazuin, 1991). Marsh Hawk is a disused common name for the American form. Northern harriers hunt small mammals and birds, surprising them as they drift low over fields and marshes they inhabit. While Northern harriers are common in Virginia during the winter, they rarely breed this far south, with only a few nesting locations known each summer in the coastal plain. There are scattered, non-breeding summer records from across the state.

In the early 20th century, hunting posed a great threat to the Northern harrier (Bazuin, 1991). Later, it suffered from the effects of DDT, a widely used pesticide, which resulted in the thinning of its egg shells and thus failed reproduction (NatureServe, 2009). Current threats to the Northern harrier include human disturbances to nesting birds and destruction of breeding habitats, including the alterations of wetlands and the conversion of grasslands from native grasses to monotypic farmland (Bazuin, 1991; NatureServe, 2009).

The secretive Saltmarsh Sharp-tailed sparrow is a small songbird that breeds in a narrow strip of salt marshes along the Atlantic seaboard from southern Maine all the way south to the Florida Peninsula (NatureServe, 2009). Until 1995 this and Nelson's Sharp-tailed sparrow were considered a single species. In Virginia, Saltmarsh Sharp-tailed Sparrows are uncommon winter residents, but they rarely start to breed with only a few nesting locations in tidal marshes of the Atlantic coast and Chesapeake Bay known each summer (Wilds, 1991).

This Sharp-tailed sparrow has a streaked back and breast with alternating gray and orange-buff colored stripes on its head. It has a distinctive gray nape and a gray cheek surrounded by a rather bright orange triangle. Nests are built low to the ground just above the water. Eggs are laid from May to August with double broods typical (Wilds, 1991).

Widespread loss, degradation, and fragmentation of coastal salt marshes along the eastern seaboard are the biggest threats to this species. Alteration of the habitat from the invasion of the exotic common reed (*Phragmites australis;* Benoit and Askins, 1999 per NatureServe, 2009) and spraying for mosquito and other pest control (Byrd and Johnston, 1991) may also be concerns.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov. This project is located within 2 miles of documented occurrences of a state listed and state and federally listed animals. Therefore, DCR recommends coordination with the US Fish and Wildlife Service (USFWS) and the VDGIF, Virginia's regulatory authority for the management and protection of these species to ensure compliance with protected species legislation.

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

CC: Troy Andersen, USFWS
Amy Ewing, VDGIF

Literature Cited

Bazuin, J. B. 1991. Northern Harrier, *Circus cyaneus*. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. pp. 496-497.

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Byrd, M. A., and D. W. Johnston. 1991. Birds. Pages 477-537 in K. Terwilliger, coordinator. Virginia's endangered species: proceedings of a symposium. McDonald and Woodward Publ. Co., Blacksburg, Virginia.

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COMMONWEALTH of VIRGINIA

Department of Historic Resources

Molly Joseph Ward
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
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www.dhr.virginia.gov

29 November 2016

[redacted]
Department of the Navy
Surface Combat Systems Center
30 Battle Group Way
Wallops Island, Virginia 23337-5000

Re: Installation and operation of Air and Missile Defense Radar (AN/SPY-6) at Wallops Flight Facility
Wallops Island, Accomack County, Virginia
DHR File No. 2016-1179

Dear [redacted]:

Through the Virginia Department of Environmental Quality (DEQ) we were made aware of the above referenced project.

We want to remind you that the United States Navy, as a federal agency, must consider the effects of its actions on historic properties listed in or eligible for the National Register of Historic Places and provide the Advisory Council on Historic Preservation the opportunity to comment in accordance with Sections 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR 800. The Section 106 review process begins when the federal agency provides a description of the undertaking and its Area of Potential Effect (APE) to the State Historic Preservation Officer (SHPO), which in Virginia is the Department of Historic Resources (DHR). For this reason we request that you consult with us directly on this undertaking. While 36 CFR 800.8 allows federal agencies to coordinate Section 106 compliance with the National Environmental Policy Act (NEPA), the agency must inform the applicable SHPO early in the process that it intends to do so. The agency must also take care that the environmental documentation prepared under NEPA does present information about historic properties and potential effects to such resources at a level of detail that allows the SHPO and other consulting parties to comment.

We look forward to working with you on this project. If you have any questions concerning our comments, please contact me at (804) 482-6090.

Sincerely,

Marc Holma, Architectural Historian
Review and Compliance Division

C: Ms Valerie Fulcher, DEQ

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COMMONWEALTH of VIRGINIA

Randall P Burdette
Director

Department of Aviation
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November 22, 2016

Mr. John E. Fisher
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, Virginia 23219

Re: Air and Missile Defense Radar at Wallops Flight Facility
Consistency Determination, Project Number 16-229F

Dear Mr. Fisher

Thank you for requesting our comments regarding the Air and Missile Defense Radar at Wallops Flight Facility, Project Number 16-229F.

