EXPANSION OF SATELLITE GROUND COMMUNICATIONS TERMINAL FACILITIES AND OPERATIONS

BLOSSOM POINT RESEARCH FACILITY
DRAFT ENVIRONMENTAL ASSESSMENT

U.S. DEPARTMENT OF THE ARMY

June 2014

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DRAFT FINDING OF NO SIGNIFICANT IMPACT

FOR

EXPANSION OF SATELLITE GROUND COMMUNICATIONS TERMINAL FACILITIES AND OPERATIONS: BLOSSOM POINT RESEARCH FACILITY DRAFT ENVIRONMENTAL ASSESSMENT

Introduction

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with proposed expansion of satellite ground communications terminal facilities and operations at the U.S. Naval Research Laboratory (NRL) Blossom Point Tracking Facility (BPTF), located within the U.S. Army Garrison Adelphi Laboratory Center, Blossom Point Research Facility (Blossom Point) in Charles County, Maryland. As the landowner, the U.S. Army is the lead agency for the Proposed Action. Action Proponents include the U.S. Naval Research Laboratory (NRL) and the National Aeronautics and Space Administration (NASA).

Existing BPTF antennas receive data from and transmit commands to several types of satellites located in low, medium, and high Earth orbits, including highly elliptical and geosynchronous orbits. BPTF also supports Operationally Responsive Space (ORS) capabilities. These capabilities support national security by providing tactical communications and surveillance, space situational awareness, and space protection. The BPTF is in continuous operation 24 hours a day, 7 days a week in support of numerous spacecraft.

NASA's existing Space Network Expansion Ground System-East (SNEGS–E) antenna facility is located immediately southeast of the BPTF. Construction of the SNEGS–E antennas and related infrastructure (completed in 2013) and their long-term operation was previously analyzed in an EA that resulted in a Finding of No Significant Impact (FONSI) signed by the U.S. Army and NASA in 2008. Following implementation, NASA determined that the antenna line-of-sight (LOS) zone (i.e., tree clearance area) analyzed in the EA was not large enough to enable the NASA antennas to meet their mission requirements.

Purpose and Need

The purpose of the Proposed Action, as part of expanded BPTF operations, is to provide communications links with NASA Space Network and NRL satellites in orbit over the Atlantic Ocean region. The Proposed Action is needed for the following reasons:

1. Ensure that previously installed SNEGS–E antennas are able to fulfill their mission-critical need of long-term communications with orbiting spacecraft associated with the Tracking and Data Relay Satellite System.
2. Provide the NRL's Southern Drawl project with required exclusive use of one to two new satellite communications antennas to communicate with satellites in the Atlantic Ocean region to support ORS capabilities and national security.

Proposed Action and Alternatives Considered

Proposed Action

The Navy proposes to construct and operate up to two 13-meter parabolic satellite communications antennas, related facilities, and infrastructure on Blossom Point in support of the NRL's Southern Drawl

project. BPTF is uniquely located in an area with an unobstructed view to the satellites with which the antennas would need to communicate, where there is minimal radio frequency interference, and where the antennas would not impact other existing or future missions. Trees that would obstruct communications signals in the combined LOS zone would need to be removed. The following two alternatives were analyzed in the EA:

Alternative 1 (Preferred Alternative). Under this alternative, the Southern Drawl facility would be located immediately north of NASA's SNEGS–E site and adjacent to the BPTF. Trees within the combined LOS zone would be cut at ground level and the vegetation maintained at that height for the life of the antennas (approximately 20 years). Vegetation maintenance within the combined LOS zone would consist of prescribed burning, mechanical removal, herbicide application, or a combination of these methods every 2 to 3 years, depending on the rate of vegetation growth.

Alternative 2. Under this alternative, the Southern Drawl facility would be built immediately south of NASA's SNEGS–E site. Because of its location farther from existing BPTF operations, this alternative would require an approximate 900-foot-long gravel access road around the east side of the SNEGS–E facility, much longer cable runs, and likely would require that a new data center be built on site. Also, due to the site's steeper grades and proximity to wetlands, a concrete retaining wall would need to be constructed on drilled piers around the south side of the facility. Rip-rap would then be added along the wall for shoreline protection.

Trees within the combined LOS zone would be cut at ground level and the vegetation maintained at that height for the life of the antennas (approximately 20 years). Vegetation maintenance within the combined LOS zone would be conducted in the same manner as described for Alternative 1.

No Action Alternative

Under the No Action Alternative NASA's SNEGS–E LOS would not be expanded, previously installed antennas would not be able to communicate with satellites, and the SNEGS–E would not be able to fulfill its mission. Moreover, the proposed Southern Drawl antennas would not be constructed, meaning that the NRL would not be able to communicate with satellites over the Atlantic Ocean region and fulfill its mission. While potential environmental impacts from implementation of the Proposed Action would not occur, the No Action Alternative would not support the purpose of and need for the Proposed Action.

Summary of Findings

The following environmental resources, which could be impacted by the Proposed Action, were analyzed in this EA: Air Quality; Biological Resources; Water Resources; Cultural Resources; Land Use; Utilities and Infrastructure; and Geology, Topography, and Soils. The environmental impacts of the Proposed Action are summarized as follows for each alternative and resource topic analyzed.

No significant impacts on air quality would be expected under either Alternative 1 or 2. Air pollutant emissions from construction, prescribed burns, and the operation of an emergency power generator would be well below general conformity *de minimis* thresholds.

No significant impacts on biological resources, including habitat, bald eagles, migratory birds, and other wildlife, would be expected under either alternative. No effect on threatened and endangered species would be expected, as none are present. Alternative 1 would include the removal of one active bald eagle nest and Alternative 2 would require removal of one active and one inactive nest. A permit from the U.S. Fish and Wildlife Service would be obtained prior to nest removal(s).

No significant impacts on water resources, including wetlands, storm water, or floodplains, would be expected under either alternative. Impacts on wetlands under Alternative 1 would include the permanent loss of 0.31 acre of wetlands and the conversion of approximately 3.15 acres of forested wetland areas to emergent wetland habitat. Under Alternative 2, wetland impacts would include the permanent loss of 0.24 acre of wetlands and the conversion of approximately 1.19 acres of forested wetland areas to emergent wetlands. All necessary wetland permits would be obtained prior to clearance and construction activities. Alternative 1 would increase impervious surface area by approximately 0.96 acre, while Alternative 2 would result in an increase of 1.2 acres. Implementation of either alternative would require application for coverage under the Maryland Department of the Environment General Discharge Permit for Stormwater Associated with Construction Activity. Use of erosion-and-sediment-control plans and best management practices (BMPs) to provide erosion and sediment control and storm water management during site construction and forestry operations would reduce adverse effects on surface water. The anticipated impacts of construction in the 100-year floodplain and flood zones at BPTF would be negligible.

No cultural resources would be impacted by either Alternative 1 or Alternative 2. The three previously recorded archaeological sites within or just outside of the proposed LOS zone for both Alternatives 1 and 2 are not expected to be impacted as long as low-impact timber harvesting methods are used and no grubbing or grading occurs in these areas. For an approximate 100-meter-long segment of proposed logging road located outside of previously surveyed areas, the U.S. Army and NRL will conduct a Phase I archaeological survey of the road segment and consult with the Maryland Historical Trust prior to any clearing in that area. Results will be included in the Final EA.

Neither Alternative 1 nor 2 would impact land use or utilities and infrastructure at Blossom Point. No significant impacts on geology, topography, and soils would be expected for either alternative. Alternative 2 would have 2.58 more acres of highly erodible soils than Alternative 1 (Alternative 1 would have 0.17 acre). However, erosion-and-sediment-control plans and BMPs would be implemented to minimize impacts.

Based on a review of past, present, and reasonably foreseeable future actions at Blossom Point and in areas near the installation, it was determined that there would be no significant cumulative impacts.

Finding of No Significant Impact

Implementation of either Alternative 1 or Alternative 2 of the Proposed Action would not result in significant, direct, indirect, or cumulative impacts on the natural or man-made environment. Thus, this EA supports a FONSI. Accordingly, the requirements of the National Environmental Policy Act (NEPA) (42 United States Code 4321 et seq.), the Council on Environmental Quality regulations for implementing the procedural provisions of the NEPA (40 Code of Federal Regulations [CFR] §§ 1500–1508), and Environmental Analysis of Army Actions (32 CFR § 651, et seq.) have been fulfilled, and an Environmental Impact Statement (EIS) is not necessary and will not be prepared.

The Draft EA and FONSI will be available for a 30-day public review and comment period from June 25 to July 24, 2014. A copy of each will be placed at the Charles County Public Library, La Plata Branch, 2 Garrett Avenue, La Plata, MD 20646, and on the Internet at:

http://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/mid-atlantic/about_us/environmental_norfolk/environmental_compliance.html

Comments may be submitted via email to blossom_point_ea@navy.mil or in writing to: Blossom Point EA Project Manager; Naval Facilities Engineering Command, Atlantic Division, Attn: Code EV21, 6506 Hampton Boulevard, Norfolk, VA 23508. Comments must be postmarked no later than July 24, 2014.

_____ _____

Mr. Joseph F. Watson
Garrison Manager
U.S. Army Garrison Adelphi Laboratory Center

Date

EXPANSION OF SATELLITE GROUND COMMUNICATIONS TERMINAL FACILITIES AND OPERATIONS
BLOSSOM POINT RESEARCH FACILITY

DRAFT ENVIRONMENTAL ASSESSMENT

JUNE 2014

LEAD AGENCY:	U.S. Department of the Army
COOPERATING AGENCY:	National Aeronautics and Space Administration
PROPOSED ACTION:	To expand satellite ground communications terminal facilities and operations at the Blossom Point Tracking Facility on the U.S. Army Garrison Adelphi Laboratory Center Blossom Point Research Facility.
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ABSTRACT

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with proposed expansion of satellite ground communications terminal facilities and operations at the Blossom Point Tracking Facility by the U.S. Naval Research Laboratory and the National Aeronautics and Space Administration. The EA has been prepared in accordance with the following requirements: the National Environmental Policy Act (NEPA) (42 United States Code 4321 et seq.), the Council on Environmental Quality regulations for implementing the procedural provisions of the NEPA (40 Code of Federal Regulations [CFR] §§ 1500–1508), and Environmental Analysis of Army Actions (32 CFR § 651). Potentially affected environmental resources were identified through review of past environmental documentation. Resources with the potential for environmental consequences include air quality; biological resources; water resources; cultural resources; land use; utilities and infrastructure; and geology, topography, and soils.

The Proposed Action would not result in significant impacts on the natural or man-made environment. Emissions are not expected to surpass any significant threshold and would not result in any significant air quality impacts on the Southern Maryland Intrastate Air Quality Control Region. All necessary permits would be acquired before implementation of the Proposed Action. Best management practices would be used to minimize or eliminate impacts on biological and physical resources. No known cultural resources are expected to be impacted. Land use would not be impacted. The Proposed Action would not have a disproportionate impact on minority or low-income populations and would not result in impacts on children. Additionally, there would be no significant cumulative impacts from the proposed project when considered with past, present, and reasonably foreseeable future projects.

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EXECUTIVE SUMMARY

Introduction

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with proposed expansion of satellite ground communications terminal facilities and operations at the Blossom Point Tracking Facility (BPTF) by the U.S. Naval Research Laboratory (NRL) and the National Aeronautics and Space Administration (NASA). The BPTF is located on the U.S. Army Garrison Adelphi Laboratory Center, Blossom Point Research Facility (Blossom Point), situated on approximately 1,600 acres near the community of Welcome in Charles County, Maryland. The EA has been prepared in accordance with the following requirements: the National Environmental Policy Act (NEPA) (42 United States Code 4321 et seq.), the Council on Environmental Quality regulations for implementing the procedural provisions of the NEPA (40 Code of Federal Regulations [CFR] §§ 1500–1508), and Environmental Analysis of Army Actions (32 CFR § 651).

As the landowner, the U.S. Army is the lead agency for the Proposed Action. The information presented within this document serves as the basis for the Army's determination as to whether implementation of the Proposed Action would result in a significant impact on the environment, requiring the preparation of an Environmental Impact Statement, or that no significant impacts would occur, in which case a Finding of No Significant Impact (FONSI) would be appropriate.

Background

Located on 41 acres within the U.S. Army's Blossom Point property, BPTF is an integral part of NRL's Space Systems Development Department, the research and development organization of the Naval Center for Space Technology that develops space systems to support Navy mission requirements and new technologies for use in space. The BPTF antennas receive data from and transmit commands to several types of satellites located in low, medium, and high Earth orbits, including highly elliptical and geosynchronous orbits. BPTF also supports Operationally Responsive Space (ORS) capabilities. The BPTF is in continuous operation 24 hours a day, 7 days a week in support of numerous spacecraft.

At Blossom Point, NASA's existing Space Network Expansion Ground System-East (SNEGS–E) antenna facility is located immediately southeast of the BPTF. The NASA antennas are part of a network that provides mission-critical, long-term communication with orbiting spacecraft associated with the Tracking and Data Relay Satellite System (TDRSS). Construction of the SNEGS–E antennas (completed in 2013) and their long-term operation were previously analyzed in an EA that resulted in a FONSI signed by the U.S. Army and NASA in 2008. After the 2008 EA was completed, full facility design of the NASA antennas, related infrastructure, and tree clearance of the antenna line-of-sight (LOS) zone commenced. During facility design and following installation, however, NASA determined that the antenna LOS zone analyzed in the EA was not large enough to enable the NASA antennas to meet their mission requirements, as there were tree obstructions exceeding the horizon mask limits. Additional tree clearance would be necessary for the SNEGS–E antennas to operate and fulfill their mission.

Project Purpose and Need

The BPTF facility is an integral part of NRL's Space Systems Development Department, which develops space systems to support Navy mission requirements and develops new technologies for use in space. The numerous BPTF antennas receive data from and transmit commands to various types of satellites. These capabilities are needed to support national security by providing tactical communications and surveillance, space situational awareness, and space protection.

The purpose of the Proposed Action, as part of expanded BPTF operations, is to provide communications links with NASA Space Network and NRL satellites in orbit over the Atlantic Ocean region. The Proposed Action is needed for the following reasons:

3. Ensure that previously installed SNEGS–E antennas are able to fulfill their mission-critical need of long-term communications with orbiting spacecraft associated with the TDRSS.
4. Provide the NRL's Southern Drawl project with required exclusive use of one to two new satellite communications antennas to communicate with satellites in the Atlantic Ocean region to support ORS capabilities and national security.

Proposed Action and Alternatives Considered

Proposed Action

The Navy proposes to construct and operate up to two 13-meter parabolic satellite communications antennas, related facilities, and infrastructure on Blossom Point in support of the NRL's Southern Drawl project. Just as for NASA's SNEGS–E antennas, the two new NRL antennas would serve as communications links for satellites over the Atlantic Ocean region. BPTF is uniquely located in an area with an unobstructed view to the satellites with which the proposed Southern Drawl antennas and the existing SNEGS–E antennas need to communicate, where there is a minimal radio frequency interference, and where the antennas would not impact other existing or future missions. The proposed Southern Drawl antenna facility would also require the clearing of trees that would obstruct communications signals in the LOS zone. Because the Southern Drawl antennas would be located next to the existing SNEGS–E antennas, the Proposed Action includes the clearing of trees within a combined LOS zone that would be shared by both antenna systems. Two alternatives were analyzed in this EA and are described as follows.

Alternative 1 (Preferred Alternative). For this alternative, the Southern Drawl facility would be located immediately north of NASA's SNEGS–E site and adjacent to the BPTF. Under this alternative, trees within the combined LOS zone would need to be cut at ground level and the vegetation maintained at that height for the life of the SNEGS–E and Southern Drawl antennas (approximately 20 years). Access to several areas of the LOS for tree removal would require additional clearing for logging roads. Vegetation maintenance within the combined LOS zone would consist of prescribed burning, mechanical removal, herbicide application, or a combination of these methods every 2 to 3 years, depending on the rate of vegetation growth.

Alternative 2. Under this alternative, the Southern Drawl facility would be built immediately south of NASA's SNEGS–E site. Because of its location farther from existing BPTF operations, this alternative would require an approximate 900-foot-long gravel access road around the east side of the SNEGS–E facility, much longer cable runs, and likely would require that a new data center be built on site. Also, due to the site's steeper grades and proximity to wetlands, a concrete retaining wall would need to be constructed on drilled piers around the south side of the facility. Rip-rap would then be added along the wall for shoreline protection.

Just as for Alternative 1, trees within the combined LOS zone would need to be cut at ground level and the vegetation maintained at that height for the life of the SNEGS–E and Southern Drawl antennas (approximately 20 years). Additional clearing for logging roads would also be required in some areas. Vegetation maintenance within the combined LOS zone would be conducted in the same manner as described for Alternative 1.

No Action Alternative

Under the No Action Alternative, NASA's SNEGS–E LOS would not be expanded, previously installed antennas would not be able to communicate with satellites, and the SNEGS–E would not be able to fulfill its mission. Moreover, the proposed Southern Drawl antennas would not be constructed, meaning that the NRL would not be able to communicate with satellites over the Atlantic Ocean region and fulfill its mission. The No Action Alternative would not support the purpose of and need for the Proposed Action.

Environmental Consequences of the Proposed Action

Review of the direct and indirect environmental impacts associated with implementation of either Alternative 1 or 2 of the Proposed Action determined that the impacts would range from no impact to no significant impact on the natural or man-made environment. Based on the proposed activities, five resource topics were eliminated from detailed consideration in this EA because of negligible or nonexistent impacts: airspace management; noise; traffic and transportation; hazardous materials, waste, and installation restoration; and socioeconomics, environmental justice, and children's health and safety. While the No Action Alternative would result in no impacts, it also would not fulfill the purpose of and need for the Proposed Action and, therefore, is considered an unacceptable alternative. The environmental impacts of the Proposed Action are summarized as follows for each alternative and resource topic analyzed.

Air Quality. No significant impacts on air quality would be expected from either Alternative 1 or 2. Air pollutant emissions from construction, prescribed burns, and the operation of an emergency power generator would be well below general conformity *de minimis* thresholds.

Biological Resources. For Alternative 1, no significant impacts on biological resources would be expected. Wildlife would temporarily flee from construction and clearing disturbances and LOS maintenance activities. Approximately 34.0 acres of upland and wetland forest would be cleared under Alternative 1. Habitat would be altered; however, there is abundant forested habitat adjacent to areas of impact, which would continue to support forest-dwelling species. The combined LOS zone would convert to an early successional type habitat that would likely support wildlife species associated with that habitat type. No effect on threatened and endangered species would be expected, as none are present at Blossom Point. Alternative 1 LOS clearance would include the removal of one active bald eagle nest. A permit from the U.S. Fish and Wildlife Service would be obtained prior to nest removal. No significant impacts on migratory birds would be expected. Construction, clearing, and maintenance activities would be conducted outside of nesting season to avoid indirect takes of migratory birds.

Under Alternative 2, impacts on biological resources would be the same as described for Alternative 1, with the exception that there would be approximately 6.6 fewer acres of upland/wetland forest cleared and one additional inactive bald eagle nest removed.

Water Resources. For Alternative 1, no significant impacts on water resources would be expected. Impacts would include the permanent loss of 0.31 acre of wetlands and the conversion of approximately 3.15 acres of forested wetland areas to emergent wetland habitat. All necessary wetland permits would be obtained prior to clearance and construction activities. Although Alternative 1 would increase impervious surface area by approximately 0.96 acre, no significant impacts on storm water management would be expected. Alternative 1 would require application for coverage under the Maryland Department of the Environment (MDE) General Discharge Permit for Stormwater Associated with Construction Activity. Use of erosion-and-sediment-control-plans and best management practices (BMPs) to provide erosion and sediment control and storm water management during site construction and forestry operations would reduce adverse effects on surface water. The anticipated impacts of construction in the 100-year

floodplain and flood zones at BPTF would be negligible. No significant impacts on the floodplain would occur.

Overall impacts on water resources for Alternative 2 generally would be the same as for Alternative 1. Alternative 2, however, would impact approximately 2.03 fewer acres of wetlands. Under Alternative 2, wetland impacts would include the permanent loss of 0.24 acre of wetlands and the conversion of approximately 1.19 acres of forested wetland areas to emergent wetlands. Although Alternative 2 would result in 0.24 more acres of impervious surface area than Alternative 1, the overall increase is not expected to have a significant impact on storm water management.

Cultural Resources. No cultural resources are expected to be impacted by either Alternative 1 or Alternative 2. Based on available records, three previously recorded archaeological sites are located within or just outside of the proposed LOS zone for both Alternatives 1 and 2. Although the National Register of Historic Places status of these three sites is undetermined, they are not expected to be impacted as long as low-impact timber harvesting methods are used and no grubbing or grading occurs in these areas. For an approximate 100-meter-long segment of proposed logging road outside of previously surveyed areas, the U.S. Army and NRL plan to conduct a Phase I archaeological survey of the road segment and consult with the Maryland Historical Trust prior to any clearing in that area.

Land Use. Neither Alternative 1 nor 2 would impact land use at Blossom Point. Present and future land use at the site is designated for research and development. The Proposed Action is compatible with that land use category.

Utilities and Infrastructure. Neither Alternative 1 nor Alternative 2 would impact utilities and infrastructure at Blossom Point. Implementation of the Proposed Action would not exceed current capacities.

Geology, Topography, and Soils. For Alternative 1, no significant impacts on geology, topography, and soils would be expected. Ground-disturbing activities such as construction, grubbing, and grading can increase the potential for soil loss from erosion. Included in the area of disturbance is 0.17 acre of highly erodible soils. However, erosion-and-sediment-control-plans and BMPs would be implemented to minimize impacts.

Under Alternative 2, impacts on geology, topography, and soils generally would be the same as for Alternative 1, except that the combined LOS zone for Alternative 2 contains 2.58 more acres of highly erodible soils than Alternative 1. Therefore, Alternative 2 has a greater potential for soil erosion from LOS clearance and maintenance activities than Alternative 1. As with Alternative 1, erosion-and-sediment-control-plans and BMPs would be implemented to minimize impacts.

Environmental Consequences of the No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. As a result, potential impacts from proposed Southern Drawl construction activities, and tree clearance and long-term maintenance of the combined SNEGS–E and Southern Drawl LOS zone, would not occur. Although existing conditions at BPTF would be expected to remain unchanged, the purpose of and need for the Proposed Action would not be met.

Cumulative Impacts

Based on a review of past, present, and reasonably foreseeable future actions at Blossom Point and in areas near the installation, it was determined that several actions in the vicinity should be considered when analyzing the potential cumulative impacts associated with the Proposed Action. The projects

analyzed for cumulative impacts are the prior installation of NASA's SNEGS–E antenna facility, and NRL's Telstar Telescope and Chronos Antenna on BPTF, an upcoming power infrastructure upgrade for BPTF, and upcoming restoration and tree-harvesting activities on the Nanjemoy Creek Preserve located a little over a mile west of Blossom Point. These actions in combination with the Proposed Action would result in environmental effects as a result of the various clearing and construction activities; however, the impacts would not be significant.

Summary of Findings

Implementation of either Alternative 1 or Alternative 2 of the Proposed Action would not result in significant, direct, indirect, or cumulative impacts on the natural or man-made environment. Thus, this EA supports a FONSI.

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1 PURPOSE OF AND NEED FOR PROPOSED ACTION

1.1 Introduction

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with proposed expansion of satellite ground communications terminal facilities and operations at the Blossom Point Tracking Facility (BPTF) by the U.S. Naval Research Laboratory (NRL) and the National Aeronautics and Space Administration (NASA). The BPTF is located on the U.S. Army Garrison (USAG) Adelphi Laboratory Center (ALC) Blossom Point Research Facility (Blossom Point), situated on approximately 1,600 acres near the community of Welcome in Charles County, Maryland. Blossom Point is bounded on three sides by water: Nanjemoy Creek empties into the Potomac River on the facility's west side and the Potomac River borders the facility on the south and the east (see Figure 1-1). The NRL has a land use agreement (permit) with the USAG ALC to operate the BPTF, originally established to track missile tests in the 1950s and now used as a long-range tracking station for various satellites.

In support of Space Network Expansion Ground System–East (SNEGS–E) project, NASA recently completed construction of three antennas, and Naval Facilities Engineering Command, on behalf of NASA, recently completed the related facilities and performed line-of-sight (LOS) vegetation clearance at Blossom Point. In coordination with appropriate regulatory agencies, the Final EA for the SNEGS–E, dated September 19, 2008, concluded that the Proposed Action in that document would not significantly impact the quality of the human or natural environment. As a result, a Finding of No Significant Impact (FONSI) was signed by the U.S. Army on October 6, 2008, and by NASA, the cooperating agency, on December 2, 2008.

The Proposed Action evaluated in this EA is to expand satellite ground communications terminal facilities and operations at the BPTF. This includes installation of up to two 13-meter parabolic satellite communications antennas, related facilities, and infrastructure in support of the NRL's Southern Drawl project; and clearing of vegetation that would obstruct communications signals in the LOS zone for both the proposed Southern Drawl antennas and the previously installed SNEGS–E antennas. More information on the proposed Southern Drawl project and NASA's SNEGS–E project can be found in Section 2.1.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations on implementing NEPA (40 Code of Federal Regulations [CFR] § 1500–1508), and Army procedures for implementing NEPA (32 CFR § 651). NEPA requires the consideration of potential environmental consequences of federal actions. Regulations for federal agency implementation of NEPA were established by the CEQ. Under NEPA, federal agencies must prepare an EA or an Environmental Impact Statement (EIS) for any major federal action, except those actions that are determined to be "categorically excluded" from further analysis.

An EA is a concise public document that provides sufficient analysis for determining whether the potential environmental impacts of a proposed action are significant, which would result in the preparation of an EIS, or not significant, which would result in the preparation of a FONSI. An EIS is prepared for those federal actions that might significantly affect the quality of the human environment. Thus, if an action proponent were to determine that a proposed action would have a significant impact on the quality of the human environment, an EIS would be prepared leading to a Record of Decision. An EA or EIS should include brief discussions of the purpose of and need for the proposal, the proposed action, the alternatives considered, the existing environmental and socioeconomic conditions, the environmental impacts of the proposed action and alternatives, a listing of agencies and persons consulted, and a discussion of the cumulative impacts associated with the alternatives.

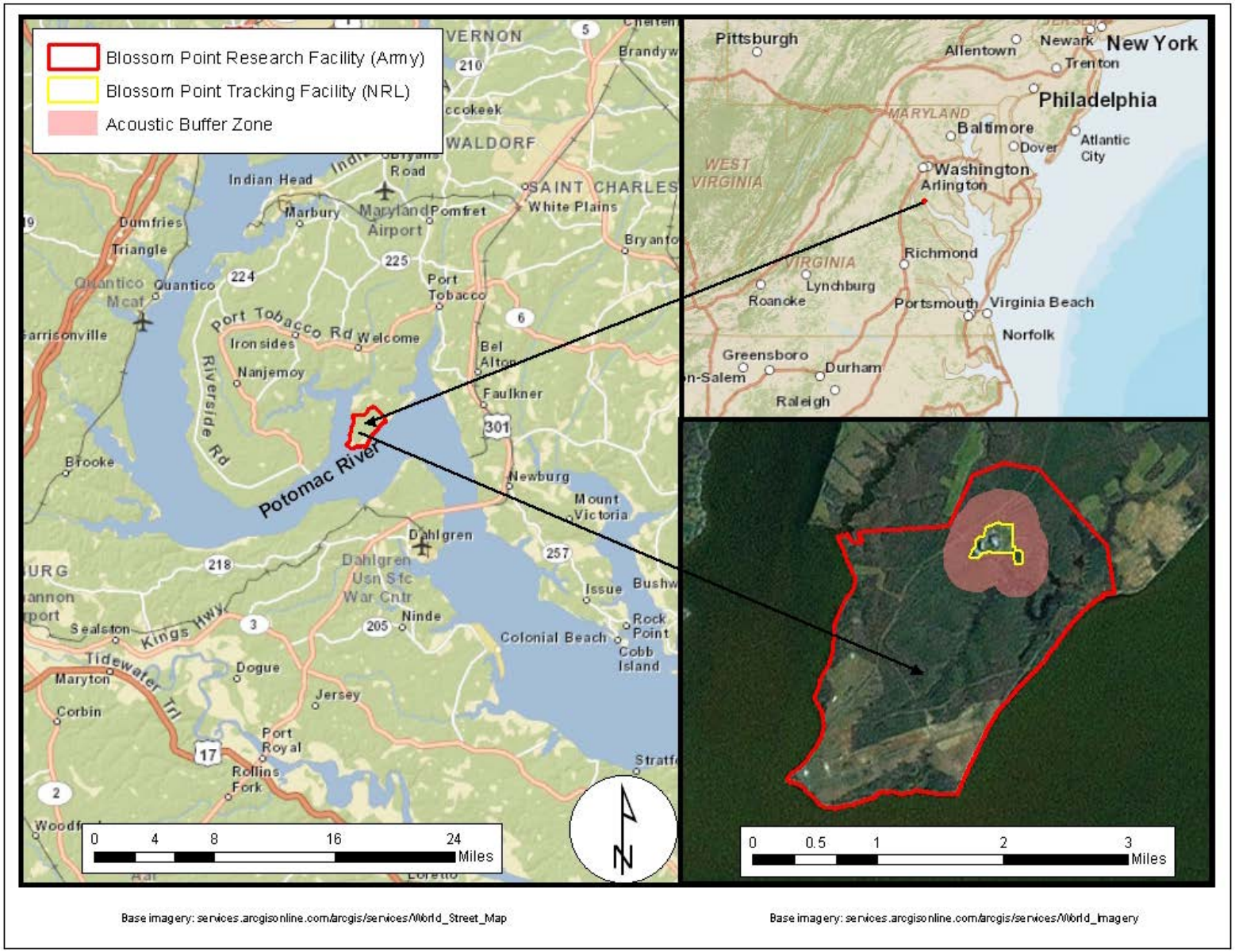

Figure 1-1. Blossom Point Installation and Vicinity

As the landowner, the U.S. Army is the lead agency for the Proposed Action. The information presented within this document serves as the basis for the Army's determination as to whether implementation of the Proposed Action would result in a significant impact on the environment, requiring the preparation of an EIS, or that no significant impacts would occur, in which case a FONSI would be appropriate. NASA will serve as a cooperating agency because they have special expertise related to satellite ground communications facilities.

1.2 Background

The primary mission of the USAG ALC Blossom Point is to field test fuses, explosives and pyrotechnic devices, and electronic telemetry systems. Fuse and related ordnance testing has been conducted at this site since 1943 (JMT 2012). In addition to the ranges that physically occupy most of the property, the NRL tracking facility is located at Blossom Point.

The NRL, the Navy's corporate laboratory that conducts a multidisciplinary program of scientific research and advanced technological development for space sciences and related technologies, established a tracking station for the early Vanguard Missile Program on 23 acres near the northeastern perimeter of Blossom Point in 1956 (PBS&J 2007). NASA operated the facility from 1958 to 1967, at which time control reverted to the Navy. Today, the BPTF is contained on 41 acres located within the U.S. Army's Blossom Point property (USACE 2009). This area has an adjacent 265-acre wooded acoustical buffer zone to prevent interference with the sensitive satellite antenna radio receivers that could result from encroachment or new radio frequency (RF) emitters located in the vicinity. The NRL BPTF is an integral part of NRL's Space Systems Development Department, the research and development organization of the Naval Center for Space Technology that develops space systems to support Navy mission requirements and new technologies for use in space. The BPTF antennas receive data from and transmit commands to several types of satellites located in low, medium, and high Earth orbits, including highly elliptical and geosynchronous orbits. BPTF also supports Operationally Responsive Space (ORS) capabilities. These capabilities support national security by providing tactical communications and surveillance, space situational awareness, and space protection, for example, the NRL's Tactical Satellite-(TacSat) 4 mission. TacSat-4 supports several ORS system-level objectives including missions that require dwell[1], such as communications for the warfighter and Blue Force Tracking, which provides military commanders and forces with location information about friendly forces. The BPTF is in continuous operation 24 hours a day, 7 days a week in support of numerous spacecraft.

There are 82 personnel assigned to the Blossom Point facility. Of these 82 personnel, four civilians are assigned to the Blossom Point facility from USAG ALC. There are 54 NRL employees and 24 NASA employees, a subset of which would be on site at any given day and time. The entire Blossom Point campus includes 70,000 square feet of enclosed area in 46 buildings over the 1,600-acre site (PBS&J 2007). The BPTF facility occupies 13 of those buildings.

1.3 Purpose of and Need for the Proposed Action

The BPTF is an integral part of NRL's Space Systems Development Department, which develops space systems to support Navy mission requirements and develops new technologies for use in space. The numerous BPTF antennas receive data from and transmit commands to various types of satellites. These capabilities are needed to support national security by providing tactical communications and surveillance, space situational awareness, and space protection.

[1] "Dwell" refers to a satellite remaining in relatively 1 place for a period of time. Satellites that are geosynchronous or have an elliptical orbit tend to "dwell" over the same field of view for an extended time versus satellites that have a circular orbit, which have the same field of view only for a few minutes and do not "dwell" at that same location.

The purpose of the Proposed Action, as part of expanded BPTF operations, is to provide communications links with NASA Space Network and NRL satellites in orbit over the Atlantic Ocean region. The Proposed Action is needed for the following reasons:

1. Ensure that previously installed SNEGS–E antennas are able to fulfill their mission-critical need of long-term communication with orbiting spacecraft associated with the Tracking and Data Relay Satellite System (TDRSS).
2. Provide the NRL's Southern Drawl project with required exclusive use of one to two new satellite communications antennas to communicate with satellites in the Atlantic Ocean region to support ORS capabilities and national security.

1.4 Relevant Laws and Regulations

A decision on how to proceed with the Proposed Action rests on numerous factors such as mission requirements, schedule, and availability of funding; and environmental and historical considerations. In addressing environmental considerations for this Proposed Action, the Army is guided by the following relevant statutes (and their implementing regulations):

- NEPA, as amended by Public Law 94-52, July 3, 1975 (42 United States Code [U.S.C.] § 4321–4347), which requires environmental analysis for major federal actions significantly affecting the quality of the environment
- CEQ regulations, as contained in 40 CFR Parts 1500–1508, which direct federal agencies on how to implement the provisions of NEPA
- 32 CFR 651, et seq., Environmental Analysis of Army Actions
- Clean Air Act (CAA) (42 U.S.C. § 7401 et seq.)
- Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.)
- Coastal Zone Management Act (CZMA) (16 U.S.C. § 1451 et seq.)
- National Historic Preservation Act (NHPA) (16 U.S.C. § 470 et seq.)
- Endangered Species Act (ESA) (16 U.S.C. § 1531 et seq., as amended)
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703–712)
- Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §§ 668–668c 16).

A description of the Proposed Action's consistency with these laws and regulations is included in Chapter 5 of this EA.

1.5 Scope of Environmental Analysis

In compliance with NEPA, CEQ regulations, and Army guidelines for implementing NEPA, the evaluation of environmental impacts should focus on those resources and conditions potentially subject to impacts, identify potentially relevant environmental resource areas deserving of study, and de-emphasize irrelevant resource areas. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. Accordingly, the following resources will be analyzed in this EA:

1. Air Quality
2. Biological Resources (e.g., wildlife, vegetation, avian resources, protected species)
3. Water Resources (e.g., wetlands, storm water, floodplains)

4. Cultural Resources
5. Land Use
6. Utilities and Infrastructure (e.g., electricity, natural gas, water, sewer, solid waste)
7. Geology, Topography, and Soils.

The resources and regulatory requirements identified in Table 1-1 will not be carried forward for analysis in this EA, as potential impacts on these topics under any of the alternatives analyzed would be considered negligible or nonexistent.

Table 1-1. Resource and Regulatory Analysis Eliminated

Resources and Regulatory Analysis	Reason for Elimination
Airspace Management	The Proposed Action would be land-based. Changes to designation of or restrictions to airspace would not occur. The use of antennas at the Blossom Point site would not cause radio frequency interference for air traffic.
Noise	The Proposed Action would have minimal noise impacts. Short-term noise generated during installation of the antennas and LOS clearance and maintenance would not increase the long-term noise level at Blossom Point.
Traffic and Transportation	The Proposed Action would temporarily generate increased traffic (e.g., construction and field crews) during site preparation, installation of the antennas, and LOS clearance. Minor increases in traffic would also occur a few times per year, at most, for long-term maintenance of the combined LOS zone. However, there would not be a permanent influx of personnel to Blossom Point, as the Southern Drawl site would largely be operated remotely. The only permanent traffic to and from the site would be periodic maintenance personnel who would access the site with a minimal number of vehicles.
Hazardous Materials, Waste, and Installation Restoration	No use of hazardous materials, generation of hazardous wastes, or disturbance of installation restoration sites would be anticipated under the Proposed Action. Additionally, there is a low probability for unexploded ordnance to be present in the project area (McCoun 2014, USAG 2013).
Socioeconomics, Environmental Justice, Children's Health and Safety	The Proposed Action would not result in changes to population, demographics, income, community services and facilities, or housing and would not have a disproportionate adverse effect on minority or low-income populations or children's health and safety.

1.6 Interagency Coordination and Public Involvement

NEPA requirements promote informing the public during the decisionmaking process and prior to taking action. The premise of NEPA is that the quality of federal decisions is enhanced if proponents provide information on potential environmental impacts of the Proposed Action to the public and involve the public in the planning process. The Army considers involvement of other agencies, organizations, and individuals in the development of EAs to enhance identification of issues of concern to the public and problem solving. Such involvement also demonstrates that the Army is committed to open

decisionmaking and builds the necessary community trust that sustains the Army in the long term. Accordingly, a draft of this EA will be released to the public for a 30-day review and comment period.

1.7 Organization of Document

This EA identifies, evaluates, and documents the potential environmental effects of the Proposed Action and its alternatives, and the No Action Alternative. The following describes the organization of this EA, listed by chapter:

- Chapter 1 provides background information relevant to the Proposed Action and discusses the purpose of and need for the Southern Drawl and SNEGS–E projects.
- Chapter 2 describes the Proposed Action, alternatives considered, and the No Action Alternative.
- Chapter 3 describes baseline conditions (i.e., the conditions against which potential impacts of the Proposed Action and alternatives are measured) for each of the potentially affected resources and analyzes the potential environmental consequences to those resources.
- Chapter 4 describes potential cumulative impacts.
- Chapter 5 describes other considerations required by NEPA.
- Chapter 6 contains a list of the persons, agencies, and organizations contacted during the preparation of this document.
- Chapter 7 includes the references used in the preparation of the EA.
- Chapter 8 lists the preparers of this document.
- Chapter 9 lists those congressional offices, agencies, organizations, and individuals that were sent a copy of the Draft EA/Draft FONSI for review and comment.
- Chapter 10 includes a list of acronyms and abbreviations used in this EA.
- Appendix A contains air emissions calculations for the Proposed Action.
- Appendix B contains the Eagle Nest Permit Application.
- Appendix C contains agency correspondence.

1.8 Public Notification and Review

In accordance with the CEQ (40 CFR § 1500–1508) and U.S. Army (32 CFR § 651) regulations for implementing NEPA, the U.S. Army is soliciting comments on this Draft EA from interested and affected parties. A Notice of Availability for this Draft EA, and the enclosed Draft FONSI, was published in the *Maryland Independent* newspaper for the Blossom Point region. A copy of the Draft EA/Draft FONSI, which identifies the Preferred Alternative, was placed in the following local library:

Charles County Public Library
La Plata Branch
2 Garrett Avenue
La Plata, MD 20646

Copies of the Draft EA/Draft FONSI were also available on the Internet at:

http://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/mid-atlantic/about_us/environmental_norfolk/environmental_compliance.html

A list of the congressional offices, agencies, and organizations that were sent copies of the document is provided in Chapter 9.

Following the 30-day public review period (as specified in the newspaper notice), the U.S. Army will decide whether to finalize the EA and sign the FONSI, which would allow the proposed expansion of satellite ground communications terminal facilities and operations at the BPTF to proceed; or to prepare an EIS. If the U.S. Army decides to finalize the document, then it will take into consideration those public and agency comments received during development of the Final EA and FONSI. The Final EA will include both the written comments (i.e., letters and electronic messages received) and their resolutions. The Final EA and the signed FONSI will also be available for a limited time on the Internet at:

http://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/mid-atlantic/about_us/environmental_norfolk/environmental_compliance.html

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2 PROPOSED ACTION AND ALTERNATIVES

2.1 Description of Proposed Action

The Proposed Action evaluated in this EA is to expand satellite ground communications terminal facilities and operations at the BPTF, and includes installation of up to two 13-meter parabolic satellite communications antennas, related facilities, and infrastructure in support of the NRL's Southern Drawl project; and clearing of vegetation that would obstruct communications signals in the combined LOS zone for the proposed Southern Drawl antennas and the previously installed SNEGS–E antennas analyzed in the *Final Environmental Assessment for the Space Network Expansion Ground System–East at Blossom Point Tracking Facility* (A. Morton Thomas and Associates, Inc. 2008).

Just as for NASA's SNEGS–E antennas, the two new NRL antennas would serve as communications links for satellites over the Atlantic Ocean region. BPTF is uniquely located in an area with an unobstructed view to the satellites with which the proposed Southern Drawl antennas and the existing SNEGS–E antennas need to communicate, where there is a minimal RF interference, and where the antennas would not impact other existing or future missions.

NRL and NASA hold real estate permits for the areas they occupy at BPTF. Portions of the Proposed Action would occur outside of these permitted areas; therefore, new permits need to be issued or the existing permits need to be modified by the U.S. Army as part of the Proposed Action.

2.1.1 Southern Drawl Infrastructure Requirements

Southern Drawl is the project name of a satellite communications system. The NRL proposes to install the ground antenna portion and support facilities for the Southern Drawl project at BPTF. While there are no other Southern Drawl antenna systems at other locations, the U.S. Navy might consider additional sites elsewhere in the United States or overseas at some point in the future.

The antenna portion of the Southern Drawl system would consist of up to two 13-meter, high-gain parabolic apertures or antennas, each housed in an inflatable radome (i.e., weatherproof enclosure to protect the antenna). The site for the new antennas would initially be cleared for construction and staging areas. Usable timber from the site would be sold under the management of the U.S. Army Corps of Engineers (USACE). Bulldozers, excavators, and other heavy equipment would be used to grub, grade, trench utilities, and excavate foundations in preparation for facility construction. Any fill material trucked into the site would be obtained from existing or new borrow locations that are approved in accordance with all applicable state and local regulations. A variety of mobile cranes, forklifts, heavy trucks, pneumatic tools, and other equipment would then be needed during construction, paving, and antenna installation. The construction activities would be expected to last approximately 6 months and require about 16 temporary workers on site. Current plans are for initial clearing and construction activities to begin in late summer or early fall of 2014.

Under current plans, the NRL would begin installing one of the 13-meter tracking antennas in fiscal year (FY) 2014. Although the second 13-meter antenna is not expected to be installed until sometime in the near future, pending availability of additional funding for the mission, this EA analyzes the installation of both antennas. Depending on when the second antenna is installed, the U.S. Army will conduct supplemental environmental analyses, as necessary, to address any changes in existing environmental conditions or regulatory requirements.

Infrastructure and related system support areas needed for the Southern Drawl antennas (see Figure 2-1) would include the following:

1. Riser foundations and approximately 64-foot-diameter radome ring walls for each of the antennas.
2. One or two 30- to 35-foot-tall anemometer towers to measure wind force and velocity.
3. One 800-kilowatt (kW) emergency back-up diesel-powered, Tier II compliant, generator to be installed behind Building 6 on a new concrete pad, next to two other generators being installed as part of the BPTF Power Infrastructure Upgrade (see Section 4.3.4).
4. Two 40 kilovolt-amperes (kVA) emergency back-up diesel-powered generators to be installed at the new antenna facility. Because of the new 800-kW generator, the 40-kVA generators likely would never be run, except for maintenance purposes.
5. A data center to house approximately 30 racks of associated electronics, an uninterrupted power supply (battery backup), and network interface equipment. A new data center (approximately 30 by 50 feet) would be built if Building 10 cannot be renovated to serve this requirement.
6. Asphalt paving around the radome structures and at the facility entrance for vehicular access.
7. Storm water management systems (e.g., drainage ditches and retention pond).
8. Physical security measures, including perimeter fencing, exterior lighting, and pole-mounted closed-circuit television cameras.
9. Trenching and conduit from the antennas to the data center for signal/communications cabling and from the antennas to the power building for electrical power cabling.
10. Creation of an unobstructed LOS zone for antenna communications with satellites (see Section 2.1.4 for details).

Because the Southern Drawl antennas would be operated remotely, no new personnel would be added to the BPTF to support this mission. When operational, the antennas would receive data from and transmit calibration signals to communications satellites over the Atlantic Ocean region. Signals would be received in the K-band. S-band calibration signals would be transmitted by a small dish antenna that is attached to the side of one of the large antennas. Both the K-band and S-band are radio frequencies within the microwave bandwidth (300 megahertz to 300 gigahertz), and are commonly used for satellite communications. Just as with the existing NASA SNEGS–E antennas, the proposed Southern Drawl antenna transmitters would not present an RF radiation hazard beyond the antenna site. Outside the controlled (fenced) area for the antennas, no safety precautions or RF radiation hazard standoff distances would be required. Common safety precautions (e.g., locking the antennas in a fixed position and disabling the transmitter) would be exercised by NRL personnel and contractors when performing maintenance on the antennas.

2.1.2 Southern Drawl Selection Criteria for Siting Options

The Navy used a 4-step process to screen potential antenna sites. First, a broad list of potential sites was developed using record searches and telephone interviews. This initial list only included sites in the Mid-Atlantic region, as this is the only area in the United States where the antennas would “see” the satellites with which they would communicate. Additionally, only government-owned properties were included for security reasons and to comply with the U.S. Navy policy that encourages selection of sites at existing government facilities (SECNAVINST 11011.47C, Acquisition, Management, and Disposal of Real Property and Real Property Interests by the Department of the Navy).

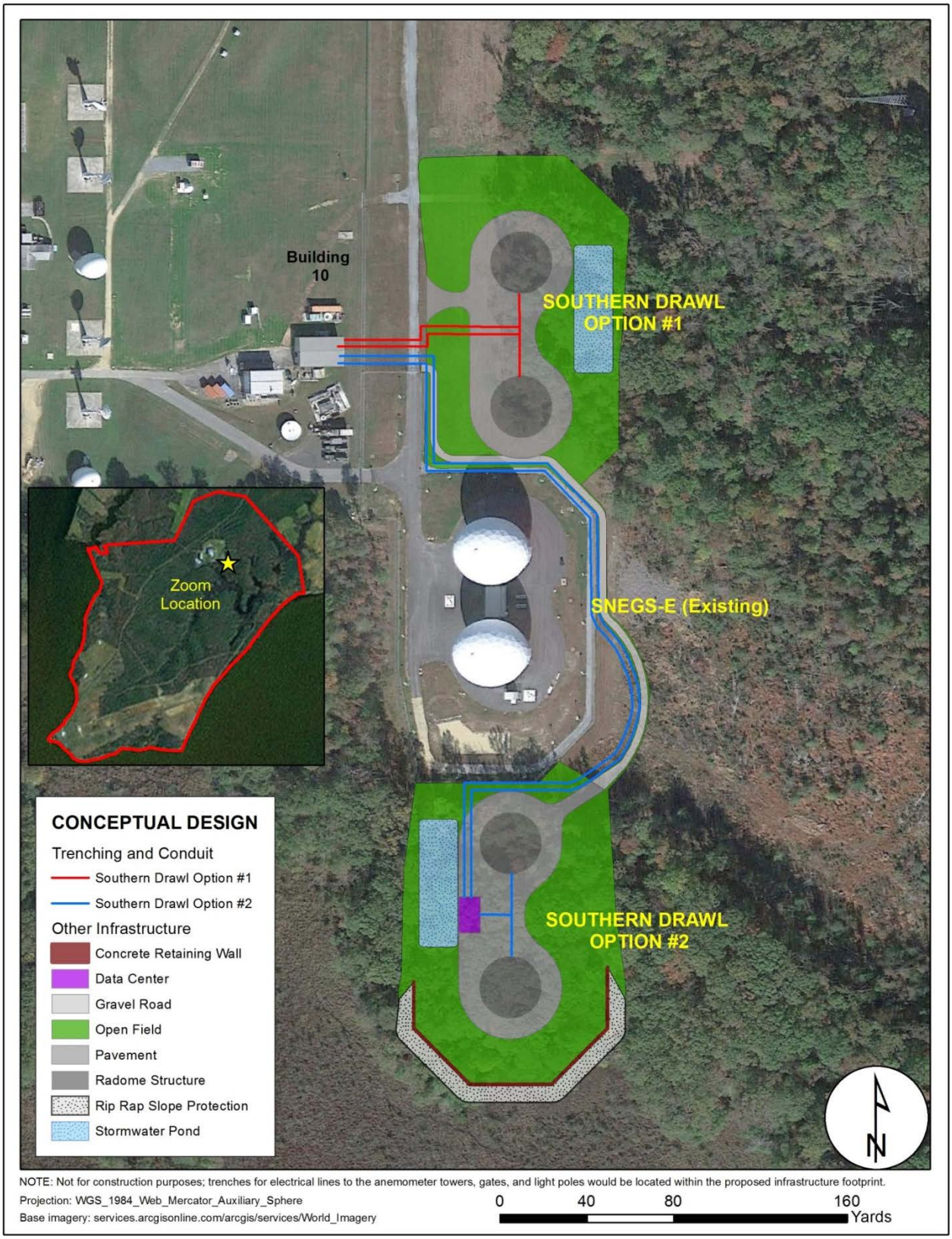

Figure 2-1. Naval Research Laboratory Infrastructure Requirements

For the second step, the following exclusionary criteria were applied to the resulting list of sites:

1. RF environment—the ambient RF noise level could not be too high and there could not be any RF emitters on the same RF frequency band or with signal strength high enough to interfere with the proposed Southern Drawl antenna operations. Examples of typical intentional transmissions permitted in that RF frequency band include radar and satellite-based communications for news agencies or others, including NASA or Department of Defense (DOD) missions.
2. Antenna look angles and obstructions—the view of the antenna to the satellite, or satellites, could not be obstructed or blocked by anything permanent.
3. Compatibility—the mission operations of existing antennas or other sensitive electronics could not be negatively impacted by installation of the proposed satellite communications antennas and existing or planned future antennas at the site could not impact proposed antennas.

For those sites not eliminated due to the exclusionary criteria, the third step in the screening process included site visits and completion of site assessment surveys using standard checklists to determine site suitability. The following items were considered during the site assessment surveys:

1. Availability of buildable space and access to utilities, support services, and transportation infrastructure
2. Adjacent land uses and the potential for encroachment
3. Environmental considerations, including flood risk; archaeological artifacts or historical structures; and existence of hazardous materials, wetlands, and water bodies
4. Cost and schedule implications.

Blossom Point was found to be the only location to meet the NRL's siting requirements.

After completion of steps 1 through 3 of the Southern Drawl site-selection process, step 4 was to define siting options on the Blossom Point property. The Southern Drawl team looked for potential locations on Blossom Point that would minimize impacts on wetlands and bald eagles, both known sensitive environmental features on the installation. Two possible locations were found (see Figure 2-2). Sites adjacent to the NASA antennas were chosen to minimize the size of the LOS, as the two LOS areas would overlap, and to limit habitat fragmentation. Sites near the existing NASA project and other BPTF structures were also found to be favorable because they would diminish the amount of new infrastructure required, minimizing environmental impact and project cost.

2.1.3 Space Network Expansion Ground System–East

The SNEGS–E is an existing NASA-operated antenna system located on Blossom Point. After the 2008 EA on the SNEGS–E project was completed, full facility design of the NASA antennas, related infrastructure, and LOS clearance area commenced. During facility design, it was determined that the LOS area analyzed in the 2008 EA was inadequate; therefore, it was expanded to include a larger area. Following installation of the facilities at BPTF, a surveyor measured the horizon mask in the field using a theodolite, a surveying tool used to measure angles and horizontal and vertical planes. The horizon mask was compared to the initial NASA requirement provided during facilities design, which was developed using analysis and custom software. It was determined that the tree clearance area developed during facilities design (referred to as the "SNEGS–E LOS Clearance (Revised)" on Figure 2-3) was not large enough to enable the NASA antennas to meet their mission, as there were obstructions exceeding the horizon mask limits.

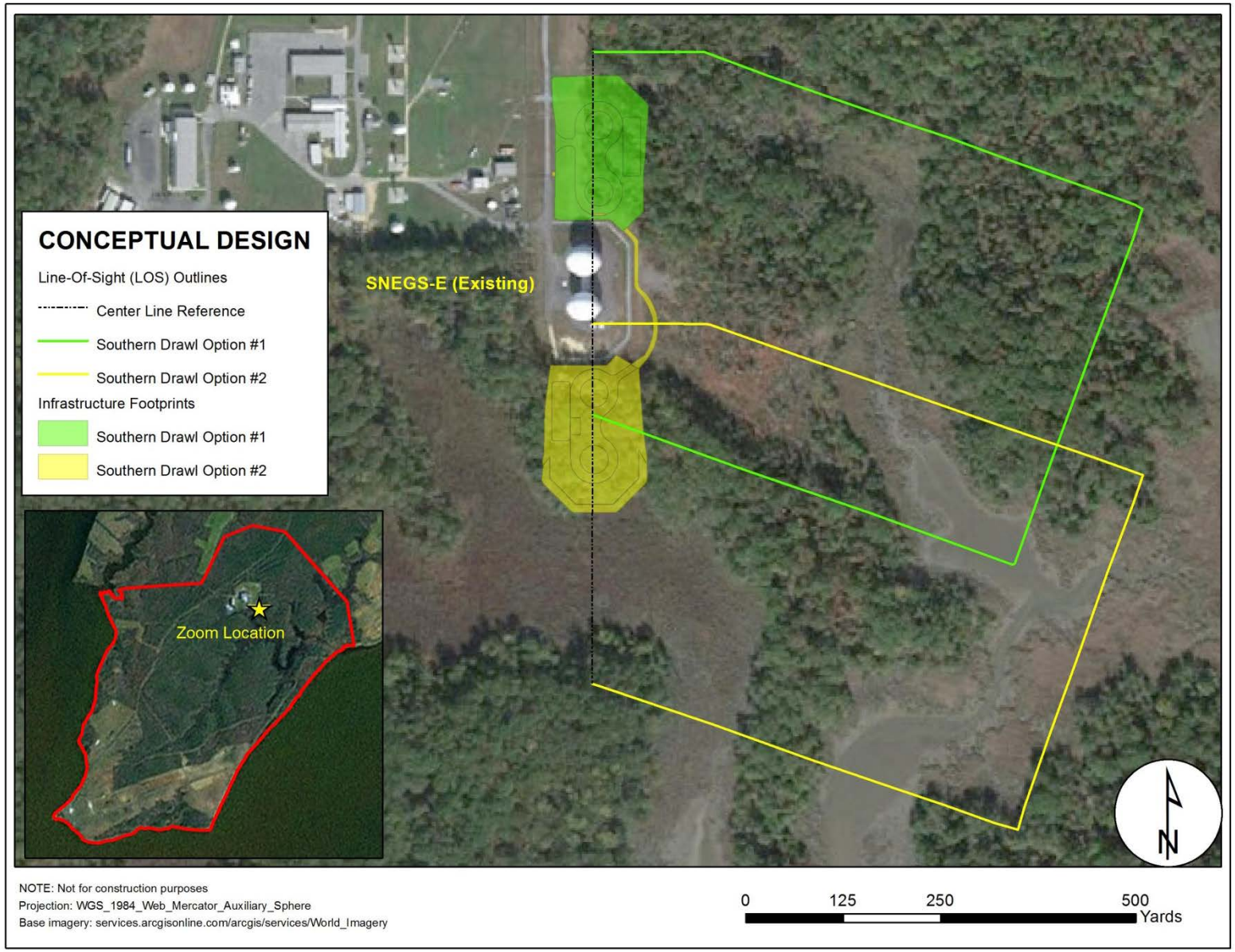

Figure 2-2. Southern Drawl Siting Options

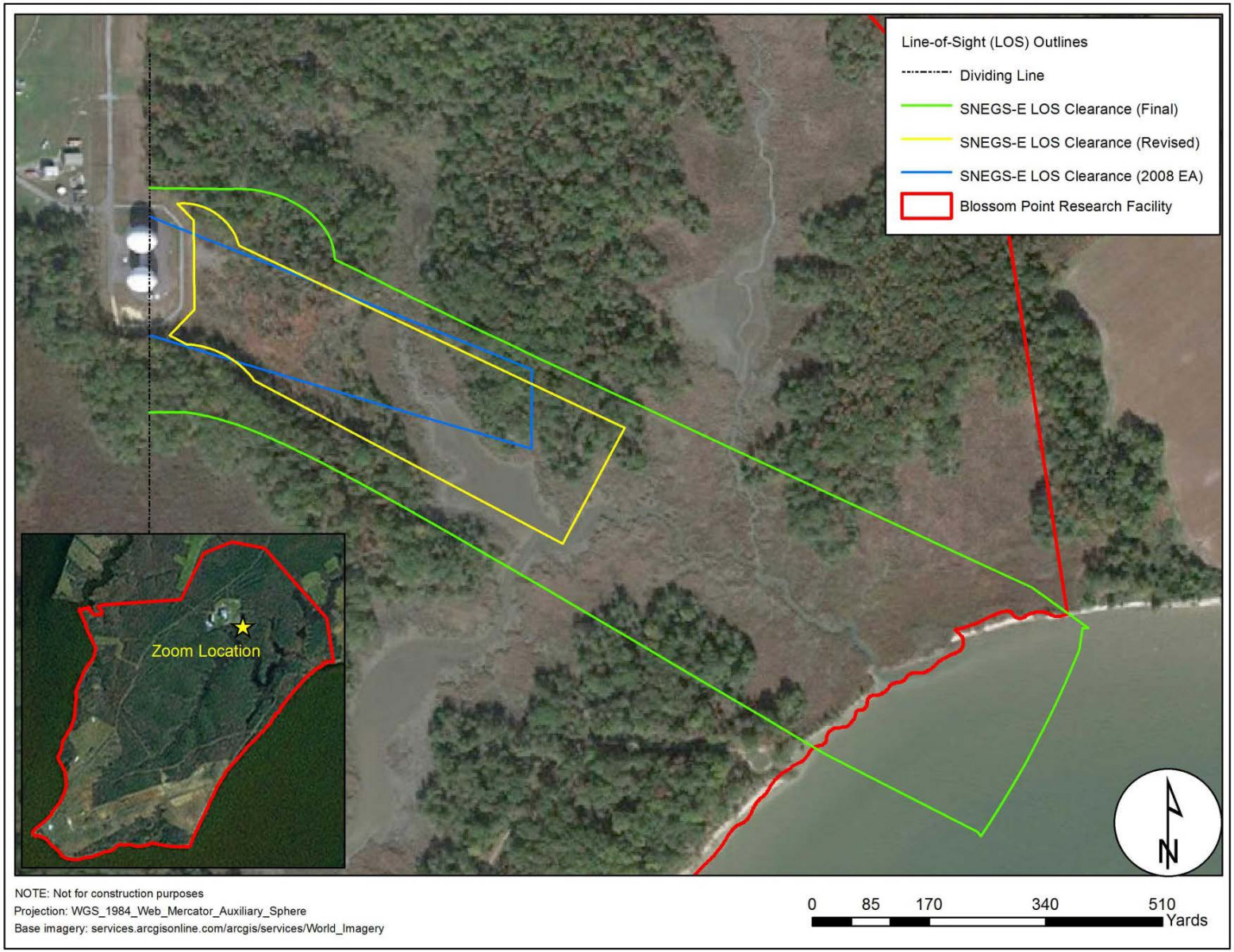

Figure 2-3. NASA Line-of-Sight Comparison

An additional horizon mask, which estimated the conditions 22 years from the date of the original measurement, was then generated. The timeframe of 22 years was chosen to take into account the following:

- The estimated time it would take to complete the supplementary NEPA analysis
- The estimated time it would take to ensure all permits and authorizations were obtained
- The anticipated tree growth over the course of approximately 20 years.

The horizon masks were used to develop the larger, final LOS clearance area shown on Figure 2-3 (SNEGS–E LOS Clearance [Final]). This LOS zone was created by analysis and software that translated the volume of air space that must have an unobstructed RF path, onto the surface area of the ground (see Section 2.1.4 for more information on how the LOS was derived). This zone is portrayed as a rectangular area on the ground that cannot contain trees or other tall objects that could interfere with antenna-satellite communication. For uninterrupted communications to occur, there cannot be any obstructions inside the final LOS zone.

Under the Proposed Action, this EA includes analysis of the expansion and complete clearance of the final LOS area for the SNEGS–E antennas. The expansion of the SNEGS–E LOS would ensure that the NASA antennas are able to meet their mission-critical need of long-term communications with TDRSS spacecraft.

2.1.4 Line-of-Site Zone Clearance and Maintenance Requirements

Communications antennas require direct visibility to the satellites that they communicate with, which are in orbit around the earth. This LOS must be uninterrupted and interference-free. Physical obstructions, such as trees, buildings, and any other relatively high natural or man-made objects, create interruption and interference if present within or close to the LOS. If physical obstructions are not removed, it is not possible for antennas to communicate with the satellites, in which case they would not meet their intended purposes.

The orbits, locations, and satellite characteristics including RF bands; and the locations, levels of permitted interference, heights, and sizes of the communications antennas on the ground drive the shape, size, and direction of areas that must be obstruction-free. These variables, along with a maximum existing tree height of 125 feet, an average vertical tree growth rate of 24 inches per year[2], and a small margin to accommodate horizontal growth of peripheral tree canopies, were used to establish the required LOS zone for the proposed Southern Drawl antennas and for the final LOS for the previously installed SNEGS–E antennas (marked as “SNEGS–E LOS Clearance (Final)” on Figure 2-3).

The proposed Southern Drawl LOS areas analyzed in this EA are shorter and wider than the SNEGS–E LOS area. This difference can be attributed to the locations and movements of the satellites in relation to the antenna locations. The Southern Drawl satellites have a wider degree of separation (i.e., they need a wider azimuth) than the NASA antennas. If a satellite is closer to the horizon, a longer LOS is required to allow the antenna on the ground to see the satellite (which is the case with the NASA SNEGS–E satellite). The Southern Drawl project does not need an LOS as long as the SNEGS–E LOS because the NRL satellites are at a slightly higher angle relative to the horizon.

Under the Proposed Action, all trees within the combined Southern Drawl and SNEGS–E LOS zone would be cut at ground level and removed (where feasible), and maintained at that height for the life of the antenna operations (approximately 20 years). For some of the less accessible LOS areas, additional

[2] An average of 24 inches per year was used because it is the average growth rate of the sweetgum (*Liquidambar styraciflua*), which is prevalent at the site and would likely be the dominant early successional species if the forest overstory at BPTF were to be removed.

trees also would need to be cleared to create logging roads for equipment access (see Figure 2-4). Each new logging road would be 15 to 20 feet wide. Usable timber from all cleared areas would be sold under the management of the USACE. Bulldozers and/or other heavy equipment would then be used to grub and grade most of the upland areas, where feasible and practical. While no grubbing and grading would occur along logging roads located outside of the construction area and combined LOS zone, tree stumps left in those areas could be flattened by logging equipment traversing the routes. For those wetland areas cleared of trees, no grubbing or grading would occur. During these activities, appropriate best management practices (BMPs) and stabilization techniques would be used that are consistent with Maryland Department of the Environment (MDE) standards and specifications for soil erosion and sedimentation control (e.g., seeding, mulching, and silt fencing) (MDE 2011b). The initial clearing, grubbing, and grading activities within the combined LOS zone are expected to last up to approximately 6 months and require up to ten temporary workers on site. Current plans are for initial clearing activities within the combined LOS to begin in late summer or early fall of 2014.

For the long-term maintenance of the vegetation within the combined LOS zone, the USAG ALC, NRL, and NASA are considering three maintenance options: prescribed burning, mechanical removal, and the application of herbicides. Some combination of these options also could be considered for long-term LOS maintenance. Each option is described in the following paragraphs.