The Virginia Department of Aviation has reviewed the document as provided. The Department does not anticipate any negative impacts associated with the proposed action.

The Department appreciates the consideration you have given to us by requesting our comments on this project. Please do not hesitate to contact me should you have any questions or require further assistance regarding the Department's review of this project.

Sincerely,

R. N. (Rusty) Harrington
Manager, Planning and Environmental Section
Airport Services Division

tbm/

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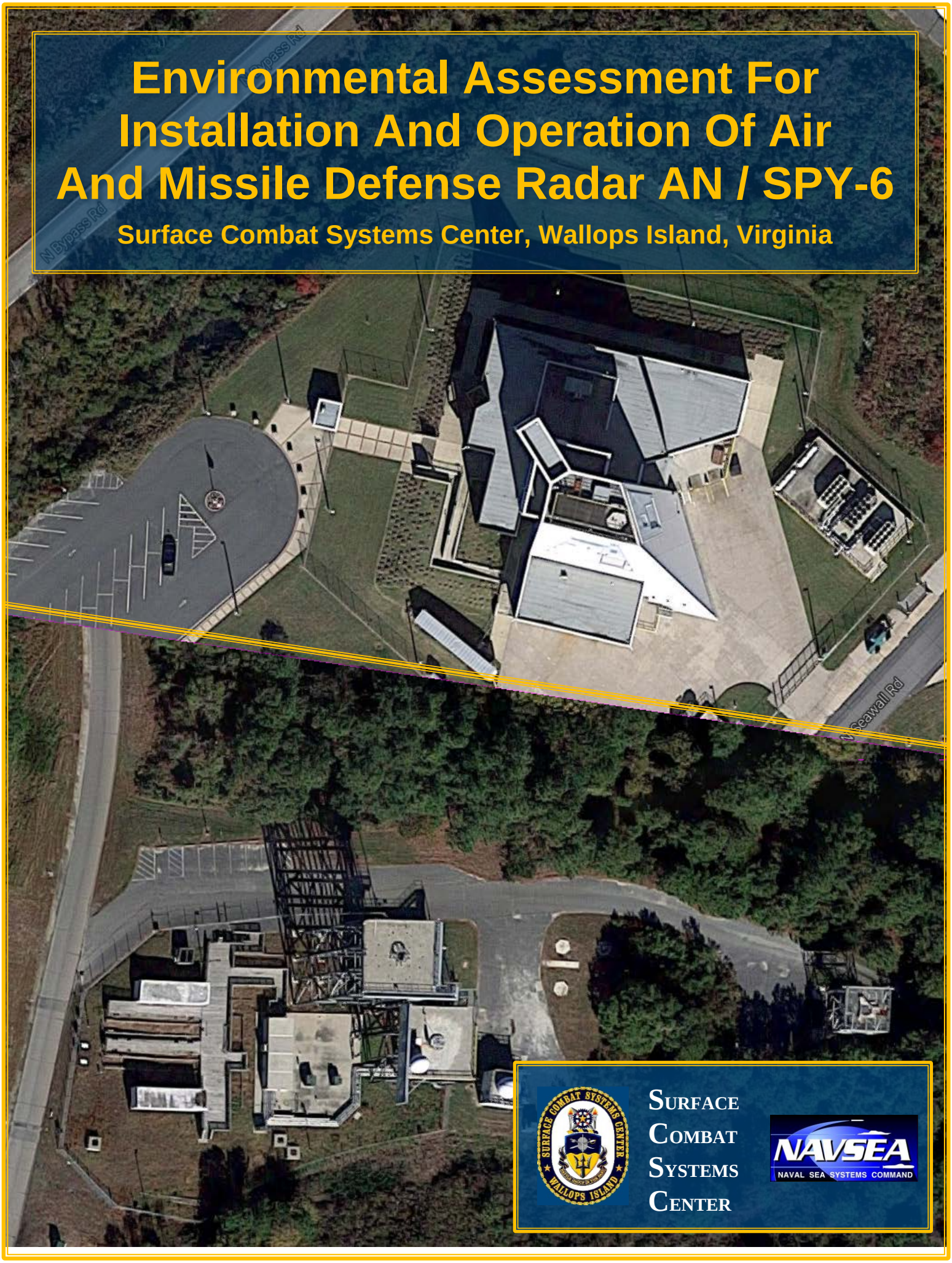
Environmental Assessment For Installation And Operation Of Air And Missile Defense Radar AN / SPY-6

Surface Combat Systems Center, Wallops Island, Virginia



SURFACE COMBAT SYSTEMS CENTER

NAVSEA
NAVAL SEA SYSTEMS COMMAND