Prescribed burning, which is the controlled application of fire, would be conducted on a rotational schedule to clear individual areas every 2 to 3 years. Prescribed burning would only be used on those forest tracts where all trees have been cut and removed (clearcut). Additionally, all relevant DOD-, U.S. Army-, federal-, and state-prescribed burn regulations would be followed, and a written Wildland Fire Management Plan would be developed for approval by the state before any prescribed burns were conducted. Trained technicians would manage the prescribed burns and fire-suppression equipment would be on hand whenever burns are conducted. Firebreaks (e.g., natural or man-made barriers used to halt the spread of fire) would be used (NWCG 2012). Adjacent property owners, local government offices, emergency responders, and the media would be given at least 24 hours of notice before burns are carried out. Smoke from the prescribed burns would be managed according to recommendations found in the Smoke Management Guide for Prescribed and Wildland Fire (NWCG 2001). These recommendations include not burning during air quality advisory days, conducting burns on days when weather and ground conditions would promote rapid dispersion, prevention of smoldering fires, use of test fires to confirm smoke behavior, burning in smaller blocks rather than large burn areas, and other BMP recommendations.

Mechanical removal is defined here as the cutting of vegetation several inches above the ground, leaving stalks and root systems intact. It includes the use of hand-held power tools (e.g., weed eaters and chain saws), mowers, and bush hogging or brush hogging equipment (e.g., tractors with large rotary cutter attachments). Because of the amount of acreage involved, bush hogging equipment likely would be used in most instances. For less accessible areas or around obstacles, the cutting of small tree and brush growth would be accomplished using hand-held power tools. Mechanical-removal activities would be conducted every 2 to 3 years, depending on the rate of vegetation regrowth.

The application of herbicides is normally conducted from a tractor or similar equipment, and can either be applied over all areas within the LOS or only in certain targeted areas. No herbicides would be applied over wetland areas, unless specifically permissible for use in wetlands. Herbicide applications only would be conducted by trained and certified personnel in accordance with USAG ALC policies and procedures (USACE 2013a). The type of herbicide used would depend on the type of vegetation growth being targeted, but only those herbicides registered through the U.S. Environmental Protection Agency (USEPA) under the Federal Insecticide, Fungicide, and Rodenticide Act, and approved by the U.S. Army, would be used. Examples of herbicides that could be used are glyphosate and triclopyr (in the form of Garlon 3A). Glyphosate is a non-selective, systemic herbicide commonly used to control most annual and perennial plants, including invasive species. Additionally, certain formulations of glyphosate are

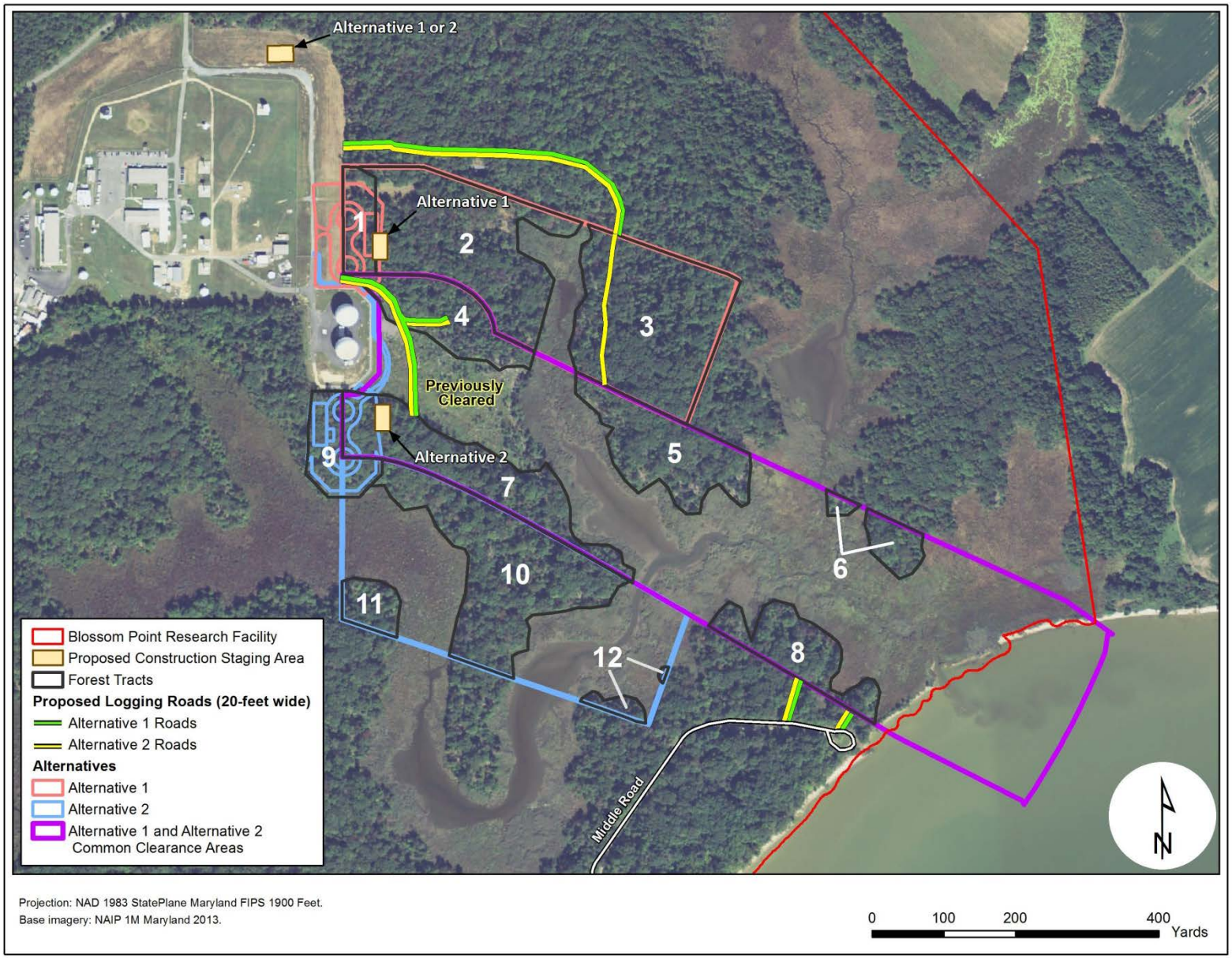

Figure 2-4. Forest Clearing Tracts and Construction Staging Areas

approved by the USEPA for wetland applications (MDNR 2014). Garlon 3A is a selective, systemic herbicide used to control woody and herbaceous broadleaf plants along rights-of-way, in forests, and in grasslands and parklands. These herbicides and their effects are discussed in Sections 3.2.3.1.2.1 and 3.3.3.1.2.1. All herbicide applications would be conducted in accordance with the Invasive Species Management Plan for Blossom Point (USACE 2013a). If used, herbicide applications likely would occur every 2 to 3 years.

2.2 Description of Alternatives

This EA evaluates two alternatives in addition to the No Action Alternative. The two action alternatives described in Sections 2.2.1 and 2.2.2 meet the purpose of and need for the Proposed Action described in Section 1.3. Under the No Action Alternative described in Section 2.2.3, the Southern Drawl antennas, related infrastructure, and LOS clearance, and the expansion of the SNEGS–E LOS, would not occur. While the No Action Alternative would not meet the purpose of and need for the Proposed Action, it is used as a benchmark for decisionmakers to compare the potential environmental effects of the Proposed Action and alternatives with existing baseline conditions.

2.2.1 Alternative 1 (Preferred Alternative)

The Southern Drawl antenna facility for Alternative 1 would be located immediately north of NASA's SNEGS–E site and adjacent to the BPTF (Figure 2-1). For a discussion on the rationale for selecting Alternative 1 as the preferred alternative, refer to Section 2.3. This alternative would easily allow the existing Building 10 at BPTF to be renovated and used as the data center, reducing the amount of new construction. To raise and level the construction site to meet facility operational, security, and drainage requirements, approximately 9,600 cubic yards of fill material would be trucked to the site from an approved borrow location.

Alternative 1 would include clearance of the combined SNEGS–E and Southern Drawl Option 1 LOS (see Figure 2-5), and installation of the Southern Drawl antennas and related infrastructure identified in Section 2.1.1. The combined LOS includes the following:

1. The area between the revised SNEGS–E LOS and the final SNEGS–E LOS (green area in Figure 2-5)
2. Clearance of the remaining standing trees in the revised SNEGS–E LOS (blue area in Figure 2-5), which was only partially cleared previously due to the tiered tree clearance approach that did not meet NASA's needs (see Section 2.1.3 for background information on the SNEGS–E LOS)
3. The Southern Drawl Option 1 LOS (yellow striped area in Figure 2-5).

The Southern Drawl LOS zone would overlap the existing and proposed LOS zone for the SNEGS–E antennas, thereby reducing the number of trees that would need to be cut and minimizing wildlife habitat fragmentation compared to a stand-alone LOS zone. A summary of the land cover types and acreage within the project area, and affected by Alternative 1 activities, is shown in Table 2-1. As explained in the table, approximately 34.0 acres of mostly upland forest would be converted to open field or scrub-shrub under Alternative 1, not including acreage previously cleared for the SNEGS–E project. Only 11 percent of the overall wetland areas and none of the open waters would be disturbed by project-related activities. Once constructed, the new antenna facility would add approximately 0.96 acre of impervious surface (i.e., radomes, generators, and pavement) to Blossom Point.

Under this alternative, trees and other vegetation within the combined LOS zone would need to be cut at ground level. For those forest tracts that are easily accessible from the BPTF or accessible through cutting of new logging roads, all timber and the majority of slash (woody debris) would be removed. Logs, tree tops, and other slash material would be hauled by skidders or other harvesting equipment to the

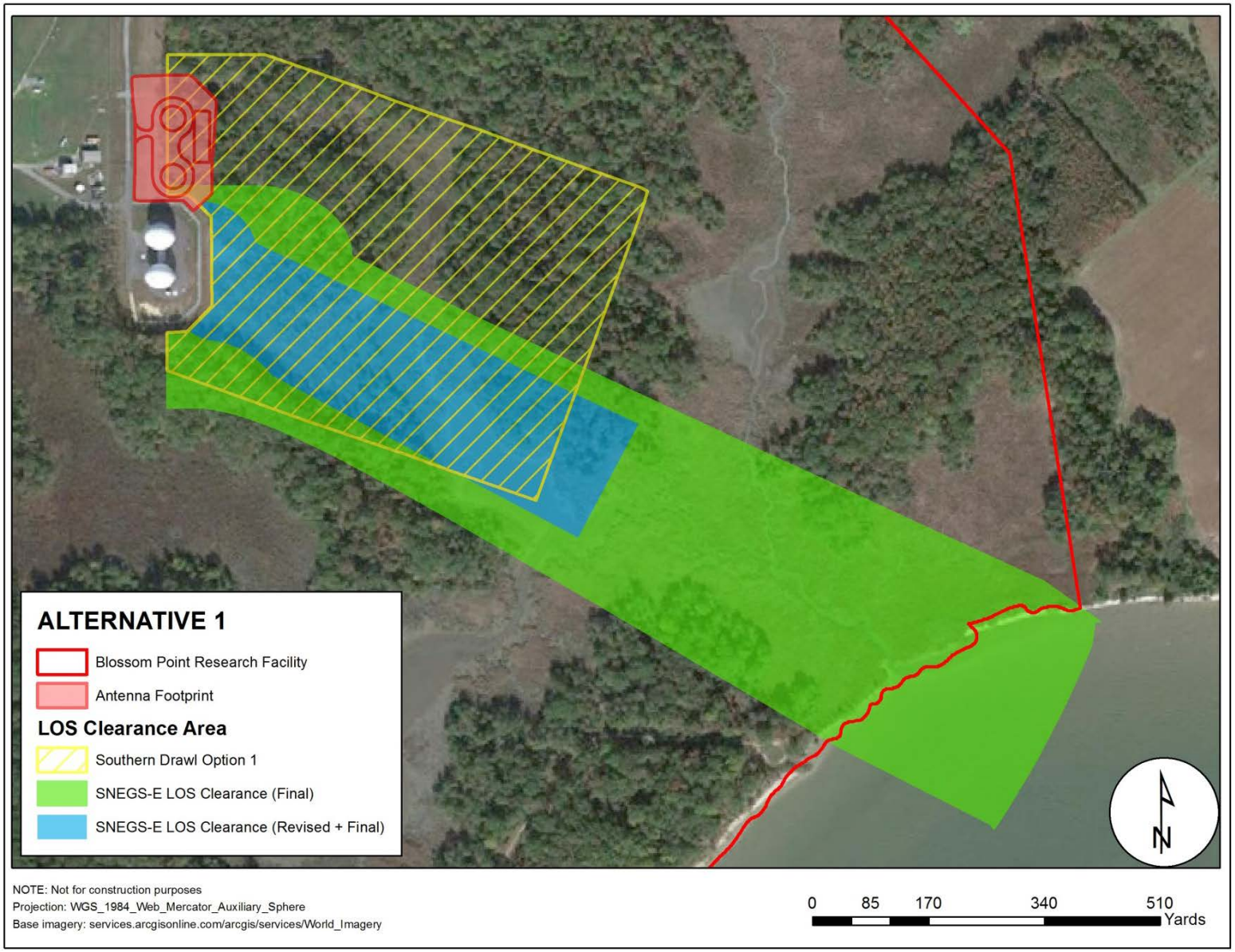

Figure 2-5. Alternative 1

Table 2-1. Summary of Land Cover Areas by Alternative (Acres)

Area Type	Alternative 1			Alternative 2		
	Antenna Footprint	LOS and Logging Roads	Total	Antenna Footprint	LOS and Logging Roads	Total
Upland Areas						
Lawn/Maintained Vegetation	0.96	0.00	0.96	0.06	0.00	0.06
Forested Upland (to be cleared, grubbed, and graded for construction)	1.40	NA	1.40	2.55	NA	2.55
Forested Upland (to be cleared, grubbed, graded, and maintained)	NA	25.66	25.66	NA	18.62	18.62
Scrub-shrub Upland (previously cleared for the SNEGS–E project; to be grubbed and graded for construction and maintenance)	NA	4.93	4.93	0.26	4.67	4.93
Forested Upland (to be cleared and maintained, but not grubbed and graded)	NA	3.06	3.06	NA	3.94	3.94
Forested Upland (to be cleared for new logging roads outside of combined LOS zones; little or no grubbing and grading)	NA	0.75	0.75	NA	1.04	1.04
Total Upland Area	**2.36**	**34.40**	**36.76**	**2.87**	**28.27**	**31.14**
Wetland Areas						
Emergent Non-tidal Wetland	0.31(1)	0.39(2)	0.70	0.00(1)	0.00	0.00
Forested Non-tidal Wetland	0.00	3.08(3)	3.08	0.12(1)	1.19(3)	1.31
Forested Tidal Wetland	0.00	0.07(3)	0.07	0.00	0.00	0.00
Previously Cleared Wetland, currently Scrub-Shrub (previously cleared for the SNEGS–E project) (4)	NA	0.22	0.22	NA	0.22	0.22
Emergent Tidal Wetland	0.00	26.65(2)	26.65	0.12(1)	34.64(2)	34.76
Total Wetland Area	**0.31**	**30.41**	**30.72**	**0.24**	**36.05**	**36.29**
Open Water						
Local Surface Waters (2)	0	2.93	2.93	0	4.10	4.10
Potomac River (2)	0	8.24	8.24	0	8.24	8.24
Total Open Water Area	**0**	**11.17**	**11.17**	**0**	**12.34**	**12.34**
GRAND TOTAL	**2.67**	**75.98**	**78.65**	**3.11**	**76.66**	**79.77**

Notes:

1. Wetlands to be filled in as part of antenna facility construction.
2. No disturbances or activities to occur in these areas.
3. Wetlands to be cleared and maintained; no grubbing or grading.
4. Within the SNEGS–E LOS clearance (Revised), the MDE Non-Tidal Letter of Authorization (LOA) (MDE 2010) permitted temporary impacts on 0.09 acre of wetlands, of which only 0.06 acre were cleared before the LOA expired in May 2013. The August 2013 wetland survey, however, delineated 0.22 acre of scrub-shrub wetlands in the area that were previously cleared. The difference in measured acres is because the wetland surveys were conducted a few years apart and conditions have changed.

edge of the forest where a log landing site (for loading and chipping equipment) would be established. Log landings would only occur along existing roads in areas previously cleared. Following the completion of harvesting activities, grubbing and grading operations would be conducted in most upland areas.

Figure 2-4 shows the location of eight forest tracts spread across Alternative 1, including the LOS common clearance areas (tracts 1 through 8). Also shown are proposed logging roads that would fall within and outside of the previously cleared areas and combined LOS zone as part of the Proposed Action. Temporary construction staging areas are also shown. An explanation of the tree-clearing methods to be applied within each forest tract is provided in Table 2-2. For those forest tracts that have poor accessibility (tract 6 in this case), cut trees likely would be left in place except in wetland areas. As tract 6 is only accessible through the Cedar Point Wildlife Management Area (WMA), permission to access the Blossom Point property through the Maryland state property would be sought prior to work commencing. Only if smaller scale/low-impact harvesting equipment and methods (e.g., compact skidders, all-terrain vehicles [ATVs], winches, horses/mules, and wooden mats) are used without creating additional logging roads would logs be removed from these areas. Because of the proximity of known archaeological sites, tree clearing and logging road activities in and around forest tract 8 must use low-impact timber harvesting techniques that minimize soil disturbance and compaction. Any log landings in this area would be required to stay within previously cleared areas along Middle Road. Because of these limitations, forest tracts 6 and 8 would not be grubbed and graded.

Table 2-2. Explanation of Clearing Methods for Individual Forest Tracts

Forest-Clearing Method	Forest Tracts by Alternative (1)	
	Alternative 1	Alternative 2
Cut and remove all timber (clearcut); grub and grade all areas except in wetlands	1, 2, 3, 4, 5, 7	4, 5, 7, 9, 10
Cut and remove all timber (clearcut) using low-impact methods only; no grubbing or grading (2)	8	8
Cut and leave trees in place, except in wetlands; no grubbing or grading (3)	6(4)	6(4), 11, 12

Notes:

1. Refer to Figure 2-4 for forest tract locations.
2. Timber harvesting limitations are due to possible archaeological resources in the area.
3. The inability to harvest trees and grub/grade is due to poor accessibility for large equipment.
4. Accessing this forest tract requires travel through the Cedar Point WMA.

For the life of the SNEGS–E and Southern Drawl antennas, new vegetation growth throughout the combined LOS zone would be maintained. Maintenance activities would consist of either prescribed burning on a rotational schedule, mechanical removal, herbicide application, or a combination of these methods every 2 to 3 years (see Section 2.1.4 for more information on the three vegetation maintenance options). The method(s) used would be tailored according to how initial tree-clearing activities were conducted within individual forest tracts. For example, within those forest tracts where cut trees were left in place (tract 6 in this case), prescribed burning would not be used because of excessive fuel build-up. The new logging roads identified in Figure 2-4 also would need to be maintained to ensure long-term access for maintenance equipment into some LOS areas; however, only mechanical removal or herbicide applications would be used along these roads.

2.2.2 Alternative 2

Under Alternative 2, the Southern Drawl antenna facility would be located immediately south of NASA's SNEGS–E site (Figure 2-1). Because of its location farther from existing BPTF operations, this alternative would require an approximate 900-foot-long gravel access road around the east side of the SNEGS-E facility, much longer cable runs, and likely would require that a new data center be built on site. To raise and level the construction site to meet facility operational, security, and drainage requirements, approximately 16,500 cubic yards of fill material would be trucked to the site from an approved borrow location. Also, due to the site's steeper grades and proximity to wetlands, a concrete retaining wall would need to be constructed on drilled piers around the south side of the facility. Rip-rap would then be added along the wall for shoreline protection.

Alternative 2 would include clearance of the combined SNEGS–E and Southern Drawl Option 2 LOS (see Figure 2-6), and installation of the Southern Drawl antennas and related infrastructure identified in Section 2.1.1. The combined LOS includes the following:

1. The area between the revised SNEGS–E LOS and the final SNEGS–E LOS (green area in Figure 2-6)
2. Clearance of the remaining standing trees in the revised SNEGS–E LOS (blue area in Figure 2-6), which was only partially cleared previously due to the tiered tree clearance approach that did not meet NASA's needs (see Section 2.1.3 for background information on the SNEGS–E LOS)
3. The Southern Drawl Option 2 LOS (yellow striped area in Figure 2-6).

For Alternative 2, the Southern Drawl LOS zone would overlap the existing and proposed LOS zones for the SNEGS–E antennas, though less so than Option 1, thereby reducing the number of trees that would need to be cleared and minimizing wildlife habitat fragmentation compared to a stand-alone LOS zone. A summary of the land cover types and acreage within the project area and affected by Alternative 2 activities is shown in Table 2-1. Just as for Alternative 1, the table shows that the largest land cover type affected by Alternative 2 would be upland forest. Approximately 27.5 acres of mostly upland forest would be converted to open field or scrub-shrub under this alternative, not including acreage previously cleared for the SNEGS–E project. Only 4 percent of the overall wetland areas and none of the open waters would be disturbed by project-related activities. Once constructed, the antenna facility would add approximately 1.20 acres of impervious surface to Blossom Point—slightly more than Alternative 1 due to the gravel road extension.

Figure 2-4 shows the nine forest tracts to be cleared under Alternative 2. Also shown are proposed logging roads that would fall within and outside of the previously cleared areas and combined LOS zone as part of the Proposed Action. Temporary construction staging areas are also shown. An explanation of the tree-clearing methods to be applied within each forest tract is provided in Table 2-2. Just as described for Alternative 1, tree-clearing methods for Alternative 2 would vary depending on the location and limitations of the individual forest tracts. Because tracts 6, 11, and 12 have limited accessibility, the trees cut in these areas likely would be left in place except in wetland areas. As tract 6 is only accessible through the Cedar Point WMA, permission to access the Blossom Point property through the Maryland state property would be sought prior to work commencing. Only if small scale/low-impact harvesting equipment and methods (see Section 2.2.1) are used without creating additional logging roads would logs be removed from tracts 6, 11, and 12. Also, in and around tract 8, tree clearing and logging road activities must use low-impact timber harvesting techniques because of known archaeological resources in the area. Because of these limitations, forest tracts 6, 8, 11, and 12 would not be grubbed and graded.

As with Alternative 1, vegetation within the combined LOS zone for Alternative 2 would be maintained for the life of the SNEGS–E and Southern Drawl antennas. Maintenance activities would consist of either

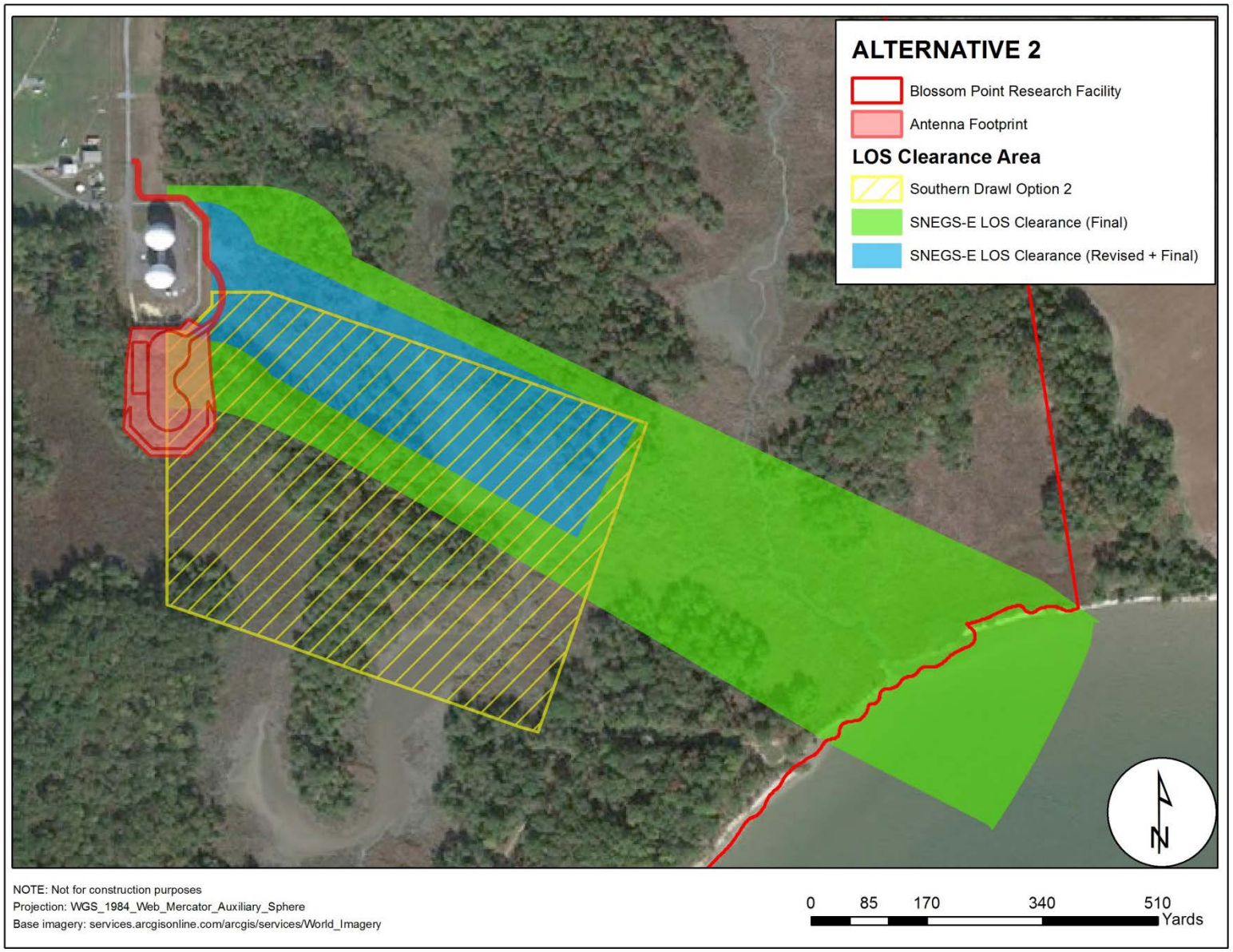

Figure 2-6. Alternative 2

prescribed burning on a rotational schedule, mechanical removal, herbicide application, or a combination of these methods every 2 to 3 years; and the method(s) used would be tailored according to how initial tree-clearing activities were conducted within individual forest tracts. For example, within those forest tracts where cut trees were left in place (tracts 6, 11, and 12 in this case), prescribed burning would not be used. The new logging roads identified in Figure 2-4 also would need to be maintained to ensure long-term access for maintenance equipment into some LOS areas; however, only mechanical removal or herbicide applications would be used along these roads.

2.2.3 No Action Alternative

Pursuant to 40 CFR 1502.14(d), the No Action Alternative is evaluated in this EA. The No Action Alternative serves as a benchmark for decisionmakers to compare the potential environmental effects of the Proposed Action and alternatives with existing baseline conditions.

Under the No Action Alternative, NASA's SNEGS–E LOS would not be expanded, existing antennas would not be able to communicate with satellites, and the SNEGS–E would not be able to fulfill its mission. Moreover, the Southern Drawl antennas would not be constructed, meaning that the NRL would not be able to communicate with satellites over the Atlantic Ocean region and fulfill its mission. The No Action Alternative would not support the purpose of and need for the Proposed Action.

2.3 Selection of the Preferred Alternative

USAG ALC, NRL, and NASA selected Alternative 1 as the preferred build alternative over Alternative 2 for the following reasons:

- While both of the alternative antenna construction sites would result in a permanent loss of wetland acreage, Alternative 1 would only impact mowed/maintained emergent non-tidal wetlands (0.31 acre), while Alternative 2 would impact undisturbed emergent tidal and forested non-tidal wetlands (a total of 0.24 acre).
- Because of fewer variations in slope and grade, Alternative 1 would require approximately 6,900 fewer cubic yards of imported fill compared to Alternative 2.
- Because Alternative 1 is located adjacent to the existing BPTF operations and is closer to Building 10, it would require shorter electrical and communications cabling. Connections to the Alternative 2 site would exceed 1,000 feet in length; thus, a new data center likely would be required at the new antenna facility to avoid latency impacts (i.e., slow communications) on the system.
- Alternative 2 would require a retaining wall constructed on drilled piers and rip-rap for shoreline protection. Alternative 1 would not have such construction requirements.
- For Alternative 2, construction and operations support vehicles would have to pass in front of NASA's SNEGS–E antennas and any oversized vehicles could impact their satellite communications operations. Alternative 1 would not have such an effect on NASA's operations.
- Overall construction costs for the Alternative 2 antenna facility would be approximately 15 to 25 percent higher than Alternative 1.
- Alternative 1 would result in 0.24 fewer acre of impervious surface compared to Alternative 2.
- Alternative 1 would require one less inactive bald eagle nest to be removed compared to Alternative 2.

- For Alternative 1, long-term vegetation maintenance within the combined LOS zone would be more easily implemented because the combined LOS zone contains two fewer remote peninsulas when compared to Alternative 2.

2.4 Alternatives Considered, but Eliminated from Detailed Analysis

Only those Southern Drawl locations meeting the selection criteria outlined in Section 2.1.2 were considered as alternatives in this EA. The following are alternative locations in the Mid-Atlantic region that were considered and eliminated from further detailed analysis:

1. **NRL's Midway Research Center in Stafford, Virginia.** This site is a transmit site, while the proposed Southern Drawl antennas are meant to receive signals. Existing transmissions at Stafford would create an excess of RF interference for the proposed Southern Drawl antennas.
2. **Bureau of Land Management's Maryland Point Observatory in Charles County, Maryland.** There is not enough buildable space at this site. Only 26 acres would be available, which would mean the Southern Drawl LOS tree-clearance area would partially cover an area outside of government ownership.
3. **NRL's Chesapeake Beach Division site in Calvert County, Maryland.** This site tests radar across the Chesapeake Bay, which would cause RF interference with the proposed Southern Drawl antennas.
4. **Patuxent River Naval Support Facility in St. Mary's County, Maryland.** There are existing transmitters and other activities, including the airfield, at this installation which would interfere with the proposed Southern Drawl antenna transmission.
5. **Dahlgren Naval Support Facility in Dahlgren, Virginia.** Weapons testing is conducted at this facility. Because of hazards of electromagnetic radiation to ordnance (HERO) concerns, transmitting antennas are normally not allowed anywhere near ordnance. The calibration signal transmitted by the Southern Drawl antennas would be incompatible with the weapons testing mission at Dahlgren.
6. **Indian Head Naval Support Facility in Charles County, Maryland.** Because of HERO concerns, the proposed Southern Drawl antennas would conflict with existing operations at this installation including the Naval Explosive Ordnance Disposal School (Stump Neck Annex). It is also close to the Washington D.C., metropolitan area which means there would be RF interference.
7. **Joint Base Andrews in Prince George's County, Maryland.** Existing airfield operations and the surrounding RF environment would interfere with Southern Drawl communications. This installation also has height restrictions associated with the airfield which would preclude installation of the proposed Southern Drawl antennas. Additionally, because of its location in the Washington D.C., metro area, there would be an excess of RF interference.
8. **Fort Belvoir in Fairfax County, Virginia.** In addition to being located in the Washington D.C., metro area, which has an excess of RF interference, operations at this installation, including the U.S. Army major command headquarters and other commands and agencies of the DOD and more than 140 tenant and satellite organizations, would conflict with operation of the proposed Southern Drawl antennas.
9. **NRL's main campus in Washington D.C.** There is not enough buildable area at this installation; proposed Southern Drawl antennas would interfere with current operations and the installation has height restrictions that would preclude construction of the proposed Southern

Drawl antennas. Additionally, because of its location in the metro area, there would be an excess of RF interference.

Two other potential Southern Drawl siting options on the Blossom Point property were identified, but eliminated from detailed analysis. The first site was located several hundred feet east of the BPTF (see Site #3 on Figure 2-7). This location, while on Army property, would not abut the BPTF fence or the NASA SNEGS–E site, missing the opportunity to minimize the combined LOS zone by overlapping with the SNEGS–E LOS area. This option would have fragmented wildlife habitat and increased the size of the impact area by creating a stand-alone LOS zone. It also would result in higher infrastructure costs because of the added distance from existing facilities.

The other Southern Drawl siting option eliminated from consideration was on an elevated area south of the BPTF (see Site #4 on Figure 2-7). This location, while on Army property, would not abut the BPTF fence or the NASA SNEGS–E site, missing the opportunity to minimize the LOS area by overlapping with the SNEGS–E LOS area. Due to the location of this option, the length of cable run between the antennas and Building 10 would be excessive, thus eliminating the ability of using Building 10 as the data center and increasing infrastructure costs. This option also would have fragmented wildlife habitat and increased the size of the impact area by creating a stand-alone LOS zone.

Alternatives for the SNEGS–E project were examined in the 2008 EA (A. Morton Thomas and Associates, Inc. 2008). This EA examines one action alternative for NASA, expansion of the SNEGS–E LOS, against the No Action Alternative. Other alternatives would not enable the NASA antennas, already in place at Blossom Point, to fulfill their mission-critical need of long-term communications with TDRSS spacecraft.

2.5 Comparison of Alternatives

Table 2-3 summarizes the potential environmental consequences of the Proposed Action, alternatives, and the No Action Alternative, based on the impact analyses presented in Chapter 3.

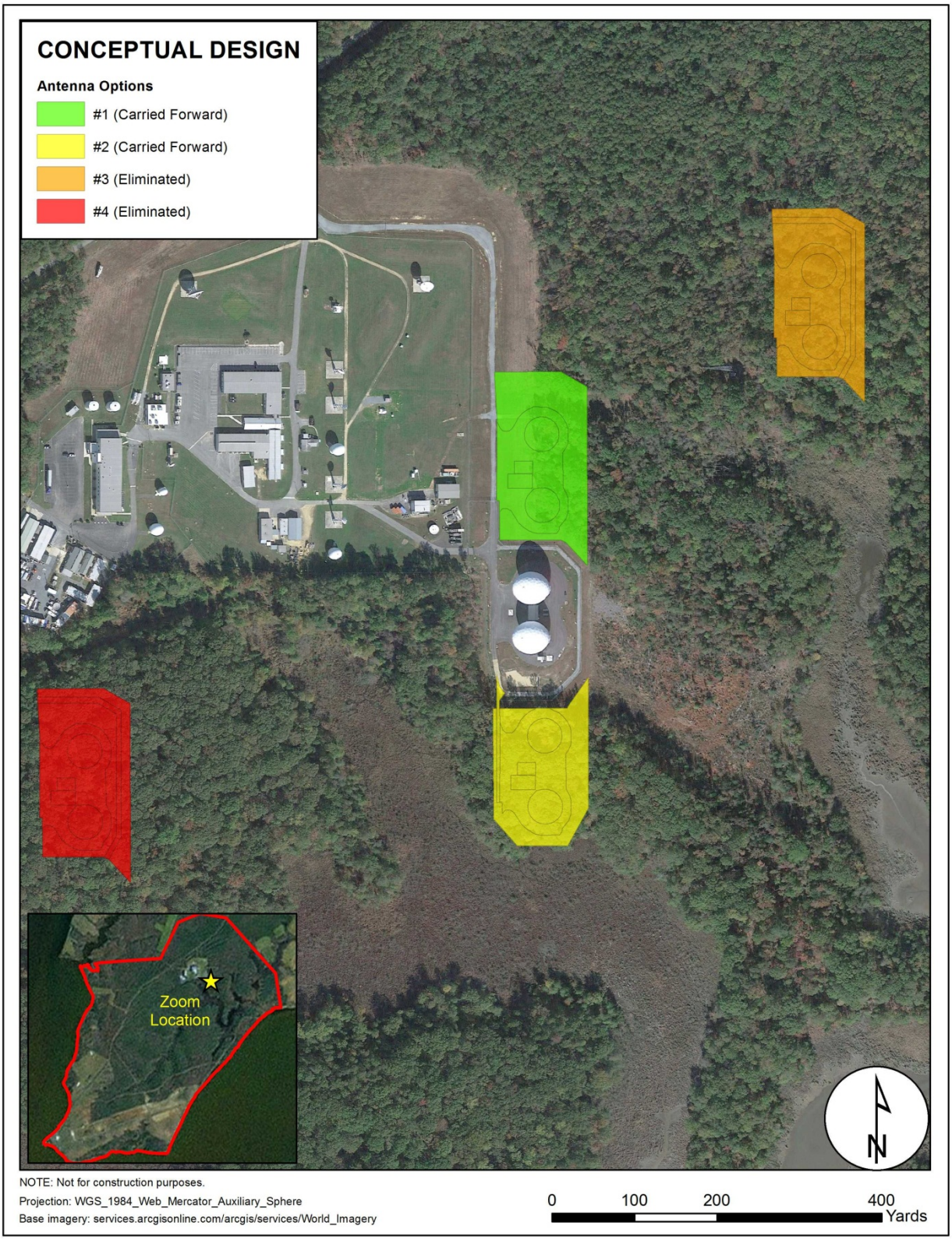

Figure 2-7. Blossom Point Alternatives Eliminated

Table 2-3. Summary of Potential Environmental Consequences

Resource	Alternative 1	Alternative 2	No Action
Air Quality	No significant impacts on air quality would be expected. Air pollutant emissions from construction, prescribed burns, and the operation of an emergency generator would be well below general conformity *de minimis* thresholds.	Impacts on air quality would be approximately the same as those described for Alternative 1.	No impact.
Biological Resources	No significant impacts on biological resources would be expected. No significant impacts on wildlife would be expected. Wildlife would temporarily flee from construction and clearing disturbances and LOS maintenance activities. Approximately 34.0 acres of upland and wetland forest would be cleared. Habitat would be altered; however, there is abundant forested habitat adjacent to areas of impact, which would continue to support forest-dwelling species. The combined LOS zone would convert to an early successional type habitat that would likely support wildlife species associated with that habitat type. No effect on threatened and endangered species would be expected, as none are present on the installation. Alternative 1 LOS clearance would include the removal of one active bald eagle nest. A permit from the U.S. Fish and Wildlife Service (USFWS) would be obtained prior to nest removals. No significant impacts on migratory birds would be expected. Construction, clearing, and maintenance activities would be conducted outside of nesting season to avoid indirect takes of migratory birds.	Impacts on biological resources would be the same as described for Alternative 1, with the exception that there would be approximately 6.6 fewer acres of upland/ wetland forest cleared and one additional inactive bald eagle nest removed.	No impact.
Water Resources	No significant impacts on water resources would be expected. Under Alternative 1, impacts on wetlands would include the permanent loss of 0.31 acre of wetlands and the conversion of approximately 3.15 acres of forested wetland areas to emergent wetland habitat. All necessary wetland permits would be obtained prior to clearance and construction activities. Although Alternative 1 would increase impervious surface area by approximately 0.96 acre, no significant impacts on storm water management would be expected. Alternative 1 would require application for coverage under MDE General Discharge Permit for Stormwater Associated with Construction Activity. Use of erosion-and-sediment-control-plans and BMPs to provide erosion and sediment control and storm water management during site construction and forestry operations would reduce adverse effects on surface water. The anticipated impacts of construction in the 100-year floodplain and flood zones at BPTF would be negligible. No significant impacts on the floodplain would occur.	Overall impacts on water resources for Alternative 2 generally would be the same as for Alternative 1. Alternative 2, however, would impact approximately 2.03 fewer acres of wetlands. Under Alternative 2, wetland impacts would include the permanent loss of 0.24 acre of wetlands and the conversion of approximately 1.19 acres of forested wetland areas to emergent wetlands. Although Alternative 2 would result in 0.24 more acres of impervious surface area than Alternative 1, the overall increase is not expected to have a significant impact on storm water management.	No impact.

Resource	Alternative 1	Alternative 2	No Action
Cultural Resources	No cultural resources are expected to be impacted. Based on available records, three previously recorded archaeological sites are located within or just outside of the combined LOS zone. Although the National Register of Historic Places status of these three sites is undetermined, they are not expected to be impacted as long as low-impact timber harvesting techniques are used and no grubbing or grading occurs in these areas. For an approximate 100-meter-long segment of proposed logging road located outside of previously surveyed areas, the U.S. Army and NRL plan to conduct a Phase I archaeological survey of the road segment and consult with the Maryland Historical Trust prior to any clearing in that area.	Impacts on cultural resources would be the same as those described for Alternative 1.	No impact.
Land Use	No impact.	No impact.	No impact.
Utilities and Infrastructure	No impact.	No impact.	No impact.
Geology, Topography, and Soils	No significant impacts on geology, topography, and soils would be expected. Ground-disturbing activities such as construction, grubbing, and grading can increase the potential for soil loss from erosion. Included in the area of disturbance is 0.17 acre of highly erodible soils. However, erosion-and-sediment-control-plans and BMPs would be implemented to minimize impacts.	Impacts on geology, topography, and soils generally would be the same as for Alternative 1, except that the combined LOS zone for Alternative 2 contains 2.58 more acres of highly erodible soils than Alternative 1. Therefore, Alternative 2 has a greater potential for soil erosion from LOS clearance and maintenance activities than Alternative 1. As with Alternative 1, erosion-and-sediment-control-plans and BMPs would be implemented to minimize impacts.	No impact.

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3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

For each resource topic, this chapter describes the existing environmental conditions at Blossom Point, immediately followed by the analysis of potential environmental impacts associated with implementation of the Proposed Action (Alternatives 1 and 2) described in Chapter 2. The environmental impacts from the No Action Alternative are also described. Under each environmental consequences discussion and for each build alternative, the impact analyses are broken out by (1) the near-term LOS clearing, facility site preparation, and construction activities (including timber cutting and sales, the grubbing and grading of most upland areas, and soil stabilization); and (2) long-term facility operations and the maintenance of vegetation within the combined LOS zone (by means of prescribed burning, mechanical removal, herbicide applications, or a combination of these methods). The information and data presented in this chapter are commensurate with the importance of the potential impacts to provide the proper context for evaluating impacts.

In conducting the Southern Drawl antenna facility construction, and the initial clearing and long-term maintenance of the combined LOS zone for the Southern Drawl and SNEGS–E antennas, air quality, biological resources, water resources, cultural resources, land use, and geological resources are the only resource topics of concern requiring analysis. As discussed in Section 1.5, the following environmental resource topics were omitted from analysis because of little or no environmental concerns: airspace; noise; traffic and transportation; hazardous materials, waste, and installation restoration; and socioeconomics, environmental justice, and children's health and safety.

For the analysis of environmental consequences presented in this EA, determining the significance of potential impacts was conducted in accordance with 40 CFR § 1508.27. The analysis approach used in determining the significance requires consideration of both context and intensity, defined as follows:

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1) Impacts that might be both beneficial and adverse. A significant effect might exist even if the federal agency believes that, on balance, the effect will be beneficial.

2) The degree to which the proposed action affects public health or safety.

3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

6) The degree to which the action might establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

7) Whether the action is related to other actions with individually insignificant, but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively

significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

8) The degree to which the action might adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) or cause loss or destruction of significant scientific, cultural, or historical resources.

9) The degree to which the action might adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA.

10) Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

In determining whether the Proposed Action and alternatives could have a significant effect on the environment, this EA considered every phase of the action, including both direct and indirect effects, and the short- and long-term effects of the action.

3.1 Air Quality

3.1.1 Definition of Resource/Regulatory Background

In accordance with CAA requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions. Blossom Point is located in the Southern Maryland Intrastate Air Quality Control Region (ACQR) 116.

Ambient Air Quality Standards. Under the CAA, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), reparable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}], particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb) (40 CFR Part 50). The CAA also gives the authority to states to establish air quality rules and regulations. The State of Maryland has adopted the NAAQS, presented in Table 3-1.

Attainment versus Nonattainment and General Conformity. The USEPA classifies the air quality in an AQCR, or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment, but is now attainment; and an unclassified air quality designation by USEPA means that there is not enough information to classify an AQCR appropriately, so the area is considered to be in attainment. USEPA has delegated the authority for ensuring compliance with the NAAQS in Maryland to the MDE, which regulates air quality for the state through their Air Quality Compliance Program. In accordance with the CAA, each state must develop a State Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS.

Table 3-1. National and State Ambient Air Quality Standards, Effective October 2011

Pollutant	Averaging Time	Primary Federal Standard	Secondary Standard
CO	8-hour (1)	9 ppm (10 mg/m^3)	None
	1-hour (1)	35 ppm (40 mg/m^3)	None
Pb	Rolling 3-Month Average (2)	0.15 µg/m^3 (3)	Same as Primary
	Quarterly Average	1.5 µg/m^3 (3)	Same as Primary
NO_2	Annual (4)	53 ppb (5)	Same as Primary
	1-hour (6)	100 ppb	None
PM_{10}	Annual (Arithmetic Mean)	None	None
	24-hour (7)	150 µg/m^3	Same as Primary
$PM_{2.5}$	Annual (8)	12 µg/m^3	15 µg/m^3
	24-hour (6)	35 µg/m^3	Same as Primary
O_3	8-hour (9)	0.075 ppm (10)	Same as Primary
	1-hour	0.12 ppm	Same as Primary
SO_2	1-hour (11)	75 ppb (12)	None
	Annual (Arithmetic Average)	0.03 ppm	None
	24-hour	0.14 ppm (365 µg/m^3)	None
	3-hour (1)	None None	0.5 ppm (1300 µg/m^3)

Sources: COMAR 2013, USEPA 2012

Notes: Parenthetical values are approximate equivalent concentrations.

1. Not to be exceeded more than once per year.
2. Not to be exceeded.
3. Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved. USEPA designated areas for the new 2008 standard on November 8, 2011.
4. Annual mean.
5. The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
6. 98th percentile, averaged over 3 years.
7. Not to be exceeded more than once per year on average over 3 years.
8. Annual mean, averaged over 3 years.
9. Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
10. Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
11. 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
12. Final rule signed June 2, 2010. The 1971 annual (0.3 ppm) and 24-hour (0.14 ppm) SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until 1 year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved. USEPA designated certain areas for the new 2010 standard on July 25, 2013, with the remaining designations to occur in the future.

Key: ppm = parts per million; ppb = parts per billion; mg/m^3 = milligrams per cubic meter; µg/m3 = micrograms per cubic meter

For Federal actions in nonattainment or maintenance areas, the General Conformity Rule applies. This rule requires that any federal action meet the requirements of a SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured when a federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS. With respect to the General Conformity Rule, effects on air quality might be considered significant if the proposed federal action emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area.

***Greenhouse Gas Emissions*.** Greenhouse gases (GHGs) are compounds that contribute to the greenhouse effect, a natural phenomenon in which these gases trap heat within the surface-troposphere (lowest portion of the earth's atmosphere) system, causing heating (radiative forcing) at the surface of the earth. Scientific evidence indicates a trend of increasing global temperature over the past century due to increasing GHG emissions from human activities (USEPA 2009). The climate change associated with this global warming is predicted to produce negative environmental, economic, and social consequences across the globe. The average global temperature since 1900 has risen by 1.5 degrees Fahrenheit (°F) and is predicted to increase by up to 11.5 °F by 2100 (Karl et al. 2009).

GHGs are primarily produced by the burning of fossil fuels, and through industrial and biological processes. The primary long-lived GHGs directly emitted by human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Although CO_2, CH_4, and N_2O occur naturally in the atmosphere, their concentrations have increased by 38 percent, 149 percent, and 23 percent, respectively, from the preindustrial era (1750) to 2007–2008 (USEPA 2009).

Federal agencies address emissions of GHGs by reporting and meeting reductions mandated in laws, executive orders (EOs), and policies. The most recent of these are EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance (signed on October 5, 2009), and EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management (signed on January 24, 2007). The *Draft NEPA Guidance on Consideration of the Impacts of Climate Change and Greenhouse Gas Emissions* (CEQ 2010) states that "if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2 equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public."

3.1.2 Existing Conditions

Because air quality is measured and regulated on a regional level, the Region of Influence (ROI) for air quality in this EA is the Southern Maryland Intrastate AQCR 116 and those areas in the vicinity of the Proposed Action. Blossom Point is located in Charles County, Maryland, which has been designated by the USEPA as unclassified/attainment for all criteria pollutants except 8-hour O_3 and $PM_{2.5}$ (USEPA 2013a). According to 40 CFR Part 81, no Class I areas are located within 6.2 miles (10 kilometers, as specified by 40 CFR Part 52, Subpart A, for the distance from a major stationary source or major modification) of Blossom Point (USEPA 2013b). Class I areas are areas (national parks and wilderness areas) listed in 40 CFR Part 81, where visibility is an important value.

The most recent emissions inventories for Charles County and AQCR 116 are shown in Table 3-2. O_3 is not a direct emission, but it is generated from reactions of volatile organic compounds (VOCs) and nitrogen oxides (NO_x), which are precursors to O_3. Therefore, for the purposes of this air quality analysis, VOCs and NO_x emissions are used.

Table 3-2. Local and Regional Air Emissions Inventories for Areas Impacted by the Proposed Action (2008)

Area	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Charles County	6,283	14,457	21,605	70,706	4,547	2,874
Southern Maryland Intrastate AQCR 116	13,691	33,110	55,798	72,267	7,193	4,191

Source: USEPA 2008

Key: tpy - tons per year; VOC - volatile organic compound

3.1.3 Environmental Consequences

After reviewing the potential effects of implementing the Proposed Action under Alternatives 1 and 2, it was determined that the project-related air emissions would not result in a significant impact on air quality. What follows is the supporting analysis for this finding.

3.1.3.1 Alternative 1

3.1.3.1.1 LOS Clearing, Facility Site Preparation, and Construction

The proposed Southern Drawl antenna construction activities would generate air pollutant emissions from site-disturbing activities, operation of construction equipment, and truck-hauling activities. Construction activities associated with the installation of proposed Southern Drawl antennas, related facilities, and infrastructure would also generate particulate emissions as fugitive dust from ground-disturbing activities and from the combustion of fuels in construction equipment. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being cleared or prepared for construction and the level of construction activity. Emissions from construction activities would be produced only for the duration of the activities, which, for the purposes of this air quality analysis, is conservatively assumed to be 120 workdays or 6 months.

Construction activities would incorporate BMPs to minimize fugitive particulate matter emissions. Additionally, the work vehicles would be properly maintained and would use diesel particle filters to reduce emissions. Construction workers commuting daily to and from the job site in their personal vehicles would also create regulated pollutant air emissions.

Air emissions from antenna facility construction activities under Alternative 1 are summarized in Table 3-3. Appendix A contains detailed calculations and the assumptions used to estimate the air emissions.

Table 3-3. Estimated Air Emissions Resulting from Construction Activities under Alternative 1

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Construction Equipment Combustion	2.40	1.34	0.08	0.59	0.70	0.59	264.40
Fugitive Dust	-	-	-	-	3.79	0.38	-
Haul Truck On-Road	0.08	0.02	0.05	0.00	0.00	0.00	32.91
Construction Commuter	0.02	0.19	0.17	0.00	0.00	0.00	31.75
Total Construction Emissions	**2.50**	**1.55**	**0.30**	**0.59**	**4.49**	**0.97**	**329.06**

Notes: All activities generate emissions from mobile sources unless indicated as stationary sources.

Analysis of the proposed LOS clearing activities includes clearing the combined LOS zone, and grubbing and grading most of the upland areas, where necessary. LOS clearing activities would also generate particulate emissions as fugitive dust from ground-disturbing activities and from the combustion of fuels in construction equipment. Emissions from site-clearing activities would be produced only for the duration of the activities, which, for the purposes of this air quality analysis, is conservatively assumed to occur over 120 workdays or 6 months.

LOS clearing activities would incorporate BMPs to minimize fugitive particulate matter emissions. Additionally, the work vehicles would be properly maintained and would use diesel particle filters to reduce emissions. Construction workers commuting daily to and from the job site in their personal vehicles would also create regulated pollutant air emissions.

Air emissions from LOS clearing activities under Alternative 1 are summarized in Table 3-4. Appendix A contains detailed calculations and the assumptions used to estimate the air emissions.

Table 3-4. Estimated Air Emissions Resulting from LOS Clearing under Alternative 1

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Equipment Combustion	16.33	0.90	7.12	1.26	0.85	0.82	1,792.89
Fugitive Dust	-	-	-	-	23.48	2.35	-
Haul Truck On-Road	0.22	0.03	0.07	0.00	0.01	0.01	97.39
Commuter	0.02	0.19	0.17	0.00	0.00	0.00	31.75
Total LOS Clearing Emissions	16.57	1.12	7.35	1.27	24.34	3.18	1,922.04

Notes: All activities generate emissions from mobile sources unless indicated as stationary sources.

Air emissions would be generated by the LOS clearing, facility site preparation, and construction activities under Alternative 1; however the relatively minor amounts of pollution generated would not result in a significant impact on air quality.

3.1.3.1.2 Operations and Maintenance

For long-term operation of the Southern Drawl antennas under Alternative 1, the new 800-kW back-up generator would only be operated during power outages; and for periodic training, testing, and maintenance. The two 40-kVA emergency generators might never be operated except for periodic maintenance. Using a conservative estimate, Table 3-5 lists the estimated emissions for 500 hours of operations per year for the 800-kW generator. For detailed emissions calculations, refer to Appendix A. For the installation of the new emergency generators, the NRL would need to register the generators and might be required to obtain a permit for generator operation through the MDE. It is anticipated that operation of the emergency generators could begin as early as 2015.

Table 3-5. Estimated Air Emissions Resulting from Operation of an Emergency Generator (Alternatives 1 and 2)

NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
2.82	0.19	1.54	0.004	0.088	0.085	350.03

Long-term operation of Alternative 1 would include maintenance of the combined LOS zone. The three options for vegetation maintenance being considered are prescribed burning, mechanical removal, and the application of approved herbicides; although a combination of these methods also could be used (see Section 2.1.4 for a description of maintenance methods). For prescribed burning, a Wildland Fire Management Plan would be developed and implemented prior to the first burn. This plan would include smoke management practices and controls, such as not burning during air quality advisory days, conducting burns on days when weather and ground conditions would promote rapid dispersion, prevention of smoldering fires, use of test fires to confirm fire behavior, and burning in smaller blocks rather than large burn areas (NWCG 2001). All relevant regulations and policies pertaining to prescribed burning would be followed. Trained technical experts would manage the prescribed burns and fire-suppression equipment would be on hand whenever burns are conducted. Firebreaks (e.g., natural or man-made barriers used to halt the spread of fire) would be utilized (NWCG 2012).

Smoke from fires increases particulate and gaseous emissions, predominantly PM_{10}, CO, and CO_2 (USEPA 1995a). Prescribed burns could briefly reduce air quality and visibility in the immediate vicinity. Any adverse effects from the prescribed burns would be temporary; smoke from a prescribed burn would be of a short duration, likely less than 1 day. To minimize effects, burns would be conducted in accordance with the Wildland Fire Management Plan.

Emissions from prescribed burns are dependent on the type of vegetation consumed, weather conditions, and topographical features. Prescribed burn emissions estimates (Table 3-6) were conservatively based on average emissions factors for the region and could vary depending on exact conditions. Emissions calculations are conservatively based on the entire combined LOS clearance area for the Southern Drawl and SNEGS–E antennas (worst-case scenario). However it is anticipated that the combined LOS zone would be divided into smaller sections that would be burned on a rotational schedule once every 2 to 3 years.

Table 3-6. Estimated Air Emissions Resulting from LOS Maintenance under Alternative 1

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Prescribed Burn	1.30	-	43.40	-	6.09	6.09	41.49
Mechanical Removal	0.82	0.06	0.33	0.06	1.78	0.22	88.24
Herbicide Application	0.82	0.06	0.33	0.06	1.78	0.22	88.24

Both mechanical removal and herbicide applications are estimated to require the use of approximately three tractors over a 2-week period. As described for proposed construction equipment, tractors used for either bush hog or herbicide application would be well-maintained and would use particle filters (for diesel-powered equipment) to reduce emissions. In addition, BMPs would be incorporated to minimize fugitive particulate matter emissions. Table 3-6 summarizes emissions from these LOS maintenance options. The exact type and amount of herbicides to be used are not known at this time; however, based on common application types and amounts of approved herbicides, the annual VOC emissions from herbicide applications are expected to be minimal.

As a result, the potential impacts from the long-term operation of the new antennas and LOS maintenance activities are not expected to have a significant impact on air quality.

3.1.3.1.3 Greenhouse Gas Emissions

Implementation of Alternative 1 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Construction and LOS clearing activities would generate approximately 2,251 tons (2,042 metric tons) of CO_2 if the proposed activities occurred during 2014. Operational activities would generate approximately 438 tons (397 metric tons) of CO_2 each year, as detailed and in Appendix A. These estimated annual GHG emissions fall well below the CEQ threshold of 25,000 metric tons. Although this limited amount of emissions would not likely contribute to global warming, any emission of GHG represents a minute increase that could have incremental effects on the global atmosphere.

3.1.3.1.4 General Conformity

As stated in Section 3.1.2, Blossom Point is located in an area that has been designated as unclassified/ attainment for all criteria pollutants except for 8-hour O_3 and $PM_{2.5}$. Therefore, the General Conformity Rule requirements are potentially applicable for O_3, which is measured as VOC and NO_x emissions, and $PM_{2.5}$. Table 3-7 summarizes and compares the estimated annual air emissions from Alternative 1 for proposed construction activities and operational activities to the *de minimis* threshold limits for Charles County. Calculated air emissions from proposed construction and LOS site-clearing activities are assumed to occur in 2014. Maintenance and operational activities (including the 800-kW emergency generator) of the Proposed Action are conservatively assumed to occur yearly, beginning in 2015. In addition, the total emissions for maintenance activities are the maximum annual emissions of the three proposed LOS maintenance methods. Both construction and operational activities would be well below *de minimis* threshold limits; therefore, a General Conformity determination would not be required.

Table 3-7. Estimated Air Emissions Resulting from Construction and Operational Activities under Alternative 1

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Construction and Site-Clearing Emissions (2014)	19.07	2.67	7.65	1.86	28.83	4.15	2,251.10
General Conformity* de minimis *thresholds	***100***	***50***	***NA***	***NA***	***NA***	***100***	***NA***
Operational Emissions (2015)	4.12	0.25	44.94	0.06	6.18	6.18	438.27
General Conformity* de minimis *thresholds	***100***	***50***	***NA***	***NA***	***NA***	***100***	***NA***

Notes: All activities generate emissions from mobile sources unless indicated as stationary sources.
NA = Not Applicable.

In conclusion, the overall project-related air emissions from the implementation of Alternative 1 would not result in a significant impact on local or regional air quality.

3.1.3.2 Alternative 2

3.1.3.2.1 LOS Clearing, Facility Site Preparation, and Construction

Effects on air quality expected from the construction Alternative 2 of the Proposed Action would be similar to those described for Alternative 1. While the area of the antenna footprint to be cleared is slightly smaller than the antenna footprint of Alternative 1 (the proposed footprint size under this alternative has been reduced because of proximity to wetlands), the size of the proposed facility and the proposed construction equipment are the same for Alternative 2. Table 3-8 summarizes air emissions anticipated from antenna facility construction activities under Alternative 2. Appendix A contains detailed calculations and the assumptions used to estimate the air emissions.

Table 3-8. Estimated Air Emissions Resulting from Construction Activities under Alternative 2

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Construction Equipment Combustion	2.40	1.34	0.08	0.59	0.70	0.59	264.40
Fugitive Dust	-	-	-	-	3.79	0.38	-
Haul Truck On-Road	0.13	0.03	0.09	0.00	0.01	0.00	56.56
Construction Commuter	0.02	0.19	0.17	0.00	0.00	0.00	31.75
Total Construction Emissions	**2.54**	**1.56**	**0.34**	**0.59**	**4.50**	**0.97**	**352.71**

Notes: All activities generate emissions from mobile sources unless indicated as stationary sources.

Analysis of the proposed LOS clearing activities includes clearing the combined LOS zone, and grubbing and grading most of the upland areas, where necessary. The proposed clearing activities for Alternative 2 would be similar to those described for Alternative 1. Air emissions from LOS clearing activities under Alternative 2 are summarized in Table 3-9. Appendix A contains detailed calculations and the assumptions used to estimate the air emissions.

Table 3-9. Estimated Air Emissions Resulting from LOS Clearing under Alternative 2

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Equipment Combustion	12.18	0.67	5.32	0.94	0.63	0.61	1,337.26
Fugitive Dust	-	-	-	-	19.01	1.90	-
Haul Truck On-Road	0.23	0.03	0.07	0.00	0.01	0.01	102.49
Commuter	0.02	0.19	0.17	0.00	0.00	0.00	31.75
Total LOS Clearing Emissions	**12.43**	**0.89**	**5.56**	**0.94**	**19.65**	**2.52**	**1,471.50**

Notes: All activities generate emissions from mobile sources unless indicated as stationary sources.
NA = Not Applicable.

3.1.3.2.2 Operations and Maintenance

For long-term operations under Alternative 2, use of the diesel-powered emergency generator would be the same as for Alternative 1. Using a conservative estimate, Table 3-5 lists the estimated emissions for 500 hours of operations per year for the 800-kW generator.

Operation of Alternative 2 would also include regular maintenance of the combined LOS zone. The options for long-term vegetation maintenance are the same as for Alternative 1, including the possibility for using a combination of options. Table 3-10 lists estimated emissions for prescribed burns, mechanical removal, and herbicide application under Alternative 2.

Table 3-10. Estimated Air Emissions Resulting from LOS Maintenance under Alternative 2

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Prescribed Burn	1.01	-	33.71	-	4.73	4.73	32.23
Mechanical Removal	0.61	0.05	0.25	0.05	1.38	0.17	66.39
Herbicide Application	0.61	0.05	0.25	0.05	1.38	0.17	66.39

3.1.3.2.3 Greenhouse Gas Emissions

Under Alternative 2, construction and LOS clearing activities would generate approximately 1,824 tons (1,654 metric tons) of CO_2 if the proposed activities occurred during 2014. Operational activities would generate approximately 416 tons (377 metric tons) of CO_2 each year, as detailed and in Appendix A. These emissions would represent a negligible contribution towards the statewide GHG inventory and an extremely negligible contribution toward the national GHG inventory previously described.

As with Alternative 1, the estimated annual GHG emissions associated with the Proposed Action fall well below the CEQ threshold of 25,000 metric tons. Although this limited amount of emissions would not likely contribute to global warming, any emission of GHG represents a minute increase that could have incremental effects on the global atmosphere.

3.1.3.2.4 General Conformity

As stated in Section 3.1.2, the installation is located in an area that has been designated as unclassified/attainment for all criteria pollutants except for 8-hour O_3 and $PM_{2.5}$. Therefore, the General Conformity Rule requirements are potentially applicable for O_3, which is measured as VOC and NO_x emissions, and $PM_{2.5}$. Table 3-11 summarizes and compares the estimated annual air emissions from Alternative 2 for proposed construction activities and operational activities to the *de minimis* threshold limits for Charles County. Calculated air emissions from proposed construction, LOS site clearing and maintenance, and operational activities of the Proposed Action would be well below *de minimis* threshold limits; therefore, a General Conformity determination would not be required.

Table 3-11. Estimated Air Emissions Resulting from Construction and Operational Activities under Alternative 2

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Construction and Site-Clearing Emissions	14.97	2.45	5.90	1.53	24.15	3.49	1824.21
General Conformity* de minimis *thresholds	***100***	***50***	***NA***	***NA***	***NA***	***100***	***NA***
Operational Emissions	3.83	0.24	35.25	0.05	4.82	4.82	416.42
General Conformity* de minimis *thresholds	***100***	***50***	***NA***	***NA***	***NA***	***100***	***NA***

Notes: All activities generate emissions from mobile sources unless indicated as stationary sources.
NA = Not Applicable.

3.1.3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. Existing conditions would generally remain the same as described in Section 3.1.2. No new effects on regional or local air quality would occur.

3.2 Biological Resources

3.2.1 Definition of Resource/Regulatory Background

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species; designated or proposed critical habitat; species of concern managed under conservation agreements or management plans; and state-listed

species. Biological resources relevant to this EA include wildlife (i.e., fauna and flora) and protected species (i.e., threatened and endangered species, bald and golden eagles, and migratory birds).

Threatened and Endangered Species. The ESA of 1973 and subsequent amendments provide for conservation of threatened and endangered species of animals and plants and the habitats in which they are found. Consultations are conducted as required under Section 7 of the ESA for any action that "may affect" a federally listed threatened or endangered species, or a designated or proposed critical habitat. Although protection of species that are listed at the state level as threatened or endangered is not legally mandated for federal agencies, cooperation with states is encouraged to protect such species where such protection does not conflict with the legal authority, military mission, or operational capabilities of the installation (DOD Instruction 4715.03, *Natural Resources Conservation Program*).

Bald and Golden Eagles. In August 2007, the bald eagle (*Haliaeetus leucocephalus*) was removed from the federal endangered species list, and in April 2010 it was removed from Maryland's list of threatened and endangered species. However, they are still afforded legal protection under the BGEPA and the MBTA. The BGEPA prohibits anyone without a permit from "taking" bald eagles. The BGEPA prohibits the take, possession, or transport of bald eagles; golden eagles (*Aquila chrysaetos*); and the parts (e.g., feathers, body parts), nests, or eggs of bald and golden eagles without authorization from the U.S. Fish and Wildlife Service (USFWS). This includes both inactive and active nests.

Migratory Birds. The MBTA of 1918 is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits taking, killing, or possessing migratory birds unless permitted by regulation.

3.2.2 Existing Conditions

This section describes the existing wildlife, including protected species occurring at Blossom Point. For purposes of analyzing biological resources, this EA limits the ROI to areas in the vicinity of the proposed Southern Drawl antenna footprint and operations, and combined Southern Drawl and SNEGS–E LOS.

3.2.2.1 Wildlife

The installation is suitable for many species of wildlife because of the diversity of habitats. Blossom Point includes some large tracts of relatively undisturbed land consisting primarily of mixed hardwood, evergreen forest, and marshland. The most common game species is the white-tailed deer (*Odocoileus virginianus*). Other wildlife includes gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), bob white (*Colinus virginianus*), mourning dove (*Zenaida macroura*), black duck (*Anas rubripes*), and wood duck (*Aix sponsa*). Mammals include opossum (*Didelphis virginiana*), mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), striped skunk (*Mephitis mephitis*), beaver (*Castor canadensis*), raccoon (*Procyon lotor*), and gray fox (*Urocyon cinereoargenteus*) (PBS&J 2009).

Wildlife species observed during the August 2013 wetland delineation at Blossom Point included several birds, reptiles, amphibians, and mammals. Reptiles and amphibians observed included the black racer (*Coluber constrictor*), 5-lined skink (*Plestiodon fasciatus*), eastern box turtle (*Terrapene carolina carolina*), mud turtle (*Kinosternon subrubrum*), and Fowler's toad (*Bufo fowleri*). The white-tailed deer, eastern cottontail, and beaver were the mammal species observed during the delineation.

Blossom Point has a relatively small amount of land classified as improved grounds, which includes areas around the occupied buildings and contain a mixture of Kentucky bluegrass (*Poa pretensis*) and tall fescue (*Schedonorus arundinaceus*). Semi-improved grounds, which include impact areas and test ranges, are dominated by a mixture of tall fescue, white clover (*Trifolium repens*), and annual and

perennial weeds. The largest portion of the facility is classified as unimproved grounds. Distinct forest types existing on the installation include Virginia pine (*Pinus virginiana*), loblolly pine (*Pinus taeda*), southern red oak (*Quercus falcata*), and white oak (*Quercus alba*). Tree cover consists of natural stands of red maple (*Acer rubrum*), oaks, black locust (*Robinia pseudoacacia*), black walnut (*Juglans nigra*), sweetgum (*Liquidambar styraciflua*), blackgum (*Nyssa sylvatica*), tuliptree (*Liriodendron tulipifera*), red cedar (*Juniperus virginiana*), and American holly (*Ilex opaca*) (USACE 2013b, PBS&J 2009). Shrubs and small trees include wax myrtle (*Morella cerifera*), autumn olive (*Elaeagnus umbellata*), dogwood (*Cornus* spp.), mountain laurel (*Kalmia latifolia*), and sweetbay magnolia (*Magnolia virginiana*) (USACE 2013b, USAG and NAVFAC 2013).

Wetland forests are dominated by red maple, black gum, and sweet gum. The shrub layer contains American holly and highbush blueberry (*Vaccinium corymbosum*). Herbaceous species include cattail (*Typha latifolia*), sedges (*Carex* spp.), soft rush (*Juncus effusus*), and marsh pepper (*Polygonum* spp.). Within wetlands along the Potomac River, common reed (*Phragmites australis*) and saltmeadow cordgrass (*Spartina patens*) are common (USACE 2013b). Wetlands on Blossom Point also contain large concentrations of giant cordgrass (*Spartina cynosuroides*) and rose mallow (*Hibiscus moscheutos*) (USAG and NAVFAC 2013). Sweetgum is prevalent in the previously cut SNEGS–E LOS area as a result of stump sprouts and seed establishment from local sources (NAVFAC HQ 2013).

3.2.2.2 Protected Species

Threatened and Endangered Species. There are no records of federal- or state-listed threatened or endangered species at Blossom Point (USFWS 2013, A. Morton Thomas and Associates, Inc. 2008).

Bald and Golden Eagles. There are several resident breeding pairs of bald eagles at Blossom Point. Figure 3-1 shows locations of nests, both active and inactive, identified during prior ground surveys, and during aerial surveys conducted in March and April 2014 by The Center for Conservation Biology (CCB 2014a, 2014b).

Migratory Birds. Many of the bird species at Blossom Point, excluding rock pigeons, mourning doves, starlings, and house sparrows, are protected under the provisions of the MBTA (16 U.S.C. § 703 et seq.) of 1918. Migratory bird species observed at Blossom Point during the August 2013 site visit include the bald eagle, great blue heron (*Ardea herodias*), osprey (*Pandion haliaetus*), and great horned owl (*Bubo virginianus*).

3.2.3 Environmental Consequences

After reviewing the potential effects of implementing the Proposed Action under Alternatives 1 and 2, it was determined that the project-related activities would not result in a significant impact on biological resources. What follows is the supporting analysis for this finding.

3.2.3.1 Alternative 1

3.2.3.1.1 LOS Clearance, Facility Site Preparation, and Construction

3.2.3.1.1.1 Wildlife

The proposed Southern Drawl antenna clearance, facility site preparation, and construction for Alternative 1 would entail the clearing of approximately 1.4 acres of forested (upland and wetland) area. Within the combined LOS zone and for new logging roads outside the LOS, Alternative 1 would require the clearance of approximately 32.6 acres of forested upland and wetlands, not including areas previously cleared for the SNEGS–E antenna project. Following the clearing of all trees within the antenna facility

Figure 3-1. Blossom Point Bald Eagle Nests

footprint and combined LOS zone (not necessarily at the same time), the footprint for the antenna facility would be readied for construction, while most of the upland areas within the LOS would be grubbed and graded, where necessary. For those wetland areas within the LOS that are cleared of trees, no grubbing or grading would occur. A summary of the forest and wetland acreage affected by clearing and construction activities is provided in Table 2-1.

Wildlife would likely temporarily flee the area as a result of noise disturbances associated with construction activities and initial clearance. Some wildlife species occurring in the vicinity of the proposed project area would be expected to have adapted to the variety of noise levels associated with the installation and could move back into the area following site development and clearance.

Long-term, direct, moderate, adverse impacts could occur from the mortality of small less-mobile terrestrial species (e.g., reptiles, rodents, and small mammals) as a result of construction, grubbing, and grading activities; and the loss of habitat within the antenna footprint.

Grading and clearing operations at the proposed antenna site would be temporary and necessary environmental permits would be obtained. Long-term alteration of the vegetative cover could affect the aquatic environment indirectly, though forestry BMPs and practices to control erosion and sedimentation during clearing and construction activities would be implemented to minimize potential impacts on adjacent forested habitats, aquatic environments, and surface waters.

After completion of the initial clearing, grubbing, and grading activities within the LOS, these areas would be stabilized using techniques that are consistent with MDE standards and specifications for soil erosion and sedimentation control (e.g., seeding, mulching, and silt fencing) (MDE 2011b). The cleared areas likely would result in some beneficial impacts for wildlife that utilize early successional habitat, such as successional bird species (Askins et al. 2012). Additionally, setback of plant development and succession could increase forage quality or quantity in the short term for white-tailed deer. There would be the potential for invasive species to colonize the disturbed areas; however, these areas would be managed in accordance with the Invasive Species Management Plan for Blossom Point (USACE 2013a). The plan complies with EO 13112, Invasive Species, which requires federal agencies to prevent the introduction of invasive species, control and monitor populations of such species, and provide for restoration of native species and habitat conditions in ecosystems that have been invaded.

Habitat patchiness would also increase, providing abundant edge habitat and diverse vegetation. Species that depend on vegetation for forage, cover, and thermal protection could be harmed if an excess amount of vegetation is removed. Although white-tailed deer forage quantity or quality could increase, deer populations might not be able to take advantage of the improvement because of exposure to human activity (Innes 2013). Although the Proposed Action would result in the conversion of 32.6 acres of forested upland and wetlands to open field/scrub-shrub and emergent wetland habitat, there is abundant forested habitat adjacent to areas of impact, and consequently most wildlife would relocate to such habitats. The removal of forest areas would also decrease the amount of mast production (e.g., acorns, berries, and nuts from trees) that wildlife forage on. However, the early successional plant species that might colonize the cleared areas would produce other food for wildlife. These plant species include wild strawberry (*Fragaria sp*.), raspberry (*Rubus spp*.), and blackberry (*Rubus spp*.) (DeGraaf and Yamasaki 2003).

Clearing of the combined LOS could result in adverse impacts on forest interior dwelling birds (FIDS) from increased exposure to predation from raptors (Benson et al. 2010) or the potential for increased nest parasitism from brown-headed cowbirds (Robinson et al. 1993). FIDS are an integral part of Maryland's landscape and natural heritage. Forest fragmentation results in both direct and indirect impacts for FIDS by reducing both the quantity and quality of forest habitat available to FIDS. Many forest tracts are too

small to support species with large breeding territories, such as the red-shouldered hawk, barred owl, and pileated woodpecker (Jones et al. 2000).

3.2.3.1.1.2 Protected Species

Bald and Golden Eagles. There are no bald eagle nests on or adjacent to the proposed antenna footprint under Alternative 1. Noise and human presence during construction of the proposed project could disturb eagles in the vicinity. However, all construction for the proposed project would be executed outside of the bald eagle nesting period (mid-December to June) to lessen the likelihood of impacts on nearby nesting eagles.

LOS clearance under Alternative 1 would include removal of one active bald eagle nest (nest #1 on Figure 3-1). The nest, which is located within the combined LOS zone, would be removed when the trees and surrounding vegetation are removed. Vegetation falling within the LOS would be removed at ground level and maintained at that height for the life of the antennas. Nest removal would only occur outside of the breeding season (mid-December to June) to ensure the nest is considered inactive. It is anticipated that the nest would not be able to be removed intact and would be destroyed when trees are cleared. In accordance with the BGEPA and USFWS regulations (50 CFR §22.27), a federal permit application for the take of the bald eagle nest was submitted to the USFWS in December 2013. The application, however, included two other potential eagle nests within the Alternative 1 combined LOS zone, which were based on 2013 ground surveys. Since then, subsequent aerial surveys have not been able to locate the two additional nest sites (CCB 2014a, 2014b). A copy of the application and earlier survey map are provided in Appendix B.

The nearest nest that would remain (inactive nest #2 on Figure 3-1) is approximately 60 feet outside of the combined LOS for Alternative 1, which is well within the buffer zones recommended by USFWS (see Table 3-12). There is the potential for an inactive nest to become active before the clearing and construction activities commence; however, the likelihood that a nest will again become active decreases the longer it goes unused (USFWS 2007). Based on prior surveys, nest #2 appears to have been inactive at least since May 2013 (CCB 2013, 2014a, 2014b). Measures would be taken to avoid disturbing any nesting bald eagles as per recommendations in the National Bald Eagle Management Guidelines (USFWS 2007).

Migratory Birds. Clearing of the proposed antenna site and combined LOS zone could result in adverse impacts on migratory birds. Although no take (e.g., wound, kill, or capture) of migratory birds is expected to occur during the clearing and construction activities, the direct loss of forest habitat would result in smaller forest tracts that may no longer be adequate to accommodate a bird's territory for providing ample food supply or to provide the necessary forest structure for breeding. However, there is abundant forested habitat in adjacent areas, and consequently birds would be expected to relocate to such habitats. In addition, conducting the timber clearing operations outside of the migratory bird nesting season (April–August) would help to ensure that the MBTA is not violated and that there would be no take of migratory birds, their nests, or eggs.

For those bird species that specialize in early successional or open scrub-shrub type habitat—such as the Indigo bunting (*Passerina cyanea*), American goldfinch (*Carduelis tristis*), red-winged blackbird (*Agelaius phoeniceus*), and common yellowthroats (*Geothlypis trichas*)—long-term beneficial impacts likely would occur from the clearing of the LOS (NRC undated).

In summary, beneficial and adverse effects on wildlife would be expected from this alternative. However, the activities associated with LOS clearing, facility site preparation, and construction under Alternative 1 are not expected to have a significant impact on wildlife and their habitats.

Table 3-12. USFWS Management Recommendations for Avoiding Bald Eagle Disturbance in the Vicinity of Nests as a Result of Proposed Activities

Visibility from Nest	No similar activity currently within 1 mile of the nest	Similar activity is closer than 1 mile from the nest
If the activity will be visible from the nest.	660 feet. Landscape buffers are recommended.	660 feet or as close as existing tolerated activity of similar scope. Landscape buffers are recommended.
If the activity will not be visible from the nest.	Category A: 330 feet. Clearing, external construction, and landscaping between 330 and 660 feet should be done outside the breeding season. Category B: 660 feet.	330 feet or as close as existing tolerated activity of similar scope. Clearing, external construction, and landscaping within 660 feet should be done outside the breeding season.

Notes:

The numerical distances shown in the table are the closest the activity should be conducted relative to the nest. Note that these guidelines may not be warranted if the nest has not been active during the preceding five breeding seasons; however, the nest itself remains protected by the BGEPA.

Category A Activities:

- Building construction, one or two story, with project footprint of 0.5 acre or less.
- Construction of roads, trails, canals, power lines, and other linear utilities.
- Agriculture and aquaculture (new or expanded operations).
- Alteration of shorelines or wetlands.
- Installation of docks or moorings.
- Water impoundment.

Category B Activities:

- Building construction, three or more stories.
- Building construction, one or two story, with project footprint of more than 0.5 acre.
- Installation or expansion of marinas with a capacity of six or more boats.
- Mining and associated activities.
- Oil and natural gas drilling and refining, and associated activities.

Modified from: USFWS 2007

3.2.3.1.2 Operations and Maintenance

During long-term operation of the Southern Drawl antennas, occasional personnel activities and periodic noise from back-up generators are not expected to have a significant effect on wildlife in the vicinity, including protected species. As for long-term maintenance of the combined LOS area, the following subsections describe the potential effects of vegetation management. Three methods are analyzed—prescribed burning, mechanical removal, and the application of herbicides—although a combination of these methods also could be used. For any given area of the LOS, maintenance activities are expected to occur once every 2 to 3 years, depending on the rate of vegetation growth.

3.2.3.1.2.1 Wildlife

Information on the short-term effects of burning ground vegetation was primarily obtained from U.S. Department of Agriculture (USDA 2000) unless otherwise noted. Despite the perception by the general public that wildland fire is devastating to animals, fires generally kill and injure a relatively small proportion of animal populations. The season of the burn is often an important variable in fauna mortality. A second popular concept regarding animals' response to fire is that they leave the area permanently as soon as fire is detected. While non-burrowing mammals and most birds do leave their habitat while it is burning, many return within hours or days. Others emigrate because the food and cover they require are not available during the burn. The length of time before these species return depends on how much fire altered the habitat structure and food supply. Many animals are actually attracted to fire, smoke, and recently burned areas because of accessibility to food resources. In general, prescribed fires can benefit wildlife and habitats by reducing fuel loads and wildfire hazards, recycling nutrients,

increasing biodiversity, and improving habitat for certain wildlife (e.g., early successional species) (Knapp et al. 2009).

Birds. In forested areas, fire effects on birds vary among species. In a report summarizing the responses of 203 North American species, some patterns were apparent. Aerial, ground, and bark insectivores clearly favored burned habitats, whereas foliage gleaners (gatherers) preferred unburned habitats. Species with closed nests responded more favorably to burned habitats than species with open-cup nests, and those nesting in the ground and canopy layers generally favored burned habitats compared to shrub nesters (Saab and Powell 2005).

Mammals. Most small mammals seek refuge underground or in sheltered places within the burn area, whereas large mammals must find a safe location in unburned patches or outside the burn. Direct fire-caused mortality has been reported for large and small mammals. Large mammal mortality is most likely when fire fronts are wide and fast-moving, fires are actively crowning, and thick ground smoke occurs. However, this would likely not occur, as a Wildland Fire Management Plan would be implemented prior to the first burn.

Reptiles and Amphibians. According to a review by Russell et al. (1999), there are few reports of fire-caused injury to herpetofauna, even though many of these animals, particularly amphibians, have limited mobility. Many reptiles and amphibians live in mesic (moderately moist) habitats, which are likely to burn less severely than upland sites. Wetlands provide refuge from fire, and activities such as breeding by aquatic species can be carried out with little interruption by fire.

Invertebrates. The vulnerability of insects and other invertebrates to fire depends on their location at the time of fire. While adult forms can burrow or fly to escape injury, species with immobile life stages that occur in surface litter or aboveground plant tissue are more vulnerable. However, aboveground microsites, such as the unburned center of a grass clump, can provide protection (Robbins and Myers 1992). Fires can have various effects on invertebrates, depending on the season and the life-cycle stage of the species at the time of the burn.

Soil Microorganisms. How microorganisms respond to fire depends on numerous factors, including fire intensity and severity, site characteristics, and preburn community composition. Most studies have shown strong resilience by microbial communities to fire. Recolonization to preburn levels is common, with the amount of time required for recovery generally varying in proportion to fire severity. The effect of fire is greatest in the forest floor (litter and duff) (USDA 2005).

Invasive Species. The generalization that fire favors nonnatives over natives is supported by the literature for some nonnative species in some plant communities under some conditions. Nonnative plants that survive on site, establish from the seed bank, or disperse seed into burns soon after fire have early access to resources that are more plentiful or more available after fire. To what degree they will dominate, and for how long, is less clear. Nonnative invasive species show some patterns in their responses to wildland fire. Postfire invasions can be intense and lead to severe impacts on native communities; however, invasions also vary with numerous site and climatic factors, depend on the nonnative propagating vegetative structure (e.g., seeds and spores) within and near the burn, and can be short-lived (USDA 2008).

The option of mechanical removal requires the use of heavy equipment that can harm wildlife and its natural habitat. Most ground-dwelling wildlife, including deer, quail, and turkey, nest or give birth from April until August. A rearing period adds 2 to 4 weeks after the birth, when they remain vulnerable to tractor equipment. To reduce harming wildlife this time of year, vegetation removal would be delayed until after the primary nesting/breeding season. If mechanical removal must occur during this time, it would be done from the center outward to allow wildlife to escape.

Application of herbicides for vegetation removal can expose wildlife to chemicals. Wildlife risk assessment considers pesticide behavior in the environment and routes of exposure. Direct exposure can occur when mammals and birds contact pesticide residues with their skin or eyes or when they inhale vapors or particulates. Indirect exposure to mammals and birds can occur when they eat contaminated prey or vegetation. Appropriate herbicides that may be used, such as glyphosate and Garlon 3A, are non-toxic to most wildlife and can even be applied during the nesting season with little disturbance to wildlife.

In terms of biological uptake, glyphosate is poorly absorbed from the digestive tract and is largely excreted unchanged by mammals. Glyphosate has no significant potential to accumulate in animal tissue. Glyphosate is practically non-toxic to fish; "Roundup" was found to be more toxic to fish than glyphosate. An additive used in the "Roundup" formulation was found to be more toxic to fish than many common surfactants. Other formulations of glyphosate recommended by the USEPA for use in wetland environments (MDNR 2014) omit the "Roundup" additive. The surfactant is used to allow the compound to dissolve readily in solution and to keep the compound from balling up on the leaf surface. There is a very low potential for the compound to build up in the tissues of aquatic invertebrates or other aquatic organisms (Cornell 1994). Glyphosate also has been evaluated for toxicity to bobwhite quail and mallard duck in laboratory studies. These species are surrogates for wild avian species that might be exposed to herbicides through various exposure routes. In dietary studies, in which the birds consumed a treated diet for 5 days, glyphosate had no effects at the highest dose tested (Monsanto 2002). Reproductive tests indicated that no adverse effects on avian reproduction or hatchling development would be expected from normal use of glyphosate (Monsanto 2002). The exposure of birds to glyphosate in the environment is predicted to occur at much lower levels than the levels evaluated in the laboratory studies. In addition, glyphosate has been shown to dissipate rapidly from treated vegetation, and such vegetation becomes unpalatable within 1 to 3 weeks after treatment (Monsanto 2002).

Triclopyr is the active ingredient in the herbicide Garlon 3A. Fish and aquatic insect exposure to triclopyr occurs primarily through direct contact with contaminated surface waters (WSDOT 2006). Triclopyr is practically non-toxic to mammals, birds, fish, and aquatic insects (USEPA 1998). Data from animal studies indicate that triclopyr is rapidly eliminated via the urine as the unchanged parent compound. Reported half-lives for elimination of triclopyr from mammals are 14 hours (dogs) and less than 24 hours (monkeys). The reproduction of birds were found only to be affected at triclopyr levels greater than 100 parts per million (ppm) (USEPA 1998). Because of their low toxicity, the proper application of these herbicides would result in no appreciable impacts on wildlife.

3.2.3.1.2.2 Protected Species

Threatened and Endangered Species. There are no federal- or state-listed threatened or endangered species documented or known to occur on or adjacent to the site; therefore, no impacts would be expected as a result of implementing Alternative 1.

Bald and Golden Eagles. Operations and maintenance activities under Alternative 1 could disturb bald eagles using the areas adjacent to the LOS. There is also the potential for a nearby inactive nest (nest #2 on Figure 3-1) to become active before the maintenance activities commence. However, prescribed burns would occur outside of the nesting season (mid-December to June).

Mortality from mechanical removal on bald eagles is considered unlikely, as they are highly mobile and can avoid mechanical removal equipment and activities. Mechanical-removal activities also would occur outside of the eagle nesting season (mid-December to June).

The herbicides glyphosate and triclopyr (Garlon 3A) have been evaluated for toxicity to bird species in laboratory studies (see Section 3.2.3.1.2.1). Mortality from herbicide application on bald eagles is

considered unlikely, as they are highly mobile and can avoid equipment and activities. The proper use of glyphosate- and triclopyr-containing herbicides is not expected to pose a risk to bald eagles.

Migratory Birds. Impacts on migratory birds could be classified as both beneficial and adverse. Mortality from fire on migratory birds is considered unlikely, as they are highly mobile and avoidance of heat and gases associated with fires is relatively easy. Fires that occur during the nesting season can cause some mortality by destroying nests and killing young birds. However, prescribed burns would occur outside of the nesting season (April–August). Conducting the burns at other times of the year would help to ensure that the MBTA is not violated and that there would be no take of migratory birds, their nests, or eggs. Prescribed burning often provides temporary, short-term benefits to some bird species, while simultaneously reducing habitat suitability for others. Studies have typically detected reductions in ground- and low-shrub nesting species following prescribed fires, presumably because habitat conditions in these strata were substantially altered by burning, and low-intensity fires could affect overall community structure by benefiting species requiring snags and open understories (Geo-Marine, Inc. 2013).

Mortality from mechanical removal on migratory birds is considered unlikely, as they are highly mobile and can avoid mechanical-removal equipment and activities. Mechanical-removal activities also would occur outside of the nesting season (April–August).

Glyphosate and Garlon 3A herbicides are nontoxic to most wildlife (Monsanto 2002, USEPA 1998), including migratory birds. In 1993, when glyphosate was reregistered in the United States, USEPA determined that the effects of glyphosate on birds are minimal (Monsanto 2002). Triclopyr, the active ingredient in Garlon 3A, is practically nontoxic to birds (USEPA 1998). Mortality from herbicide application on migratory birds is considered unlikely, as they are highly mobile and can avoid equipment and activities.

As a result, the long-term operation of the new antennas and LOS maintenance activities are not expected to have a significant impact on wildlife species. In conclusion, overall project-related activities associated with the implementation of Alternative 1 would not result in significant impacts on biological resources.

3.2.3.2 Alternative 2

3.2.3.2.1 LOS Clearance, Facility Site Preparation, and Construction

3.2.3.2.1.1 Wildlife

Impacts on wildlife associated with LOS clearance, facility site preparation, and construction under Alternative 2 would be similar in type to those described in Alternative 1. Under Alternative 2, impacts on vegetation would be similar to, but less (in acreage) than those described for Alternative 1 (see Table 2-1). The Alternative 2 proposed Southern Drawl antenna site construction would entail the clearing of approximately 2.7 acres of forested (upland and wetland) area. The Alternative 2 combined LOS zone, along with new logging roads outside the LOS, would require the clearance of approximately 24.8 acres of forested upland and wetlands, not including areas previously cleared for the SNEGS–E antenna project.

3.2.3.2.1.2 Protected Species

Threatened and Endangered Species. There are no federal- or state-listed threatened or endangered species documented or known to occur on or adjacent to the site; therefore, no impacts on threatened and endangered species would be expected as a result of implementing Alternative 2.

Bald and Golden Eagles. Impacts on bald eagles would be slightly greater than those described for Alternative 1. LOS clearance under Alternative 2 would include removal of one active and one inactive

bald eagle nest (nests #1 and #2 on Figure 3-1). In accordance with the BGEPA and USFWS regulations (50 CFR §22.27), a federal permit application for the take of the bald eagle nests was submitted to the USFWS in December 2013. As previously mentioned, the application included two other potential eagle nests in the vicinity that were based on 2013 ground surveys. Since then, subsequent aerial surveys have not been able to locate the two additional nest sites (CCB 2014a, 2014b). A copy of the application and earlier survey map are provided in Appendix B.

The next closest nest that would remain is an inactive nest located approximately 600 feet south of the combined LOS for Alternative 2, which is within the 660-foot buffer zone recommended by USFWS (USFWS 2007). There is the potential for an inactive nest to become active before the clearing and construction activities commence; however, the likelihood that a nest will again become active decreases the longer it goes unused (USFWS 2007). Based on prior surveys, the nest to the south appears to have been inactive at least since May 2013 (CCB 2013, 2014a, 2014b). Based on recommendations in the National Bald Eagle Management Guidelines (USFWS 2007), measures would be taken to avoid disturbing any nesting bald eagles.

Adverse effects on bald eagles would be expected from this alternative.

Migratory Birds. Impacts on migratory birds (both beneficial and adverse) would be similar in type to those described in Alternative 1; however, the amount of upland and wetland forest acreage habitat cleared would be less (6.6 fewer acres would be affected).

3.2.3.2.2 Operations and Maintenance

3.2.3.2.2.1 Wildlife

Impacts on wildlife due to operations and maintenance associated with Alternative 2 would be similar in type to those described in Alternative 1.

3.2.3.2.2.2 Protected Species

Threatened and Endangered Species. There are no federal- or state-listed threatened or endangered species documented or known to occur on or adjacent to the site; therefore, no impacts on threatened and endangered species would be expected as a result of operations and maintenance under Alternative 2.

Bald and Golden Eagles. Impacts on bald eagles would be similar to those described for Alternative 1.

Migratory Birds. Impacts on migratory birds (both beneficial and adverse) would be similar in type to those described in Alternative 1; however, several fewer acres of habitat would be affected by long-term maintenance of the combined LOS zone.

3.2.3.3 No Action Alternative

The No Action Alternative would not result in changes in biological resources if the Proposed Action were not implemented. Under the No Action Alternative, the Southern Drawl antennas, related infrastructure and clearance, and the expansion of the SNEGS–E LOS would not occur. No impacts on biological resources would be expected.

3.3 Water Resources

3.3.1 Definition of Resource/Regulatory Background

Water resources include natural and man-made sources of water that are available for use by and for the benefit of humans and the environment. Hydrology concerns the distribution of water-to-water resources

through the processes of evapotranspiration, atmospheric transport, precipitation, surface runoff and flow, and subsurface flow. Water resources discussed in this EA include wetlands, storm water, and floodplains, as those are the water resources that are present and could be impacted by the Proposed Action. Groundwater resources would not be impacted by the Proposed Action and are, therefore, not discussed here.

The federal Water Pollution Control Act, as amended by the CWA, is intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The CWA regulates the discharge of pollutants into waters of the United States. The CWA, as amended in 1987, requires each state to establish water quality standards for its surface waters derived from the amount of pollutants that can be assimilated by a body of water without deterioration of a designated use.

3.3.1.1 Wetlands

The USACE and the USEPA define jurisdictional wetlands as areas that are inundated or saturated by surface or groundwater 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 (33 CFR § 328.3). USACE regulates the discharge of dredged or fill material in jurisdictional wetlands pursuant to Section 404 of the CWA and regulations contained in 33 CFR §§ 320–330. EO 11990, Protection of Wetlands, requires that federal agencies minimize any significant action that contributes to the loss or degradation of wetlands and that action be initiated to enhance their natural value.

3.3.1.2 Storm Water

The CWA (33 U.S.C. § 1251 et. seq., as amended) establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES), 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 waters. The NPDES program regulates the discharge of point (i.e., end of pipe) and nonpoint sources (i.e., storm water) of water pollution. The Maryland NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to obtain coverage under an NPDES permit for their storm water discharges. Construction or demolition that necessitates a permit also requires preparation of a Notice of Intent to discharge storm water and a Storm Water Pollution Prevention Plan that is implemented during construction.

In 2010, the USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES storm water permits issued by the USEPA or states must incorporate requirements established in the Final Rule. As of February 1, 2010, all new construction (or demolition) sites that disturb 1 acre or more of land are required to meet the non-numeric effluent limitations and effective erosion and sedimentation controls must be designed, installed, and maintained. These include the following:

- Control storm water volume and velocity to minimize erosion.
- Control storm water discharges including both peak flow rates and total storm water volume.
- Minimize the amount of soil exposed during construction activities.
- Minimize the disturbance of steep slopes.
- Minimize sediment discharges from the site using controls that address factors such as the amount, frequency, intensity, and duration of precipitation; the nature of resulting storm water runoff; and soil characteristics, including the range of soil particle sizes expected to be present on the site.

- Provide and maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration where feasible.
- Minimize erosion at outlets and downstream channel and stream bank erosion.
- Minimize soil compaction and preserve topsoil where feasible.

To prevent adverse impacts from storm water runoff, the State of Maryland has developed performance standards that must be met at development sites, which apply to any construction activity disturbing 5,000 square feet (0.11 acre) or more of earth, including those on federal properties. An approved Erosion-and-Sediment-Control Plan (ESCP) and storm water management plan, per MDE's erosion- and sediment-control regulations (COMAR 26.17.01, Erosion and Sediment Control) and storm water management regulations (COMAR 26.17.02, Stormwater Management), would be required. Maryland's Stormwater Management Act of 2007 requires establishing a comprehensive process for storm water management approval and implementing Environmental Site Design (ESD) to the maximum extent practicable. ESD uses onsite storm water management practices to conserve or restore natural site hydrology. In addition, Section 438 of the Energy and Independence and Security Act (42 U.S.C. § 17094) establishes storm water design requirements for federal development and redevelopment projects. Under these requirements, federal facility projects disturbing greater than 5,000 square feet (0.11 acre) 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."

The State of Maryland also has regulations on forestry operations. Forestry operations that disturb in excess of 5,000 square feet (0.11 acre) in Maryland must develop and adhere to an ESCP for Forest Harvest Operations. Harvests on state and federal land require ESCP approval by MDE.

3.3.1.3 Floodplains

Floodplains are areas of low-lying ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain, melting snow, tidal surges, or wind-driven surges. Floodplain ecosystem functions include natural moderation of floods, flood storage, and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and habitat for a diversity of plants and animals. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year. Risk of flooding is influenced by local topography, the frequency of precipitation events, the size of the watershed above the floodplain, and upstream development. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety. EO 11988, Floodplain Management, establishes requirements for federal agencies with respect to floodplain management and protection. If action is taken that encroaches within the floodplain and alters the flood hazards designated on a National Flood Insurance Rate Map (e.g., changes to the floodplain boundary), an analysis reflecting any changes must be submitted to FEMA.

3.3.2 Existing Conditions

At Blossom Point, the ROI for water resources includes those local surface waters and wetlands that could be adversely affected by the proposed Southern Drawl antenna support facilities or LOS clearance activities (e.g., drainage alteration or water quality degradation).

3.3.2.1 Wetlands

Field investigations were conducted from August 13 through 16, 2013, to determine the extent of wetlands and other waters of the United States in the proposed project area. The extent of jurisdictional wetlands occurring at the proposed project area was determined based on criteria established in the 1987

USACE Wetlands Delineation Manual (USACE 1987). Forested riparian wetlands, scrub-shrub wetlands, emergent non-tidal wetlands, and open marsh tidal wetlands were found within the proposed Alternative 1 and 2 LOSs and antenna footprints. Only wetlands within the antenna footprints and forested wetlands within the LOSs would be impacted by the proposed project.

Based on the site investigations conducted in August 2013, there are approximately 31 acres of wetlands in the Alternative 1 project area and approximately 36 acres of wetlands in the Alternative 2 project area (see Table 2-1). The area of delineated wetlands and waters of the United States has been reviewed for accuracy by MDE. Figure 3-2 depicts wetlands and waters in the area of the Proposed Action.

Wetland impacts resulting from construction of the SNEGS–E antenna and clearance of the SNEGS–E LOS (Revised) were authorized by the MDE Water Management Administration in a prior Letter of Authorization (LOA) (MDE 2010). The LOA permitted permanent impacts on approximately 0.10 acre of forested nontidal wetlands (for road construction and antenna infrastructure) and temporary impacts on approximately 0.09 acre of forested nontidal wetlands (within the LOS clearance area). Construction of the SNEGS–E antenna is complete. Clearance of the SNEGS–E LOS authorized by this LOA has been initiated; however, as of this writing, it is not yet complete. Approximately 0.03 acre of authorized temporary wetland impacts are located in the remaining uncleared portion of the SNEGS–E LOS (Revised).

3.3.2.2 Storm Water

The storm water system on Blossom Point primarily includes a few ditches and a retention pond and outfall that were constructed for the SNEGS–E antenna. Surface runoff from the site flows to a marshy area and through tidal wetlands before entering the Potomac River downstream of Nanjemoy Creek (A. Morton Thomas and Associates, Inc. 2008).

3.3.2.3 Floodplains

Blossom Point is located next to the tidal Potomac River and its tributaries. Shorelines, wetlands, and estuarine portions of the installation are subject to daily fluctuations in surface water level. The high tide elevation is 1 foot above mean sea level (MSL). The average daily tidal variation is 20 to 40 inches. The 100-year tidal flood elevation, established by the U.S. Army Engineer District, Baltimore, is 9 feet above MSL (PBS&J 2009). Approximately one third of the installation is located within the 100-year floodplain. Portions of the combined LOS zone are below this elevation and within the 100-year floodplain (see Figure 3-3). In addition, a portion of the Alternative 2 antenna footprint is within the 100-year floodplain.

3.3.3 Environmental Consequences

After reviewing the potential effects of implementing the Proposed Action under Alternatives 1 and 2, it was determined that the project-related activities would not result in a significant impact on water resources. What follows is the supporting analysis for this finding.

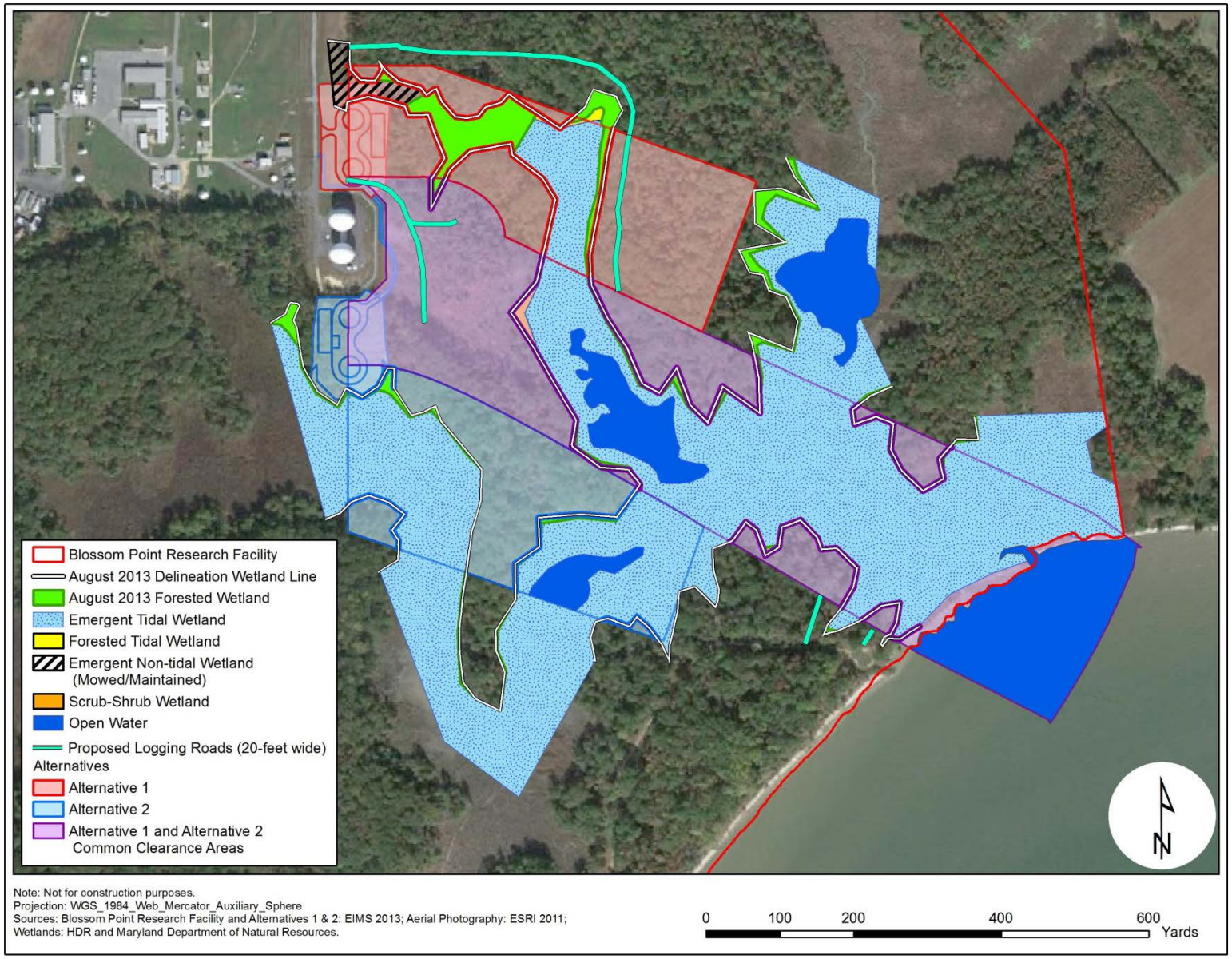

Figure 3-2. Blossom Point Jurisdictional Wetlands and Waters

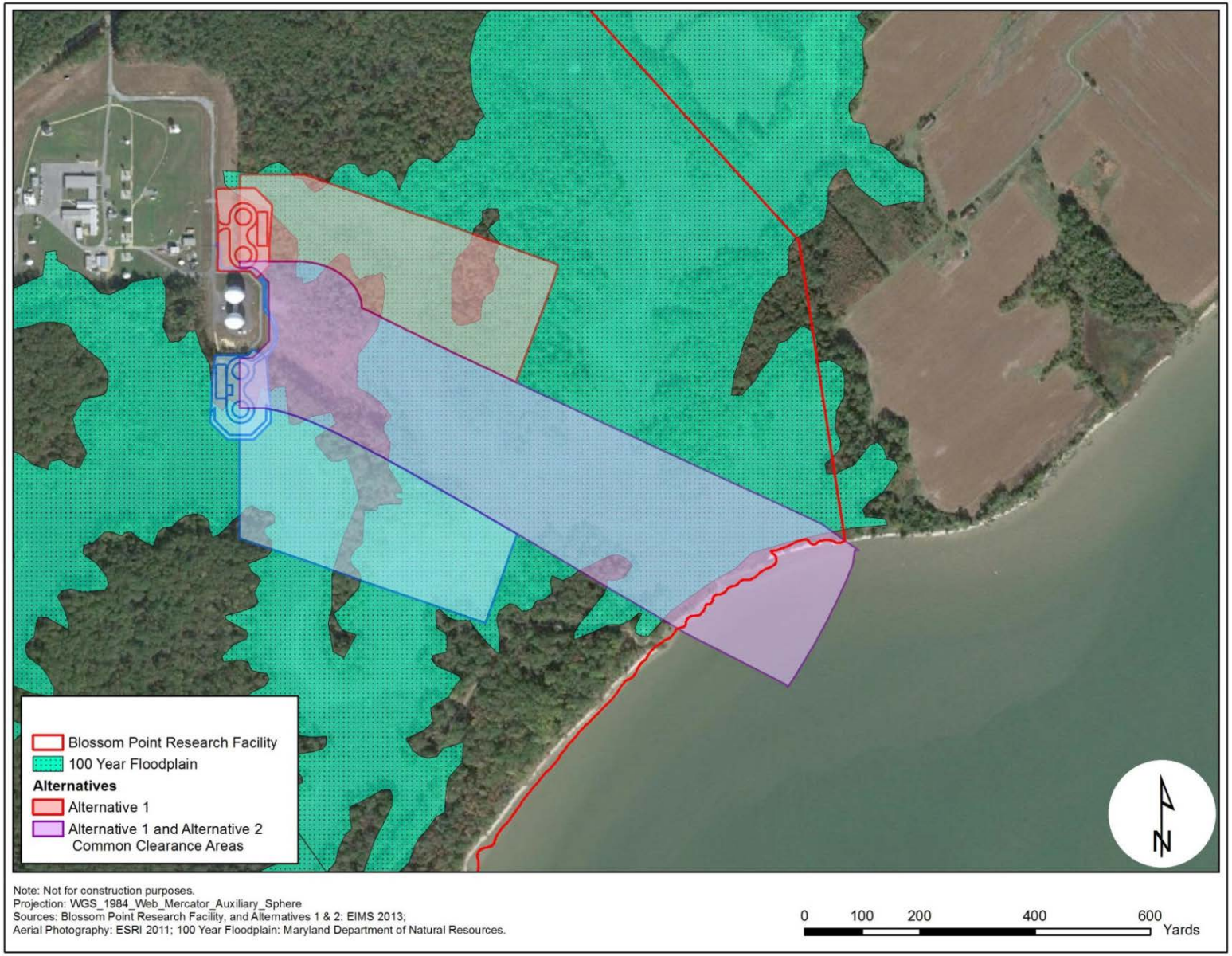

Figure 3-3. Blossom Point Floodplains

3.3.3.1 Alternative 1

3.3.3.1.1 LOS Clearance, Facility Site Preparation, and Construction

3.3.3.1.1.1 Wetlands

The implementation of LOS clearance, facility site preparation, and construction under Alternative 1 would result in the permanent loss of 0.31 acre of emergent non-tidal wetlands for the proposed Southern Drawl antenna facility, and the conversion of 3.08 acres of forested nontidal wetland areas and 0.07 acre of forested tidal wetlands to emergent wetland habitat in the combined LOS zone (see Table 2-1). Long-term alteration of the vegetative cover could affect the aquatic environment by increasing the amount and velocity of storm drainage runoff. However, this should not create a long-term increase in the amount of sediment-laden runoff. As shown on Figure 3-2, proposed logging roads are not expected to traverse any wetland areas. Additionally, no grubbing or grading would occur in wetland areas. Altered vegetative cover in the combined LOS zone would continue to buffer the effects of runoff on the wetlands because the area would not be completely denuded. For a discussion on vegetative shift and resulting effects on wildlife, see Section 3.2.3.1.1.1.

Due to expected impacts on wetland areas, necessary wetland permits would be obtained prior to proposed clearance and construction activities. Based on MDE Non-tidal Wetlands and Waterways regulations, the proposed antenna facility and LOS clearance would be considered a major project because it would impact 5,000 square feet (0.11 acre) or more of wetlands. When working within wetland areas, BMPs, such as those recommended in the Appendix G of the Maryland Non-Tidal Wetland Mitigation Guidance (MDE 2011a) and the Shore Erosion Control Guidelines (MDE 2006), would be employed to reduce impacts to the greatest extent possible. The guidance includes information on the source, quality, and placement of fill material; the maneuvering and operation of heavy equipment; proper vegetative species that will stabilize soils; and the time of year to conduct work in wetlands.

Alternative 1 is within the 1,000-foot “Critical Area” described by the Chesapeake Bay Critical Area Act (COMAR, Title 27). Activities, including the removal of vegetation, within 1,000 feet of tidal waters of the Chesapeake Bay are regulated with the intent of improving the water quality and habitat in the bay. Within the Critical Area, a minimum 100-foot buffer must be maintained around all waterways or tidal wetlands. Removal of vegetation within the Critical Area can result in increased runoff, erosion, and sedimentation of downstream waters. Because development of the antenna site and the combined LOS zone would be under the jurisdiction of the Maryland Critical Area Commission, the Navy is coordinating with the Maryland Department of Natural Resources (MDNR) and the MDE Wetlands and Waterways Program. Additionally, as part of the regulatory review process for the Proposed Action, a Coastal Consistency Determination is in preparation for distribution and review by the MDE (via the Maryland State Clearinghouse) in accordance with Maryland Coastal Zone Program guidelines and the 2013 Memorandum of Understanding (MOU) between the State of Maryland and the DOD concerning federal consistency requirements of the CZMA (Maryland and DOD 2013). As agreed upon in the MOU, the DOD is required under the CZMA to demonstrate consistency to the maximum extent practicable with the approved, enforceable policies of Maryland’s Coastal Zone Management Program.

Long-term adverse effects on wetlands would occur as a result of LOS clearance, facility site preparation, and construction under Alternative 1. Impacts on wetlands would consist of the permanent loss of 0.31 acre and the conversion of approximately 3.15 acres of forested wetlands to emergent wetlands. All necessary permits would be obtained prior to implementation. In addition, the U.S. Army, NRL, and NASA will work with the MDE and USACE to mitigate the wetland impacts, as required.

3.3.3.1.1.2 Storm Water

Approximately 2.67 acres of land would be disturbed during construction of the proposed antennas under Alternative 1, which would require clearing, grading, trenching, and excavation activities. Loss of soil structure due to compaction from foot and vehicle traffic could result in changes in drainage patterns. Soil erosion- and sediment-control measures would be included in the site plan to minimize long-term erosion and sediment production. Use of storm water-control measures that favor reinfiltration would minimize the potential for erosion and sediment production as a result of future storm events. Alternative 1 would require application for coverage under MDE's General Discharge Permit for Stormwater Associated with Construction Activity (NPDES permit MDR10). Sediment from the antenna site during construction could have an effect on the surface waters, but an ESCP and storm water management plan would be employed. Additionally, an ESCP for Forest Harvest Operations would be developed for MDE approval. These plans would include BMPs such as perimeter earth dikes, swales, sediment traps, bio-retention areas, stacked hay bales, and silt fencing, which would minimize the risk for sedimentation and erosion to occur.

Although Alternative 1 would increase impervious surface area at Blossom Point by approximately 0.96 acre, this increase would not be substantial and would have little impact on overall storm water runoff quantity or quality. The amount of realized impervious surfaces would also be greatly reduced through ESD. Benefits of ESD and subsequent minimization of impervious surfaces include the prevention of soil erosion due to decreased storm water velocity; the prevention of nonpoint source pollution; the maintenance of the chemical, physical, and biological integrity of receiving waters; and the maintenance of predevelopment groundwater recharge volume (MDE 2009).

3.3.3.1.1.3 Floodplains

Under Alternative 1, the proposed antenna facility would be almost completely outside of the 100-year floodplain. Clearing trees in the combined LOS zone would decrease storm water retention through reduced evapotranspiration and forest canopy rainfall interception (Berger et al. 2013). However because the clearing would occur over a relatively small area, there would be no significant change to the floodplain.

In summary, by using BMPs to reduce potential effects on wetlands, and to provide sediment and erosion controls and storm water management, no significant impacts on water resources would be expected during the LOS clearing, facility site preparation, and construction activities under Alternative 1.

3.3.3.1.2 Operations and Maintenance

Long-term operation of the Southern Drawl antenna facility is not expected to have a significant effect on water resources from soil erosion and sedimentation. The following subsections describe potential effects from the long-term vegetation maintenance within the combined LOS area. Three methods are analyzed—prescribed burning, mechanical removal, and the application of herbicides—although a combination of these methods also could be used. For any given area of the LOS, maintenance activities are expected to occur once every 2 to 3 years, depending on the rate of vegetation growth.

3.3.3.1.2.1 Wetlands

Typically, vegetation and leaf litter protect the soil against the forces of erosion by maintaining high infiltration rates and low levels of overland flow (Elliot and Vose 2006). Generally, prescribed fires, by design, are not intended to consume extensive layers of forest floor litter. Without sediment transport via overland flow or surface runoff, input of sediment into wetlands would be minimal following prescribed burns. If the forest floor remains intact and little to no bare soil is exposed, there is no mechanism for long-distance transport of sediment to nearby streams and wetlands, regardless of rainfall event (Elliot

and Vose 2006). Vegetation would be burned in approximately 3 acres of wetland areas in the LOS area. These sites are likely to burn less often and less severely than upland areas due to the higher moisture levels in the wetland habitats.

Mechanical-removal activities remove all or part of the aboveground portion of the target vegetation, but do not affect the root systems. This technique stimulates sprouting from some woody and herbaceous plants, and would require more maintenance and increased disturbance. It is anticipated that mechanical removal activities in the previously forested wetland areas would only be needed every 2 to 3 years to suppress woody vegetation (tree) growth. If the previously forested wetland areas revegetate with emergent species, mechanical removal might not even be necessary in the wetlands, as the emergent species might not reach a height that would interfere with antenna reception. In addition, mechanical removal would not convert the wetlands into uplands.

Vegetation management with herbicides controls both the above- and below-ground portions of the target vegetation, thus effectively preventing target vegetation from resprouting. Density of target vegetation would be reduced over time, thus lowering the quantity of herbicide needed and the frequency of application in future control operations which would reduce the disturbance to adjacent wetlands. As described in Section 2.1.4, only herbicides approved for wetland applications, such as those glyphosate formulations approved by the USEPA (MDNR 2014), would be used. If not purposefully applied to target wetland vegetation, glyphosate can enter aquatic systems through accidental spraying, spray drift, or surface runoff. From there, it dissipates rapidly from the water column as a result of adsorption and possibly biodegradation. The half-life in water is a few days. Sediment is the primary sink for glyphosate. After spraying, glyphosate levels in sediment rise and then decline to low levels in a few months (USEPA 1995b).

Similarly, Garlon 3A can reach aquatic systems through accidental spraying, spray drift, or surface runoff. Aquatic photolysis and microbial breakdown are significant degradation pathways for triclopyr, the active ingredient in Garlon 3A. Dissipation half-lives of triclopyr in surface waters range from 0.5 day to 5 days. Triclopyr is non-persistent in surface water (USEPA 1998).

3.3.3.1.2.2 Storm Water

Changes in the hydrologic cycle caused by fires—precipitation interception, infiltration, evapotranspiration, soil moisture storage, and surface flows—can affect the rate of soil erosion, and the subsequent transport and deposition of eroded soil as sediment into waterways. Maintaining a vegetative cover or a cover of litter and other organic material on the soil surface is the best means of preventing excessive soil erosion rates (USDA 2005). If such fires become too hot, the entire surface layer (humus) can be consumed, exposing the underlying mineral soil to erosion and increasing surface runoff. Through development and implementation of a Wildland Fire Management Plan, however, BMPs would be used within the LOS zone to reduce impacts on soils, such as conducting only low-intensity burns and burning only when ground moisture levels are sufficient to prevent the entire organic soil component from being burned. Mechanical removal and herbicide application, by nature, do not remove forest floor litter or expose bare soil.

3.3.3.1.2.3 Floodplains

The Southern Drawl antenna operations would have no effect on floodplains. Additionally, the long-term LOS maintenance activities would not be expected to affect floodplain functions and values adversely. The conversion of forest areas to open field or scrub-shrub would decrease storm water retention through reduced evapotranspiration and forest canopy rainfall interception (Berger et al. 2013); however, the overall area of floodplain affected would be relatively small.

As a result, the long-term operation of the new antennas and LOS maintenance activities are not expected to have a significant impact on wetlands, storm water management, and floodplains. In conclusion, overall project-related activities associated with the implementation of Alternative 1 would not result in significant impacts on water resources.

3.3.3.2 Alternative 2

3.3.3.2.1 LOS Clearance, Facility Site Preparation, and Construction

3.3.3.2.1.1 Wetlands

Under Alternative 2, LOS clearance, facility site preparation, and construction-related impacts on wetlands would be similar to those described for Alternative 1; however the amount of wetland area impacted would be less than that for Alternative 1. Impacts would include the permanent loss of 0.24 acre of wetlands for the proposed antenna facility. Impacts would also include the conversion of 1.19 acres of forested wetland areas to emergent wetland habitat in the combined LOS area. Just as for Alternative 1, all necessary permits would be obtained prior to the implementation of Alternative 2, and appropriate mitigation measures would be coordinated with the MDE and USACE, as required.

Based on MDE, Non-tidal Wetlands and Waterways regulations, the proposed antenna facility and LOS clearance would be considered a major project because it would impact 5,000 square feet (0.11 acre) or more of wetlands. To address the combined wetland impacts of both the antenna site and LOS zone, necessary wetland permits would be obtained prior to proposed clearance and construction activities.

Just as for Alternative 1, the selection of Alternative 2 would require the preparation of a Coastal Consistency Determination for submittal to the MDE in accordance with Maryland Coastal Zone Program guidelines and the 2013 MOU between the State of Maryland and the DOD concerning federal consistency requirements of the CZMA (Maryland and DOD 2013).

Long-term adverse effects on wetlands would occur as a result of LOS clearance, facility site preparation, and construction under Alternative 2. Impacts would include the permanent loss of 0.24 acre of forested and emergent wetlands, and the conversion of just over 1 acre of forested wetlands to emergent wetlands.

3.3.3.2.1.2 Storm Water

Storm water impacts associated with Alternative 2 would be similar to, but slightly higher than, those described for Alternative 1. Alternative 2 would require 0.44 more acres of disturbance during initial construction of the antenna facility and result in 0.24 more acres of impervious surface area, when compared to Alternative 1. Just as for Alternative 1, Alternative 2 would require application for coverage under MDE's General Discharge Permit for Stormwater Associated with Construction Activity (NPDES permit MDR10). Additionally, an ESCP for Forest Harvest Operations would be developed for MDE approval. Execution of this plan would minimize impacts from erosion and sedimentation.

3.3.3.2.1.3 Floodplains

Impacts associated with Alternative 2 would generally be the same as those described for Alternative 1. Approximately one-third of the antenna facility would be located within the 100-year floodplain. The clearing of trees at the antenna site and in the combined LOS zone would decrease storm water retention through reduced evapotranspiration and forest canopy rainfall interception (Berger et al. 2013); however, several fewer acres of forest would be affected by the overall project when compared to Alternative 1. Thus, the impacts of clearing and construction in the 100-year floodplain at BPTF would not be significant.

3.3.3.2.2 Operations and Maintenance

3.3.3.2.2.1 Wetlands

Impacts associated with Alternative 2 would be similar to those described for Alternative 1. Approximately 1 acre of wetland area would be subjected to prescribed burns and/or other vegetation maintenance methods every 2 to 3 years over the long term; about 2 acres less than the wetland area to be maintained under Alternative 1.

3.3.3.2.2.2 Storm Water

Impacts associated with Alternative 2 would be similar to those described for Alternative 1; however, long-term maintenance of the combined LOS zone would involve several fewer acres.

3.3.3.2.2.3 Floodplains

Impacts associated with Alternative 2 would be similar to those described for Alternative 1. The conversion of forest areas to open field or scrub-shrub would decrease storm water retention through reduced evapotranspiration and forest canopy rainfall interception (Berger et al. 2013); however, the overall area of floodplain affected would involve several fewer acres compared to Alternative 1. No significant impacts would be expected.

3.3.3.3 No Action Alternative

The No Action Alternative would not result in changes in water resources if the Proposed Action were not implemented. Under the No Action Alternative, the Southern Drawl antennas, related infrastructure and clearance, and the expansion of the SNEGS–E LOS would not occur. No impacts on water resources would be expected.

3.4 Cultural Resources

3.4.1 Definition of Resource/Regulatory Background

Cultural resources include prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason. Cultural resources are limited, nonrenewable resources whose potential for scientific research (or value as a traditional resource) can be easily diminished by actions impacting their integrity.

Numerous laws and regulations require that potential effects on cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance and consultation, define the responsibilities of the federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., State Historic Preservation Officer [SHPO] and the Advisory Council on Historic Preservation). In addition to NEPA, key laws that pertain to the treatment of cultural resources during environmental analysis include the NHPA (especially Section 106 [16 U.S.C. 470f]) and the Archaeological Resources Protection Act. Depending on the integrity and historical significance of a site or property, it might be listed or eligible for listing on the NRHP.

Procedures for NHPA Section 106 compliance require federal agencies to identify historic properties within the proposed project's area of potential effect (APE)[3] (36 CFR 800.4). The APE is the geographic area within which an undertaking, such as the Proposed Action, could directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale

[3] The term "area of potential effect" is synonymous with the ROI.

and nature of the undertaking and might be different for different kinds of effects caused by the undertaking. Generally, an area broader than the project footprint must be considered.

3.4.2 Existing Conditions

3.4.2.1 Prehistoric and Historic Context

The prehistory of Maryland is traditionally divided into three major periods known as Paleoindian (12,000 – 9500 BC), Archaic (9500 – 1000 BC), and Woodland (1000 BC – AD 1600). These periods are characterized by changes in material culture, settlement patterns, and subsistence strategies. Paleoindians were highly mobile hunter/gatherers who produced fluted projectile points. During the Archaic Period, populations transitioned from big game hunting to broad spectrum hunting and gathering in response to the shift from Pleistocene to Holocene environmental conditions. The transition between the Archaic and Woodland Periods is characterized by an increase in population and sedentism. The Woodland Period is characterized by new materials and cultural features, including technological advances in pottery, food processing, and storage (Dragoo 1975).

The Historic Period in the Middle Atlantic began with contact between Europeans and Native Americans. In 1607, the first permanent English colony was established at Jamestown, Virginia, and European exploration and settlement of the Chesapeake area continued from that time onward. Maryland was established as an English colony in 1634 and quickly became an important tobacco-producing colony. Settlement of the inner costal plain began in the mid-17th century, with settlement focused on the areas along the Potomac and Patuxent rivers (Kellock 1962). Charles County was established in 1658 (Charles County 2013).

Agriculture remained the primary industry in Charles County throughout the 18th century, with grains, such as wheat and corn, becoming major crops in addition to tobacco (Kulikoff 1986). Port Tobacco, located less than 5 miles from the project area, emerged as the major socioeconomic hub of the region. Trade in tobacco provided economic growth opportunities for the area. By 1780, however, the continued growth of tobacco and the lack of adequate fertilizer and generally poor farming practices had depleted both the soil and the ability for farmers to earn a living. From 1780 to 1820, tobacco remained a popular crop but its yields gradually declined (Gibbs 2006).

Following the end of the Civil War, Charles County remained an agricultural area with small rural communities. The number of large tobacco farms continued to decline, while simultaneously an increase in small farms occurred. Eventually, the rivers of Port Tobacco filled with sediment from agricultural runoff and the town became land-locked. Large merchant vessels could no longer navigate the waters. Port Tobacco was the economic hub for the area and the resulting downturn likely had a significant impact on regional commerce (Beisaw 2006). The area remained agricultural until 1943, when the U.S. Government leased, and later purchased, a large portion of Blossom Point (JMT 2012).

3.4.2.2 Known Cultural Resources

The ROI or APE for this resource is restricted to the footprint of both of the Proposed Action alternatives. A letter dated October 21, 2013, initiated Section 106 consultation between the U.S. Navy and the Maryland Historical Trust (MHT) (see Appendix C). The letter defined the APE, summarized built and archaeological resources within a 2-mile radius of the APE, and described the planned methodology to be used to identify historic properties that could be affected by the proposed undertaking. The MHT concurred with the methodology on November 18, 2013.

Blossom Point and surrounding areas have been the focus of 14 archaeological studies, two of which covered sections of the APE (Wilke et al. 1980, Thomas and Reinbold 1996). Thirty-three archaeological sites have been identified within a 2-mile radius of the Blossom Point APE; however, only three of these sites—18CH213, 18CH225, and 18CH226—are in proximity of the APE just southeast of the

Alternatives 1 and 2 common clearance areas, near Middle Road (see Figure 3-4) (Thomas and Reinbold 1996). Wilke et al. (1980) originally identified the sites during a cultural resources survey. Site 18CH213 is reported to be a prehistoric (unknown temporal period) shell midden area along the Potomac River shoreline. Site 18CH225 is a Late Archaic lithic scatter and has an extent of approximately 1.5 acres. Site 18CH226 is a prehistoric (unknown time period) lithic scatter within an area of approximately 0.5 acre. The NRHP status for all three sites is undetermined. Although Blossom Point is located within the known historical range of the Piscataway Indians, no Native American sacred places are currently known to exist on the property.

Currently, no architectural properties at Blossom Point are listed on the NRHP. One property at Blossom Point, the Ballast House, was identified as eligible for the NRHP in a 1984 study (USACE 2009). The Ballast House was in need of repairs at the time and was in danger of being undermined by the eroding shoreline. The house was demolished in 1995, following recordation. There are no historic properties present in the APE.

3.4.2.3 Phase I Archaeological Survey

Between December 2013 and January 2014, a Phase I archaeological survey of 66 acres was conducted within the proposed construction and LOS areas in support of NASA's existing SNEGS–E antennas and the NRL's proposed Southern Drawl antenna project (Parker et al. 2014). The Phase I investigation was completed to assist the U.S. Army, NRL, and NASA in meeting anticipated regulatory obligations under Section 106 of the NHPA, as amended. The investigation was conducted in accordance with the MHT *Standards and Guidelines for Archaeological Investigations in Maryland* (MHT 1994).

The APE for the project is defined to be the maximum extent of the two build alternatives combined, where the proposed antennas would be constructed and where tree clearing would be undertaken. Part of the APE had previously been surveyed; therefore, the current investigation only surveyed sections of the APE and adjacent areas that had not previously been subjected to archaeological survey. The area covered by the current survey was designated the Phase I Survey Area.

The archaeological investigation of the Phase I Survey Area included the excavation of shovel tests along 15-meter transects. Due to the extensive wetland system on the installation, areas where shovel testing could be conducted were intermittent across the Phase I Survey Area. In total, 667 shovel test pits (STPs) were excavated. An additional eight close interval tests were excavated (in a cruciform pattern at 5-meter intervals in alignment with the grid pattern) around the one positive STP, CC31, which is located within the proposed Alternatives 1 and 2 common clearance area (see Figure 3-4).

At STP CC31, a single chert flake was recovered from Stratum II (16–46 centimeters below surface). All close interval tests excavated around STP CC31 were negative for cultural materials. The artifact is, therefore, being recorded as an isolated occurrence. No archaeological sites were identified during the survey. As a result, investigators recommended no additional archaeological investigation of the current Phase I Survey Area.

The report on the results of the Phase I archaeological survey was submitted to the MHT in March 2014 pursuant to Section 106 of the Act. In a response letter dated April 8, 2014, the MHT concurred with the survey methodology and the report findings. Copies of correspondence with the MHT are provided in Appendix C.

Since then, the U.S. Army and U.S. Navy have determined that the APE will need to be expanded slightly for a section of new logging road that is planned just outside of the proposed construction and LOS areas (see Figure 3-4). To ensure no adverse effects on unidentified resources, the USAG ALC and NRL plan to conduct a Phase I archaeological survey of the road segment location and consult with the MHT prior to any clearing in that area.

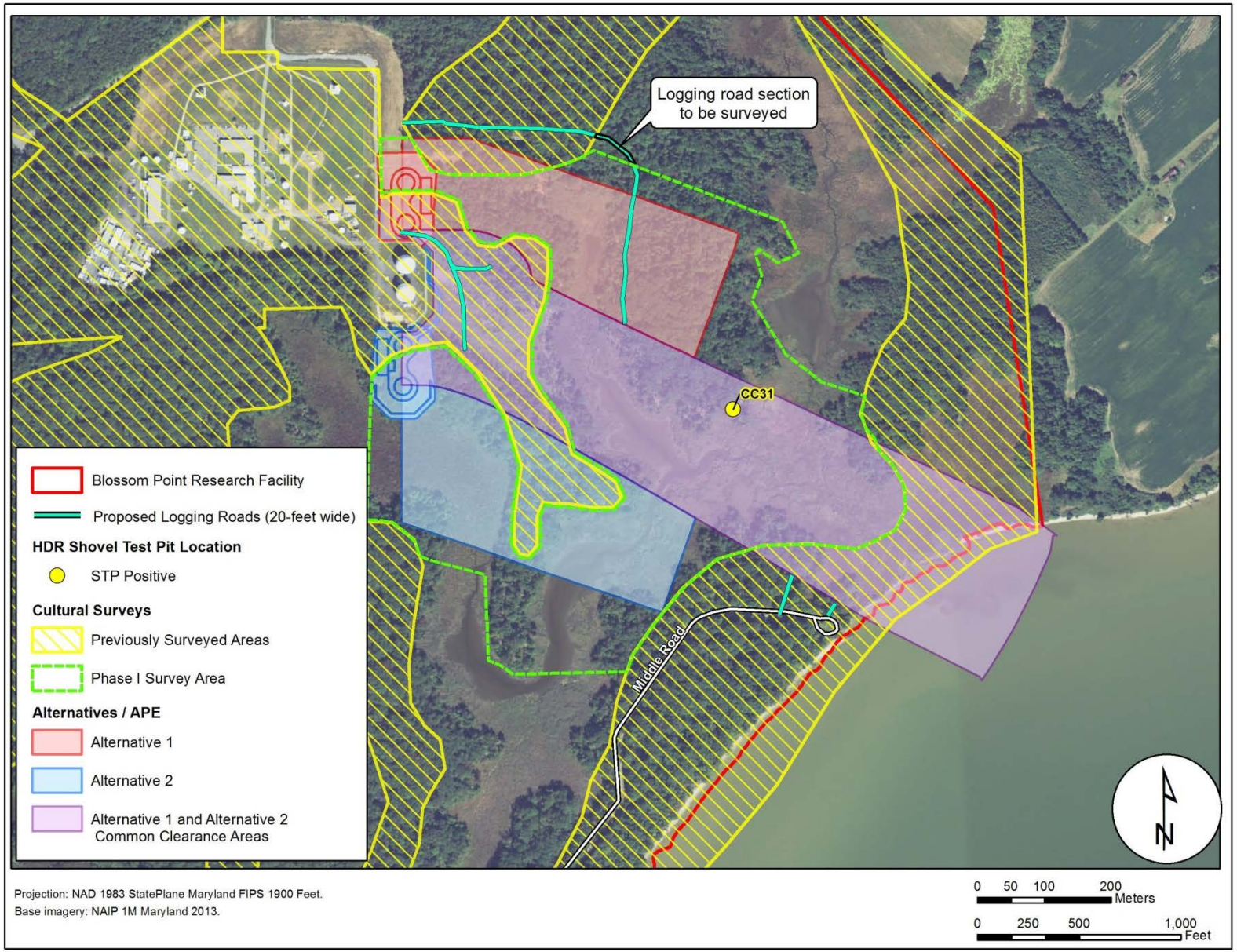

Figure 3-4. Blossom Point Archaeological Resources

3.4.3 Environmental Consequences

Ground-disturbing activities associated with the implementation of the Proposed Action Alternatives constitute the most relevant potential impact on cultural resources.

3.4.3.1 Alternative 1

3.4.3.1.1 LOS Clearing, Facility Site Preparation, and Construction

The 66-acre Phase I Survey Area was tested for archaeological materials. No archaeological sites were identified; therefore no additional archaeological investigation of the current Phase I Survey Area is recommended.

Previously recorded archaeological sites 18CH213, 18CH225, and 18CH226 are located within or just outside of the APE (Alternatives 1 and 2 common clearance areas) near Middle Road (Figure 3-4). To avoid potential impacts on these sites, tree clearing and harvesting activities in forest tract 8 (Figure 2-4) would not include grubbing or grading activities. Additionally, any tree clearing or logging road activities in proximity of these three sites must use low-impact timber harvesting techniques (see Section 2.2.1) that minimize soil disturbance and compaction. Any log landings in this area also would be required to stay within previously cleared areas along the existing Middle Road.

As shown on Figure 3-4, approximately 100 meters of proposed logging road, just north of the Alternative 1, is located in an area for which an archaeological survey has not yet been conducted. A Phase I archaeological survey will be conducted along the road segment prior to any clearing in that area. Because of the lack of resources identified in the adjacent survey areas, no archaeological resources would be expected. In the event that intact subsurface cultural resources are inadvertently discovered during the clearing, facility site preparation, and construction activities, the USAG ALC and NRL would follow the procedures outlined in the Integrated Cultural Resources Management Plan for Blossom Point (USACE 2009). Under such circumstances, work would cease in the vicinity of the find, the find would be protected from additional disturbance, and it would be evaluated for NRHP eligibility in consultation with the SHPO per 36 CFR § 800.4–800.6.

3.4.3.1.2 Operations and Maintenance

Long-term operation of Alternative 1 would include maintenance of the combined LOS zone. The three options for vegetation maintenance being considered are prescribed burning, mechanical removal, and the application of approved herbicides; although a combination of these methods also could be used (see Section 2.1.4 for a description of maintenance methods).

Prescribed burning activities would only burn surface vegetation and would occur in areas previously disturbed. Mechanical removal and herbicide applications activities also would be conducted in previously disturbed areas. Because there are no historical structures in or near the combined LOS zone, ground disturbances from the use of tractors and other equipment during LOS maintenance activities would be minimal, and the potential for archaeological resources to occur in the area is low, long-term operation and maintenance activities under Alternative 1 are not expected to impact cultural resources.

3.4.3.2 Alternative 2

3.4.3.2.1 LOS Clearing, Facility Site Preparation, and Construction

Impacts would be the same as those described for Alternative 1. To avoid potential impacts on the previously recorded archaeological sites (sites 18CH213, 18CH225, and 18CH226), tree clearing and harvesting activities in forest tract 8 (Figure 2-4) would not include grubbing or grading activities. Additionally, any tree clearing or logging road activities in proximity of these three sites must use low-

impact timber harvesting techniques (see Section 2.2.1) that minimize soil disturbance and compaction. Any log landings in this area also would be required to stay within previously cleared areas along the existing Middle Road (Figure 3-4).

3.4.3.2.2 Operations and Maintenance

Impacts would be the same as those described for Alternative 1.

3.4.3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. The existing cultural resources would not be altered. There would be no impacts on cultural resources.

3.5 Land Use

3.5.1 Definition of Resource/Regulatory Background

Land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified through the local government comprehensive planning process. There is, however, 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.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. In appropriate cases, the location and extent of a proposed action is evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence."

Army Regulation 210-20, Real Property Master Planning for Army Installations, establishes the real property master planning requirements and policies for U.S. Army installations, including the USAG ALC Blossom Point. An Army real property master plan incorporates all plans impacting or using real property into a comprehensive document. The master plan includes information and coordination of resources from many programs and sources to ensure adequate coverage of real property support to meet assigned or projected missions for the installation. The long-range component of the master plan collects baseline information and mission requirements and identifies gaps or shortfalls in facilities to guide future actions on the installation.

3.5.2 Existing Conditions

The ROI analyzed for land use consists of the Blossom Point installation and the adjoining properties. Blossom Point contains 420 acres of improved lands and 1,180 acres of unimproved lands, all located within Charles County, Maryland. Blossom Point is primarily bound by the Cedar Point WMA to the north and the Potomac River and Nanjemoy Creek to the south, and is bisected by Blossom Point Road. Land use on Blossom Point is managed in accordance with the Blossom Point Research Facility Real Property Master Plan, which includes long-range and short-range component plans (PBS&J 2007, PBS&J 2009).

The primary land use category on Blossom Point is Research and Development, due largely to its status as a test facility. This land use category consists of facilities for the research and development of electronic, electrical, and communications equipment such as microwave, radio, television, and computer

communications links. This particular land use category at Blossom Point occupies 98 percent or 1,564 acres of the facility. Secondary land uses are significantly smaller and include administration (0.75 acre), storage and supply (22 acres), and maintenance (12.23 acres) (PBS&J 2009, ALC 2013). Currently, 41 acres in the Research and Development land use category are permitted to the NRL for operation of the BPTF. The BPTF is surrounded by a 265-acre buffer zone, which protects the sensitive satellite antennas from radio frequency interference. This buffer zone is also in the Research and Development land use category. Both of the Proposed Action alternatives are located wholly within the Research and Development area. Managed deer hunts are also held in some portions of Blossom Point. These hunts are generally held five Saturdays a year. Hunters are assigned and driven to a deer stand from which they hunt. There are no deer stands located within the areas of the Proposed Action alternatives.

A joint land use study (JLUS) was completed in 2012 by Charles County and the U.S. Army to help provide an environment in which land uses adjacent to Blossom Point remain compatible with operations at the installation. Land use surrounding Blossom Point is identified in the JLUS as Protected Lands (see Figure 3-5). These Protected Lands are recreation or natural resource-oriented, open space lands already under government or conservation organization ownership or perpetual easement, plus land in the Resource Protection Zoning district (Charles County 2013). The majority of the land abutting Blossom Point is associated with the Cedar Point WMA, which is owned by the State of Maryland (MDNR 2013, Charles County 2013). The WMA is managed for wildlife-based recreational opportunities, such as hunting, fishing, hiking, and bird watching. There is also an agricultural lease on the property that was recently re-bid to the public for a 5-year term. Agriculture will continue to be a part of the management of Cedar Point WMA (Heilmeier 2014).

The U.S. Army and the MDNR have established a 300-foot restricted area around the southern border of the Cedar Point WMA due to concerns of potential conflicts between hunting activities at the WMA and operation of the NRL facilities. The buffer is outside of the proposed project area. No other potential land use conflicts have been identified (JMT 2012). Areas near Blossom Point outside of the WMA are primarily agricultural with a few scattered residential areas along Blossom Point Road; however, these areas are well outside of the proposed project area. MDNR also regulates public access onto the Blossom Point Cooperative WMA that encompasses Blossom Point (MDNR 2013). The Blossom Point Cooperative WMA consists of waterfowl blinds that are only accessible by boat. These blinds are also well outside of the proposed project area.

3.5.3 Environmental Consequences

After reviewing the potential effects of implementing the Proposed Action under Alternatives 1 and 2, it was determined that the project-related activities would not impact land use on or outside of Blossom Point. The supporting analyses for these findings are provided in the sections that follow.

3.5.3.1 Alternative 1

3.5.3.1.1 LOS Clearing, Facility Site Preparation, and Construction

Currently, both NRL and NASA hold separate real estate permits for the area of land they occupy at Blossom Point. Portions of the Proposed Action would occur outside of these current real estate permit areas. In support of the Proposed Action, both NRL and NASA are working with the U.S. Army to potentially modify current real property permits to allow the long-term expansion of the operating areas of both agencies at USAG ALC Blossom Point.

Figure 3-5. Land Use in the Vicinity of Blossom Point

According to the Blossom Point Research Facility Real Property Master Plan, the Proposed Action area is classified as Research and Development and similar facilities (NASA and NRL satellite communication antennas and related support) already exist in close proximity to the site. Alternative 1 would not result in any change to land use on or off of the installation and complies with the installation's current Master Plan. Although hunters would need to avoid the construction area and any LOS clearing activities, implementation of Alternative 1 is not expected to interfere with annual deer hunting activities on Blossom Point as hunts are held a few days a year and only on Saturdays. Additionally, tree clearing activities within the combined LOS zone would not interfere with recreational or agricultural use of the Cedar Point WMA, or with recreational boating and fishing on the Potomac River. As described earlier, forest tract 6 of the combined LOS zone (see Figure 2-4) can only be accessed through the Cedar Point WMA. Thus, permission to access the Blossom Point property through the Maryland state property would be sought prior to work commencing.

Therefore, no impacts on land use would be expected from LOS clearing, facility site preparation, or construction activities under Alternative 1.

3.5.3.1.2 Operations and Maintenance

Long-term operation of the proposed antenna facility would be consistent with the current Research and Development designated land use for the site. Additionally, antenna operations would have no effect on land use outside of the installation.

Regarding long-term maintenance of the LOS, all three methods available for vegetation control (i.e., prescribed burning, mechanical removal, and herbicide applications) would not conflict with current and future on- or off-installation land use, including annual deer hunting on Blossom Point since LOS maintenance activities only would occur every 2 to 3 years and generally outside of the hunting season. Additionally, LOS maintenance activities would not interfere with recreational or agricultural use of the Cedar Point WMA, or with recreational boating and fishing on the Potomac River.

As a result, long-term operation of the new antennas and LOS maintenance activities would not impact land use. In conclusion, overall project-related activities associated with the implementation of Alternative 1 would not impact land use on or outside of Blossom Point.

3.5.3.2 Alternative 2

3.5.3.2.1 LOS Clearing, Facility Site Preparation, and Construction

Just as for Alternative 1, clearing, site preparation, and construction activities under Alternative 2 would not impact land use. Permission to access forest tract 6 of the Blossom Point property through the Maryland state property would be sought prior to work commencing.

3.5.3.2.2 Operations and Maintenance

Just as for Alternative 1, operations and maintenance activities under Alternative 2 would not impact land use.

3.5.3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. Existing conditions would remain and no additional land use restrictions would occur. No impacts on land use would be expected under the No Action Alternative.

3.6 Utilities and Infrastructure (Electricity, Natural Gas, Water, Sewer, Solid Waste)

3.6.1 Definition of Resource/Regulatory Background

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure components to be discussed in this section include utilities and solid waste management.

Utilities include electrical supply, water supply, sanitary sewer and wastewater, storm water, and liquid fuel supply. Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs.

3.6.2 Existing Conditions

The ROI for this analysis is restricted to Blossom Point, as the Proposed Action is not expected to result in any offsite impacts on infrastructure.

Electrical Supply. Electrical power to the installation is provided by the Southern Maryland Electric Company (SMECO). The BPTF is supplied with three-phase 7,200-kilovolt service from the SMECO overhead conductors along Blossom Point Road (PBS&J 2009). For emergency purposes, there are currently seven back-up generators at BPTF, including two for NASA's SNEGS–E antenna facility. Four of the fixed generators (two 700-kVA and two 360-kVA generators) serve as the primary power source for BPTF during commercial power outages (Buttgereit 2014).

Water Supply. The BPTF uses a separate well and distribution system from the main installation for potable water (PBS&J 2009). Well water is pumped into a 500-gallon hydro-pneumatic pressurized tank for storage and is distributed to existing BPTF buildings through a 2-inch service line. Water supplied for fire protection is stored in two separate 100,000-gallon tanks attached to a fire pump and is distributed to fire hydrants throughout the BPTF via 6-inch water mains. Sprinkler systems and an expansion of the fire protection system on BPTF were installed during construction of the previous satellite ground communications terminal facilities (A. Morton Thomas and Associates, Inc. 2008).

Sanitary Sewer and Wastewater. The sanitary sewer treatment system is permitted by the State of Maryland and managed by a sewer pipe collection system, septic tank with tile field disposal and several aboveground sand mound disposal systems. The sand mound is required because current soil conditions do not meet the absorption rate standards for sanitary drain fields established by the State of Maryland. The septic tank adequately serves existing flow (PBS&J 2009).

Storm Water System. Blossom Point and the surrounding area are not intensively developed. As a result, the storm water system on Blossom Point primarily includes a few ditches and a retention pond and outfall that were constructed for the SNEGS–E antenna. Storm water ultimately drains into the Potomac River downstream of Nanjemoy Creek (A. Morton Thomas and Associates, Inc. 2008). There are no point source discharges on the installation; therefore, no NPDES permit is required (PBS&J 2009).

Petroleum, Oils, and Lubricants. Generally, hazardous materials are not used, stored, or generated at the BPTF. Used motor oil from site utility and operations vehicles, and diesel generator fuel, are stored in secured onsite storage tanks. Licensed contractors remove waste oil and deliver diesel fuel to the BPTF (PBS&J 2009). The USAG ALC Blossom Point has a Spill Prevention, Control, and Countermeasure

Plan in place to prevent and respond to any spills of oils, fuels, or other materials (including hazardous) (U.S. Army 2009).

Solid Waste Management. Solid waste at BPTF is collected by facilities personnel and deposited into dumpsters. Private contractors, licensed in the State of Maryland, remove solid waste from the property and dispose or recycle the waste in a licensed waste disposal or recycling facility. Reusable (marketable) solid waste is handled by the Defense Reutilization Marketing Office (A. Morton Thomas and Associates, Inc. 2008).

3.6.3 Environmental Consequences

After reviewing the potential effects of implementing the Proposed Action under Alternatives 1 and 2, it was determined that the project-related activities would not impact utilities and infrastructure at Blossom Point. What follows is the supporting analysis for this finding.

3.6.3.1 Alternative 1

3.6.3.1.1 LOS Clearing, Facility Site Preparation, and Construction

Electrical Supply. It is assumed that the construction contractors would primarily use diesel-, propane-, or battery-powered equipment. Any construction equipment that is powered via electricity would likely receive power from a portable generator or a temporary electrical panel.

Water Supply. Under Alternative 1, demand for the water supply system would temporarily increase from daily cleanup and dust control associated with construction activities. As a result, once construction was completed, demand for domestic use of the water supply would return to preconstruction levels.

Sanitary Sewer and Wastewater. No expansion of the wastewater system would be required under Alternative 1. Contractor crews would be expected to provide wastewater holding tanks and plumbing facilities for all workers and visitors to the site.

Storm Water System. Under Alternative 1, construction of the Southern Drawl antenna facility would increase impervious surface area at Blossom Point, which would also require the installation of storm water infrastructure (e.g., drainage ditches and retention pond). The infrastructure would be constructed using Low Impact Development (LID) to maintain site hydrology to preconstruction levels, per COMAR 26.17.01 and 26.17.02, and to mitigate adverse impacts from storm water runoff and nonpoint source pollution. The LID used would be compliant with the DOD's Unified Facilities Criteria 3-210-10 Low Impact Development manual.

Petroleum, Oils, and Lubricants. Construction contractors would be required to provide their own fuel to operate their equipment. To minimize potential impacts from spills, the construction contractor would be required to prepare their own Spill Prevention, Control, and Countermeasure Plan and obtain concurrence from the USAG ALC. The plan would include the implementation of BMPs, such as daily inspections of construction vehicles and equipment for fluid leaks, secondary containment provisions for equipment fueling sites, and proper handling and disposal of vehicle wastes. Hazardous materials are not anticipated to be generated by clearing and construction activities.

Solid Waste Management. It is expected that all construction and other solid waste resulting from clearing, construction, and renovation activities would be removed by the contractor for recycling or disposal at a licensed facility off installation. Following the removal and sale of salvageable timber, slash and other woody debris (e.g., tree stumps and limbs, brush, root mats, logs) resulting from clearance of

the antenna footprint and the combined LOS zone would be chipped on site and/or transported to one of two natural wood waste recycling facilities in Charles County.

Therefore, no impacts on utilities and infrastructure would be expected from LOS clearing, facility site preparation, or construction activities under Alternative 1.

3.6.3.1.2 Operations and Maintenance

For the long-term operation of the new antenna facility, no permanent influx of personnel to the BPTF would occur because the Southern Drawl site would generally be operated remotely. The backup diesel-powered generator and fuel tank would comply with applicable federal and state regulations for spill protection, including applicable secondary containment and monitoring systems. Site maintenance could require access to the water system; however, maintenance of the site would be temporary and intermittent. In general, operation of the antennas would not require use of the water supply. Current sewer and wastewater treatment capacity would be expected to remain at preconstruction levels. Long-term, solid waste generation would be expected to be similar to preconstruction levels. Demand for fuel on the installation would be close to preconstruction levels.

The three proposed methods for long-term maintenance of the combined LOS (i.e., prescribed burning, mechanical removal, and herbicide applications) would not affect utilities and infrastructure at Blossom Point. Contractors conducting LOS maintenance activities would be required to provide their own fuel to operate their equipment. Herbicides would be stored, handled, and applied in accordance with all applicable regulations.

In conclusion, overall project-related activities associated with the implementation of Alternative 1 would not impact utilities and infrastructure at Blossom Point.

3.6.3.2 Alternative 2

3.6.3.2.1 LOS Clearing, Facility Site Preparation, and Construction

Alternative 2 would result in no impacts on utilities and infrastructure. Because this alternative requires several fewer acres of forest to be cleared of trees and grubbed for stumps, there would be less woody debris waste generated. Just as for Alternative 1, however, such debris would be chipped on site and/or transported to one of two natural wood waste recycling facilities in Charles County.

3.6.3.2.2 Operations and Maintenance

Just as for Alternative 1, operations and maintenance activities under Alternative 2 would have no impacts on utilities and infrastructure.

3.6.3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. Existing conditions would remain as described in Section 3.6.2. No impacts on utilities and infrastructure would be expected.

3.7 Geology, Topography, and Soils

3.7.1 Definition of Resource/Regulatory Background

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and

subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural features and human-made alterations of landforms. Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

As described in Section 3.3, actions greater than 5,000 square feet (0.11 acre) require an ESCP that complies with COMAR 26.17.01.

3.7.2 Existing Conditions

The ROI for this resource is restricted to the sites of the Proposed Action alternatives, as only the resources on the project site would be affected. Blossom Point lies within the Western Shore Lowlands Region of the Atlantic Coastal Plain physiographic province (MGS 2008). This region consists of a series of low (generally below 50-foot elevation) fluvial and estuarine terraces, beaches, and drowned river mouths that fringe the Western Shore Uplands. This region extends some distance up the valleys of the Potomac and Patuxent rivers. The geologic formation is known as the Lowland Deposits, which varies in thickness from 0 to 150 feet and consists of gravel, sand, silt, and clay with cobbles and boulders near the base (Cleaves et al. 1968).

Topography at Blossom Point is characterized by rolling hills with narrow ridge tops and valleys drained by nontidal and tidal tributaries to Nanjemoy Creek and the Potomac River. Elevations range from MSL along the Potomac River and Nanjemoy Creek to 25 feet above MSL at Upper Cedar Point (PBS&J 2007).

Surface soils in the area are classified as part of the Elkton-Othello-Keyport association. These soils occur on nearly level to sloping terrain and are characterized as being poorly to moderately drained loamy soils (some of which have clay subsoils). Texture ranges from fine sand to silty loams and silty clays to coarse sands. The Elkton silt loam is the predominant soil series (USDA 1974). The following soil units are found in and adjacent to the Proposed Action alternative sites (NRCS 2013): Annemessex silt loam, 0 to 2 percent slopes; Liverpool silt loam, 0 to 2 percent and 2 to 5 percent slopes; Dodon fine sandy loam, 2 to 5 percent slopes; Mispillion and Transquaking soils, tidally flooded; and Nanticoke and Mannington soils, frequently flooded. Soils in these series occur in stream and fluviomarine terraces, which are described as nearly level in slope. These silty/sandy loam deposits belong to the recent and Pleistocene series. The soils are part of the Columbia Group, characterized as irregular yellow to orange sand, silt, gravel, and clay mixtures. The soils are very poorly to moderately well-drained.

A highly erodible soil (Liverpool-Piccowaxen complex, 5 to 15 percent slopes, unit symbol LxD) is present within the combined LOS zone of both alternatives (see Figure 3-6). The combined LOS clearance zone contains 0.17 acre of this soil type for Alternative 1 and 2.75 acres for Alternative 2. Highly erodible soils, as defined by the COMAR with relation to the Critical Area (COMAR 27.01.01.01(30)), are those soils with a slope greater than 15 percent or a K factor greater than 0.35 and with slopes greater than 5 percent. The soil K factor is a quantitative description of the inherent erodability of a particular soil; it is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff.

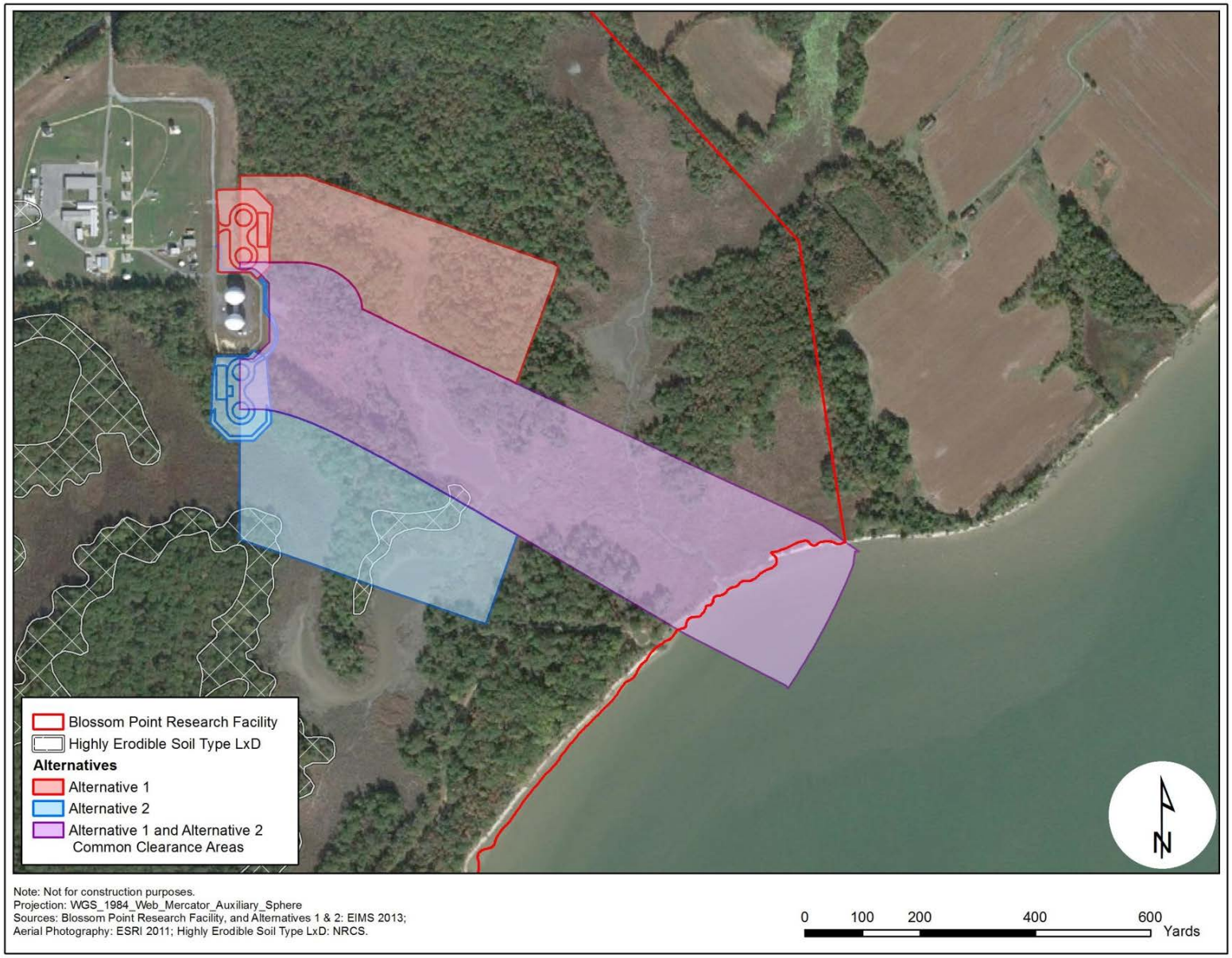

Figure 3-6. Blossom Point Highly Erodible Soils

3.7.3 Environmental Consequences

After reviewing the potential effects of implementing the Proposed Action under Alternatives 1 and 2, it was determined that the project-related activities would not result in significant impacts on geology, topography, and soils at Blossom Point. What follows is the supporting analysis for this finding.

3.7.3.1 Alternative 1

3.7.3.1.1 LOS Clearing, Facility Site Preparation, and Construction

During facility site preparation and construction, minor permanent alterations to the topography within the antenna footprint would result from grading, filling, and excavation. Any fill material trucked into the site would be obtained from existing or new borrow locations that are approved in accordance with all applicable state and local regulations.

Ground-disturbing activities can increase the potential for soil loss from erosion. Approximately 2.67 acres of land would be disturbed for construction of the antenna facility and the trenching of utilities. Therefore, an ESCP would be developed and employed to control the impacts associated with soil erosion and sedimentation during construction. This plan would comply with COMAR 26.17.01. An NPDES Phase II storm water permit would also be required. Adherence to these plans and permits would be a condition of the Proposed Action.

Initial clearing of the combined LOS zone and for new logging roads outside of the LOS (approximately 32.6 acres total, not including acreage previously cleared for the SNEGS–E project) would be expected to result in minor levels of soil erosion. Grubbing and grading activities in the non-wetland LOS areas (approximately 30.6 acres total) to remove stumps would also result in minor levels of soil erosion. Included in the area are 0.17 acre of highly erodible soils (see Figure 3-6). The grubbing and grading activities, however, are not anticipated to result in a change of slope or alter the overall site topography. An ESCP for Forest Harvest Operations would be prepared and implemented to include BMPs, such as perimeter earth dikes, swales, sediment traps, bio-retention areas, stacked hay bales, and silt fencing.

By using BMPs to reduce the potential for erosion and sedimentation, no significant impacts on geology, topography, and soils would be expected during the LOS clearing, facility site preparation, and construction activities under Alternative 1.

3.7.3.1.2 Operations and Maintenance

Long-term operation of Alternative 1 would include maintenance of the combined LOS zone. The three options for vegetation maintenance being considered are prescribed burning, mechanical removal, and the application of approved herbicides; although a combination of these methods also could be used (see Section 2.1.4 for a description of maintenance methods). For any given area of the LOS, maintenance activities are expected to occur once every 2 to 3 years, depending on the rate of vegetation growth.

The effects on soils by fire from prescribed burns can vary greatly, depending on frequency, duration, intensity of fire, and soil characteristics. Increased soil erosion and storm water runoff are the major concerns with prescribed fires. However, on most Lower and Middle Coastal Plain sites, there is little danger of erosion (USDA 1989). Generally, prescribed fires, by design, are not intended to consume extensive layers of forest floor litter. If such fires become too hot, the entire surface layer (humus) can be consumed, exposing the underlying mineral soil to erosion and increasing surface runoff. Prior to the first burn, a Wildland Fire Management Plan for the site would be prepared. This plan would identify specific BMPs to be used to reduce impacts on soils, including conducting only low-intensity burns, conducting burns on highly erodible soils only when absolutely necessary, burning only when ground moisture levels are sufficient to prevent the entire organic soil component from being burned, and placing water-control

structures, such as waterbars, along firebreaks. Post-fire BMPs would also be used as necessary to control erosion. These include monitoring the site and revegetating any exposed soils, as necessary.

Mechanical-removal activities would be implemented when the LOS has revegetated, and then only every 2 to 3 years, as needed. Because the vegetation would not be completely removed, and the stalks and roots would remain intact, there would be little to no increased risk for soil erosion. Minor soil compaction could result from tractor tires making contact with and rolling over the ground.

Herbicides, such as glyphosate and Garlon 3A, would be applied primarily to target new tree and brush growth, and invasive species. This method would not result in soil exposure by denuding the entire vegetative community. In addition, glyphosate is rapidly and extensively degraded in soil, under both aerobic and anaerobic conditions, by indigenous soil microflora (Giesy et al. 2000). Triclopyr, the active ingredient in Garlon 3A, is listed as "fairly degradable" in soil at reported half-lives ranging from 12 to 27 days (Linders et al. 1994). Minor soil compaction could result from the tires of heavy sprayer equipment rolling over the ground.

As a result, the long-term operation of the new antennas and LOS maintenance activities are not expected to have a significant impact on geology, topography, and soils. In conclusion, overall project-related activities associated with the implementation of Alternative 1 would not result in significant impacts on these resources.

3.7.3.2 Alternative 2

3.7.3.2.1 LOS Clearing, Facility Site Preparation, and Construction

Alternative 2 facility site preparation and construction would result in similar impacts on geology, topography, and soils as those described for Alternative 1. Under this alternative, approximately 3.11 acres would be disturbed for construction of the antenna facility.

Impacts resulting from clearing the LOS area for Alternative 2 also would be similar to those described for Alternative 1. The combined LOS zone and new logging roads outside of the LOS to be cleared of trees would be approximately 24.8 acres (not including acreage previously cleared for the SNEGS–E project), while the amount of area to be grubbed and graded is approximately 23.6 acres. Although fewer acres overall would be disturbed under Alternative 2, the combined LOS zone for this alternative contains 2.58 more acres of highly erodible soils than Alternative 1, for a total of 2.75 acres (see Figure 3-6). Thus, there is a slightly greater risk for soil erosion from vegetation/tree clearance when compared to Alternative 1.

3.7.3.2.2 Operations and Maintenance

For Alternative 2, the three methods available for long-term maintenance of the combined LOS zone (i.e., prescribed burning, mechanical removal, and herbicide applications) would result in similar impacts on soils as those described for Alternative 1; however, maintenance activities would involve several fewer acres.

3.7.3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. The existing characteristics of the geology, topography, and soils at Blossom Point would not be altered and no impacts would occur.

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4 CUMULATIVE IMPACTS

4.1 Introduction

CEQ regulations stipulate that the cumulative impacts analysis within an EA should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR § 1508.7). Recent CEQ guidance in considering cumulative impacts involves defining the scope of the other actions and their interrelationship with a proposed action. The scope must consider overlaps in the location and timing of a proposed action and other actions. It also must evaluate the nature of interactions among these actions.

Cumulative impacts are most likely to arise when a relationship or synergy 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 proximity to, a proposed action would be expected to have more potential for a relationship than those more geographically separated.

To identify cumulative impacts, the following 3 fundamental questions need to be addressed:

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

Just as for the potential environmental impacts caused by implementation of the proposed action alone, cumulative impacts associated with the proposed action also must be described in terms of their significance. The analysis approach used in determining the significance of cumulative environmental impacts also requires consideration of both context and intensity, as described in the introduction to Chapter 3.

4.2 Approach to Analysis

4.2.1 Overview

The scope of the cumulative impacts analysis involves both the geographic extent of the impacts and the timeframe in which the impacts could be expected to occur. It is possible that analysis of cumulative impacts might go beyond the scope of the project-specific direct and indirect impacts to include expanded geographic and time boundaries, and a focus on broad resource sustainability. This approach is becoming increasingly important as growing evidence suggests that the most significant impacts result from the combination of individual, often minor, impacts of multiple actions over time. The underlying issue is whether or not a resource can adequately recover from the impact of an action before the environment is exposed to subsequent actions.

As discussed in Chapter 3, potential environmental impacts from implementing the Proposed Action, while not significant, would be expected from the construction of the Southern Drawl antenna facility, and the initial clearing and long-term maintenance of the combined LOS zone for the Southern Drawl and SNEGS–E antennas. Therefore, the identification of potential cumulative impacts in this case required an

understanding of interactions with other past, present, or reasonably foreseeable future actions that involve forest clearing or ground-disturbing activities, habitat alterations, and similar emissions issues.

4.2.2 Study Area Geographic Boundaries and Timeframe for Analysis

In general, the geographic or spatial area of consideration for potential cumulative impacts varies by resource topic. The spatial area of consideration for some resources might only include the project boundaries, such as for geological resources, while air quality could include the entire AQCR. This cumulative impacts analysis focuses on those projects within the boundaries of Blossom Point and in the vicinity of the installation that could affect common resources. For analysis purposes, the Proposed Action timeframe is FY 2014 through FY 2020, when forested areas would be cleared, the Southern Drawl antenna facilities constructed, and the initial years of antenna operations.

4.3 Identification of Other Past, Present, and Reasonably Foreseeable Future Actions that could contribute to Cumulative Impacts

Various types of past, present, and reasonably foreseeable future actions not related to the Proposed Action have the potential to affect the resources identified in Chapter 3. The overview of these actions in this section emphasizes components of the activities that are relevant to the impact analyses in Chapter 3. Geographic distribution, intensity, duration, and historical effects of similar activities are considered when determining whether a particular activity might contribute cumulatively and significantly to the impacts of the Proposed Action on the resource areas identified in Chapter 3.

In identifying other past, present, and reasonably foreseeable future actions at Blossom Point and in the vicinity of the installation, those actions identified in the Blossom Point Research Facility Real Property Master Plan (PBS&J 2007) and in the USAG ALC Real Property Master Plan (PBS&J 2009) were reviewed. Although not included in either Master Plan, NASA's SNEGS–E antenna project analyzed in the Final EA for SNEGS–E (A. Morton Thomas and Associates, Inc. 2008) was included in this analysis. Additionally, U.S. Army and NRL personnel based at Blossom Point and BPTF were contacted for relevant project information. For pertinent actions outside of Blossom Point, the following sources were reviewed:

- Maryland Department of Transportation (MDOT) Draft FY14-19 Consolidated Transportation Program (State Highway Administration) for Charles County, Maryland (MDOT 2013) [4]
- Blossom Point Research Facility Charles County, Maryland: Joint Land Use Study (JMT 2012)
- The Charles County Draft Comprehensive Plan (Charles County 2013).

Additionally, the Charles County Department of Planning and Growth Management and the local chapter of The Nature Conservancy were contacted to identify relevant projects or actions outside of Blossom Point (Barber 2013, Blessinger 2013).

Based on a review of past, present, and reasonably foreseeable future actions at Blossom Point and in areas near the installation, it was determined that several actions should be considered when analyzing the potential cumulative impacts associated with the Proposed Action. These projects are described in the

[4] Although not considered in this cumulative impacts analysis, the MDOT State Highway Administration is currently conducting long-range planning studies for upgrades (e.g., additional lanes, new interchanges, and access control improvements) along the U.S. Route 301 corridor through Charles County (see Figure 1-1). The implementation of such improvements, however, is not expected to begin for at least 5 to 10 years (Blessinger 2013, Charles County 2013, MDOT 2013).

following sections, and the impacts from these projects, in combination with the impacts from the Proposed Action, are described in Section 4.4.

4.3.1 Space Network Expansion Ground System–East

As described in Section 2.1.3, the NRL and NASA prepared an EA for the SNEGS–E project on BPTF that addressed construction of NASA's satellite ground communications facilities and antennas, clearing of trees that could obstruct signals within LOS, access to the antenna site, renovations to the BPTF Building 13, expansion of the fire suppression system, upgrades to the electrical power supply, and the addition of stand-by electrical power from new generators (A. Morton Thomas and Associates, Inc. 2008). Construction of the SNEGS–E antenna facility (see Figure 4-1) is nearly complete. All excavation work for the facility has been completed. The last of the three antennas was installed in December 2013 and completed integration and testing earlier this year.

Project construction and clearing activities initiated in 2010 required the clearing and disturbance of 3.7 acres of forested area for the antenna facility, including approximately 0.10 acre for forested nontidal wetlands (for road construction and antenna infrastructure) (A. Morton Thomas and Associates, Inc. 2008, MDE 2010). Within the LOS zone, approximately 4.94 acres of forest were roughly cleared, which included temporary impacts on approximately 0.06 acre of forested nontidal wetlands (see Table 2-1). Following installation of the facilities at BPTF, it was determined that the tree clearance area developed during facilities design (referred to as the "SNEGS–E LOS Clearance (Revised)" on Figure 2-3) was not large enough to enable the NASA antennas to meet their mission, as there were obstructions exceeding the horizon mask limits. As a result, further expansion of the SNEGS–E LOS area is included under the Proposed Action in this EA.

4.3.2 Telstar Telescope

The Telstar telescope is a 6-foot telescope used by NRL to support studies of space weather, in particular, ionospheric and thermospheric weather (i.e., the distribution and dynamics of plasma and neutral particles in the near-Earth space environment). Space environmental monitoring is a critical component of Space Situational Awareness because it provides information about natural disturbances affecting satellite system operations and satellite communications. The telescope is located on the east side of BPTF, well inside the fenced compound in grass-covered areas (see Figure 4-1). Within the approximate 20-by-20-foot concrete slab, the telescope is enclosed in a 6- to 7-foot tall radome that is opened manually. The pad also holds an approximately 6-by-8-foot metal storage building. Associated electrical and communications lines to the site were installed underground. Construction and installation of the Telstar telescope was completed in September 2013.

No trees, wetlands, or other habitats were affected by construction activities for the telescope. Ground disturbance from excavation for the telescope foundation and the trenching of utilities was minimal.

4.3.3 Chronos Antenna

The Chronos antenna will provide precision network timing and frequency reference for BPTF operations. Chronos is a higher precision alternative to the Global Positioning System for precise time and precise frequency references. The antenna is located towards the south side of BPTF, well inside the fenced compound in grass-covered areas adjacent to other existing buildings (see Figure 4-1). The antenna is mounted on a new 4-by-4-foot concrete pad with underground power and signal cables running to it. Construction and installation of the Chronos antenna was completed in December 2013.

No trees, wetlands, or other habitats were affected by construction activities for the telescope. Ground disturbance from excavation for the antenna foundation and the trenching of utilities was minimal.

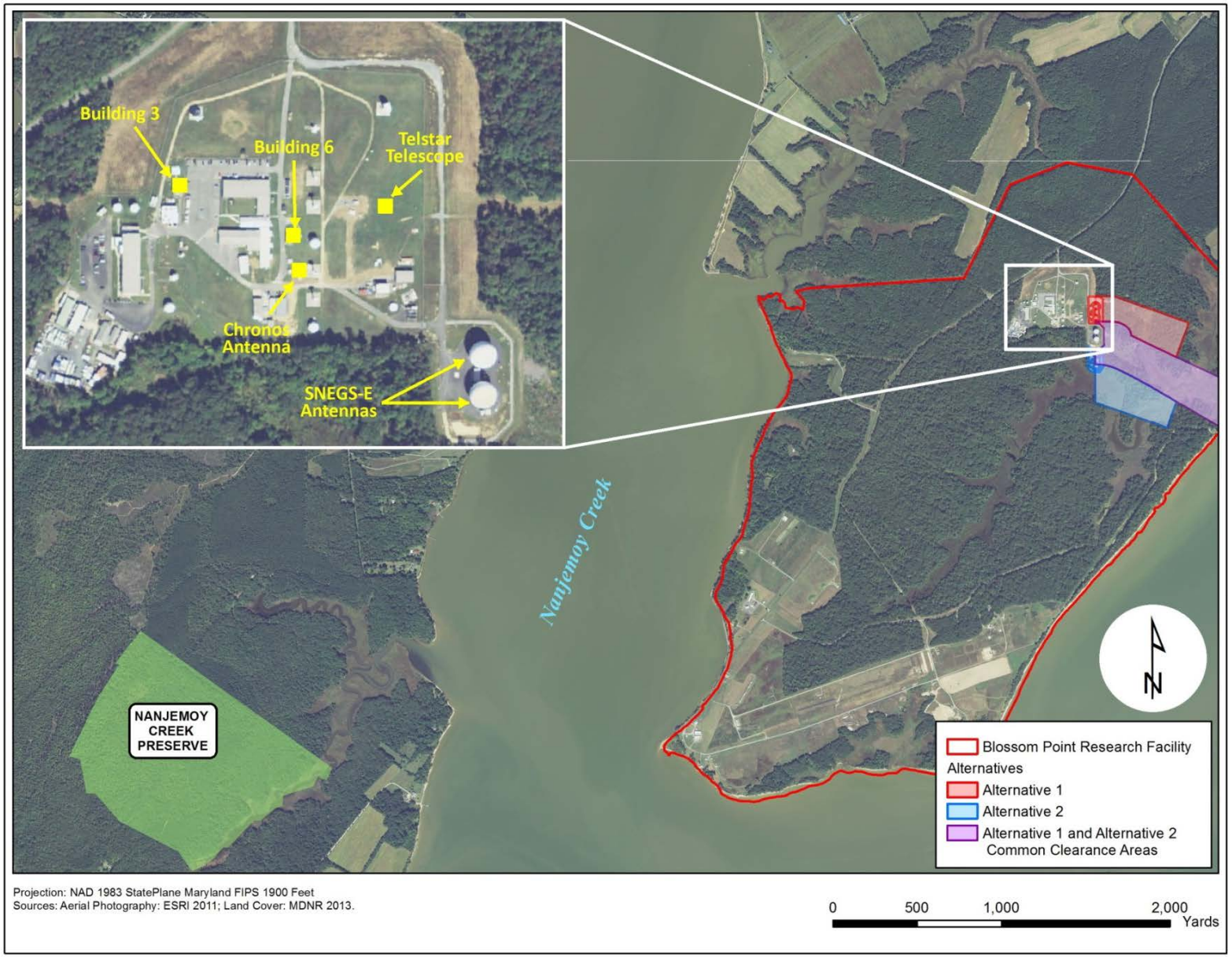

Figure 4-1. Other Projects on and in the Vicinity of Blossom Point

4.3.4 Power Infrastructure Upgrade

The power infrastructure for BPTF will be upgraded to provide ample and reliable power for the station. The new design will not only replace antiquated feeders and equipment, but will provide a single power distribution location and back-up power generation system. This will reduce the number of back-up generators, fuel storage tanks, and oil-filled transformers.

The power upgrade will be multi-faceted and utilize Building 6 (Figure 4-1) as the main power distribution center for BPTF. A summary of upgrade actions are described as follows:

- In Building 3, two existing 700-kVA diesel, Tier II, compliant generators and three oil-filled transformers will be removed from service, deinstalled, and removed from the station. In addition, two existing 1,000-gallon diesel fuel tanks at Building 3, along with all associated piping and day tanks, will be emptied, deinstalled, and properly disposed off site.
- In Building 6, two existing 360-kVA diesel, Tier III compliant, generators will be removed from service, deinstalled, and removed from the station.
- Behind Building 6, two new 800-kW diesel, Tier II compliant, generators will be installed for emergency back-up power capability at the station. Each of these generators will be mounted on a new 12-by-20-foot reinforced concrete foundation. Because the generators will be installed outside of the building, no additional structural modifications or construction are expected. The two existing 2,000-gallon capacity fuel tanks located just south of Building 6 will be reutilized for the new set of 800-kW generators. Each generator will also include an 800-gallon, dual-wall belly tank with spill containment and overflow protection.
- An underground power cable connection will be installed from Building 6 to the existing main distribution panel in Building 3. This connection will place the Building 3 distribution system on the new Building 6 main station power distribution system.

These upgrades are scheduled to occur during the second half of 2014 and could continue into early 2015. For long-term purposes, the new power generators would only be operated during power outages; and for periodic training, testing, and maintenance.

4.3.5 Nanjemoy Creek Preserve

Established in 1978 by The Nature Conservancy, the Nanjemoy Creek Preserve is located a little over a mile west of Blossom Point (see Figure 4-1), and consists of approximately 3,000 acres of forest and old field areas (The Nature Conservancy 2013). For purposes of conserving and improving forest habitat within the Nanjemoy Creek watershed, and controlling invasive plant species that threaten native wildlife, The Nature Conservancy plans to restore old fields with native trees and begin sustainable timber harvest on loblolly and Virginia pines as a means to restore native hardwood species. Forest restoration and tree-harvesting activities in the preserve are expected to start within the next 1 to 5 years (Barber 2013).

4.4 Analysis of Potential Cumulative Impacts

The following analysis examines the potential cumulative impacts on the natural and man-made environment that would result from the cumulative impact of the Proposed Action in combination with the other actions described in Section 4.3.

Based on the assessment of past, present, and reasonably foreseeable future actions at BPTF and in the vicinity, the Proposed Action would result in environmental effects from the various clearing and construction and activities. However, these impacts would not be considered significant. Resource topics

analyzed for cumulative impacts are air quality; biological resources; water resources; and geology, topography, and soils. Cultural resources, land use, and infrastructure were not analyzed for cumulative impacts due to their lack of impacts from the Proposed Action. As discussed in Section 1.5, the following environmental resource topics were omitted from analysis because of little or no environmental concerns: airspace; noise; traffic and transportation; hazardous materials, waste, and installation restoration; and socioeconomics, environmental justice, and children's health and safety.

4.4.1 Air Quality

Forest clearing and facility construction activities for the Proposed Action would occur months after completion of the SNEGS–E, Telstar, and Chronos construction projects on BPTF. The proposed clearing and construction-related activities would generate air pollutant emissions from site-disturbing activities and operation of construction equipment that would result in criteria pollutant and GHG emissions within the immediate area. However, air emissions would be temporary and typical for such activities. Although implementation of the Power Infrastructure Upgrade at BPTF and timber-harvesting activities on the Nanjemoy Creek Preserve to the west could occur during the same timeframe as the Proposed Action, cumulative emissions would not cause or contribute to a violation of any NAAQS or State Ambient Air Quality Standards and would represent a small percentage of overall air emissions in the Southern Maryland Intrastate AQCR.

The same conclusion applies for long-term air quality impacts occurring during maintenance of the combined LOS zone (via prescribed burning, mechanical removal, or the application of herbicides) when combined with the Nanjemoy Creek Preserve activities or other local projects. Although there could be a collective increase in air emissions in the area temporarily, variations in the timing of activities and the relative short duration of activities would moderate the impacts over space and time.

The planned power infrastructure upgrades to replace four existing emergency generators with two new generators, along with the new 800-kW diesel generator for the Southern Drawl project, could result in an overall increase in emissions from operations during power outages; and for periodic training, testing, and maintenance activities. However, it is expected that the three new generators would be more energy-efficient than the four older generators that are being replaced, and they would comply with Tier II emission regulations set by the USEPA. Long-term emissions are anticipated to be well below *de minimis* threshold limits and would not result in a significant impact on local or regional air quality. For the installation of the new emergency generators, Blossom Point would need to register the generators and might be required to obtain a permit for generator operation through the MDE.

GHGs are analyzed in Section 3.1.3 of this EA for relevance to CEQ guidance for individual projects. However, the potential impacts from proposed GHG emissions are by nature global and cumulative, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact on global climate change would only occur when proposed GHG emissions combine with GHG emissions from other man-made activities on a global scale. The clearing, construction, and LOS maintenance activities associated with the Proposed Action would contribute directly to emissions of GHGs from the combustion of fossil fuels and vegetation. The Department of Energy, Energy Information Administration estimates that 2009 gross CO_2 emissions in Maryland and the United States were 70.5 million metric tons and 5,631.3 million metric tons, respectively (DOE/EIA 2011). The Proposed Action would represent a negligible contribution (less than 0.001 percent) towards statewide GHG inventories and a negligible contribution (less than 0.0001 percent) toward national GHG inventories for FY 2016.

Therefore the past, present, and reasonably foreseeable future actions combined with the Proposed Action would not result in significant, cumulative air quality impacts or GHG emissions.

4.4.2 Biological Resources

For those actions identified in Section 4.3, only the Telstar and Chronos projects have had essentially no impacts on any biological resources of concern because of their location within the existing BPTF compound. The same finding applies to the upcoming Power Infrastructure Upgrade project. Also, since construction activities for the SNEGS–E, Telstar, and Chronos projects were completed in 2013, there is no potential for construction-related cumulative impacts in association with the Proposed Action.

Cumulatively, the Proposed Action, when combined with the SNEGS–E project, would result in a maximum clearing of approximately 42.7 acres of forested area. This would include several acres of forested wetland impacts, which are described in Section 4.4.3. The forest restoration and harvesting actions to occur on the Nanjemoy Creek Preserve over the next 1 to 5 years could overlap with the timing of construction and LOS clearing activities for the Proposed Action; however, those actions on the preserve would occur over a mile away and are likely to be significantly less intensive in the short term.

Equipment-related noise from activities associated with Proposed Action and the Nanjemoy Creek Preserve actions likely would not cumulatively increase noise levels due to the distance between the sites. Regardless, it is anticipated that wildlife, including protected species (e.g., bald eagles) and migratory birds, using nearby habitat would be expected to have become habituated to noise associated with the installation operations and other local activities.

Cumulative impacts on migratory birds and other wildlife could occur from the permanent removal of up to approximately 42.7 acres of forest area by the Proposed Action, when combined with the SNEGS–E project. However, there is abundant forested habitat adjacent to the impact areas, and birds and other wildlife, including protected species, would relocate to such habitats. Although the forest restoration and harvesting actions to occur on the Nanjemoy Creek Preserve would result in occasional short-term disturbances to birds and wildlife, including protected species, the long-term improvements to the hardwood forest habitat would be beneficial.

The clearing of forest for the Proposed Action would result in the removal of up to one active and one inactive bald eagle nests. At the Nanjemoy Creek Preserve, there is one known inactive eagle nest on the preserve and another nest on adjacent property. Neither nest is expected to be impacted by proposed forest restoration and harvesting actions on the preserve. However, in the event that an eagle nest is discovered in or near forest or habitat restoration sites, The Nature Conservancy would comply with all applicable federal and state regulations (Barber 2014).

As described for the Proposed Action in Section 3.2.3, the long-term maintenance of vegetative cover within the combined LOS zone through prescribed burns, mechanical removal, or herbicide applications would result in occasional short-term disturbances, and could harm migratory birds and other wildlife if conducted during the nesting/breeding season (April–August). The application of appropriate herbicides for vegetation maintenance is not likely to accumulate in animal tissue, particularly if applied only every 2 to 3 years. No other similar vegetation maintenance actions of a large scale have been identified in the vicinity of Blossom Point that would result in cumulative impacts on wildlife.

In conclusion, the past, present, and reasonably foreseeable future actions combined with the Proposed Action would not result in significant, cumulative impacts on migratory birds, protected species, or other wildlife.

4.4.3 Water Resources

During construction and clearing activities associated with the Proposed Action, runoff from site improvements could result in a slight increase in surface water turbidity. However, the potential for

cumulative impacts on local waters is not expected considering that the SNEGS–E, Telstar, and Chronos construction projects were completed in 2013. Additionally, the Telstar, Chronos, and upcoming Power Infrastructure Upgrade projects are relatively small in scale. Forest restoration and harvesting activities on the Nanjemoy Creek Preserve over the next 1 to 5 years could overlap with the timing of construction and LOS clearing activities for the Proposed Action; however, those actions to occur on the preserve likely would present only minor concerns for local surface water quality. Potential impacts from an increase in turbidity as a result of the Proposed Action and other actions would be minimized with implementation of BMPs (e.g., perimeter earth dikes, swales, sediment traps, stacked hay bales, and silt fencing) and adherence to erosion and storm water management requirements to contain soil and runoff on the project areas.

Upon completion of the Proposed Action, SNEGS–E, Telstar, Chronos, and Power Infrastructure Upgrade construction projects, there would be an overall increase of approximately 2.6 to 2.8 acres in impervious surface area at BPTF, primarily due to the Southern Drawl and SNEGS–E antenna facilities. However, the increase in impervious surface area would not be substantial, would be spread out over a large area, and would have little impact on overall storm water runoff quantity or quality. Just as for the proposed Southern Drawl project, NASA's SNEGS–E project was required to comply with federal and state regulatory policies and permits for storm water management (A. Morton Thomas and Associates, Inc. 2008).

Cumulatively, the Proposed Action, when combined with the SNEGS–E project would result in a maximum permanent loss of about 0.41 acre of wetlands and a maximum temporary impact on approximately 3.21 acres of wetlands. None of the other projects described in Section 4.3 have had or are expected to impact wetland areas. Just as for the SNEGS–E project, the Proposed Action requires that necessary wetland permits be obtained prior to proposed clearance and construction activities.

The project areas for clearing and construction activities associated with the Proposed Action and SNEGS–E project are within the 100-year floodplain of the Potomac River. The clearing of trees for these projects would not be expected to affect floodplain functions and values adversely.

Long-term alteration of the vegetative cover within the combined LOS zone through prescribed burns, mechanical removal, or herbicide applications could affect the aquatic environment indirectly by increasing the amount and velocity of storm water runoff. However, this should not create a long-term increase in the amount of sediment-laden runoff. Generally, prescribed fires, by design, are not intended to consume extensive layers of forest floor litter, which inhibits surface runoff and soil erosion. Additionally, mechanical removal or the application of herbicides would not remove root systems or all ground cover. If the forest floor remains intact and little to no bare soil is exposed, there is no mechanism for long-distance transport of sediment to streams, regardless of rainfall event.

Therefore, the past, present, and reasonably foreseeable future actions combined with the Proposed Action would not result in significant, cumulative impacts on wetlands, storm water management, and floodplains.

4.4.4 Geology, Topography, and Soils

Under the Proposed Action, minor alterations to topography and soils associated with the antenna site would occur from ground disturbance during construction of the antenna facility and the trenching for power and data cables. Similar impacts on soils occurred during the construction of the SNEGS–E, Telstar, and Chronos projects; however, the construction activities for these projects were completed in 2013. Additionally, the Telstar, Chronos, and Power Infrastructure Upgrade projects are relatively small

in scale. Forest restoration and harvesting activities on the Nanjemoy Creek Preserve over the next 1 to 5 years are not expected to result in substantial ground-disturbing activities.

Although the proposed Southern Drawl antenna site would be located adjacent to the recently constructed SNEGS–E facility, cumulative impacts on soils from these two projects generally would not occur since construction timing does not overlap. Regardless, adherence to required ESCPs and storm water management requirements is a condition that would minimize any impacts on soils from construction and clearing activities.

For the long-term maintenance of the combined LOS zone, the effects of fire on soils can vary greatly depending on the frequency, duration, intensity of fire, and soil characteristics. Generally, prescribed fires, by design, are not intended to consume extensive layers of forest floor litter, which inhibits surface runoff and soil erosion. The implementation of the prescribed burns would require the development of a Wildland Fire Management Plan and such burns generally would occur only every 2 or 3 years. If conducted, mechanical removal or herbicide applications would occur with a similar frequency, but would result in a lower potential for soil erosion. Because the herbicides that would be used would rapidly degrade and would only be used every 2 or 3 years, a build-up of herbicide levels in the soil would not occur.

In conclusion, the past, present, and reasonably foreseeable future actions combined with the Proposed Action would not result in significant, cumulative impacts on geology, topography, and soils.

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5 OTHER CONSIDERATIONS REQUIRED BY NEPA

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

Implementation of the Proposed Action would not conflict with the objectives or requirements of federal, state, or local plans, policies, or legal requirements. The Navy will consult with regulatory agencies, as appropriate, during the NEPA process.

5.1 Irreversible and Irretrievable Commitment of Resources

NEPA (42 U.S.C. § 4332 Section 102(2)(C)(v)) as implemented by CEQ regulation 40 CFR § 1502.16 requires an analysis of significant, irreversible effects resulting from implementation of a proposed action. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., nonrenewable resources such as metal, wood, fuel, paper, and other natural or cultural resources) also are irretrievable. Human labor is also considered an irretrievable resource. All such resources are irretrievable in that they are used for a project and, thus, become unavailable for other purposes. An impact that falls under the category of the irreversible or irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource.

Implementation of the Proposed Action would not result in irreversible commitment of human labor, building materials, fuels used in vehicles, and equipment used during construction of the antenna, and clearing and maintenance of the combined LOS zone. Energy (i.e., electricity and natural gas), water, and fuel consumption and demand for services would not increase significantly as a result of implementation of the Proposed Action. The commitment of these resources would be undertaken in a regular and authorized manner and does not present significant impacts in this EA.

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

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the existing conditions. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing an alternative could reduce future flexibility to pursue other alternatives, or that choosing a certain use could eliminate the possibility of other uses at the site.

The Proposed Action would not result in any environmental impacts that would narrow the range of beneficial uses of the project areas or vicinity, especially since beneficial uses are already severely limited by a radio frequency interference buffer around BPTF, which is necessary for the facility and the Proposed Action to function.

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. §4321 et seq.); CEQ NEPA implementing regulations (40 CFR 1500–1508); and U.S. Army procedures for Implementing NEPA (32 CFR Part 651)	This EA has been prepared in accordance with NEPA, CEQ regulations, and the U.S. Army's NEPA procedures to analyze the potential effects of the Proposed Action on the quality of the human environment. Public participation and review will be conducted in compliance with NEPA. As management decisions are made and project designs developed, further NEPA analysis or regulatory consultations could be required.
Clean Air Act (42 U.S.C. §7401 *et seq*.)	The Proposed Action would not change air quality attainment status or conflict with attainment and maintenance goals established in the state implementation plan. Therefore, a CAA conformity determination is not required.
Clean Water Act (Sections 401 and 404, 33 U.S.C. 1251 *et seq*.)	Due to expected impacts on wetland areas, necessary wetland permits would be obtained prior to proposed clearance and construction activities.
Coastal Zone Management Act (16 U.S.C. 1451 *et seq*.)	A Coastal Consistency Determination is being prepared for submittal to the MDE in compliance with the CZMA. The Act states that federal actions that have reasonably foreseeable effects on coastal uses or resources must be consistent to the maximum extent practicable with the enforceable policies of approved for state coastal management programs.
National Historic Preservation Act (Section106, 16 U.S.C. 470 *et seq*.)	A report on the results of a Phase I archaeological survey of the project area was submitted to the MHT pursuant to Section 106 of the Act. The MHT concurred with the survey methodology and the report findings. Further consultations under Section 106 will include an additional Phase I survey for a segment of proposed logging road located outside of the previously surveyed areas.
Endangered Species Act (16 U.S.C. 1531 *et seq*.)	There are no endangered species, or designated or proposed critical habitats, at the site of the Proposed Action; therefore, the Proposed Action would have no effect on endangered species or critical habitats.
Migratory Bird Treaty Act (16 U.S.C. 703–712)	Coordination will be initiated with the USFWS to allow for their comment on the Proposed Action.
Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d)	In accordance with the Act and USFWS regulations (50 CFR §22.27), a federal permit application for the take of bald eagle nests was submitted to the USFWS in December 2013.
Archaeological Resources Protection Act	In accordance with the Act, a survey was conducted to determine whether archaeological sites occur within the project area, which is located within a federal government installation.
EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-income Populations	No disproportionately high and adverse impacts on minority and low-income populations are expected from implementation of the Proposed Action, as neither alternative would result in displacement of people or businesses and would not change the economic character or stability of the installation or surrounding area.

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	Status of Compliance
EO 13045, Protection of Children From Environmental Health Risks and Safety Risks	Implementation of the Proposed Action would not result in any environmental health and safety risks that disproportionately affect children.
EO 11990, Protection of Wetlands	In accordance with the EO, the proponents of the Proposed Action are working to minimize impacts on wetlands. Additionally, the public is being given the opportunity to review the potential impacts on wetlands that are analyzed in this NEPA document.
EO 13112, Invasive Species	Because of the conversion of forested upland and wetlands to open field/scrub-shrub and emergent wetland habitat, the proponents of the Proposed Action would implement the Invasive Species Management Plan for Blossom Point (USACE 2013a) in accordance with the EO.

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6 PERSONS, AGENCIES, AND ORGANIZATIONS CONTACTED

The following agencies, organizations, and individuals listed in alphabetical order were consulted or provided information during the preparation of the EA:

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10 LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees fahrenheit
$\mu g/m^3$	micrograms per cubic meter
ALC	Adelphi Laboratory Center
APE	Area of Potential Effect
AQCR	air quality control region
ATV	All Terrain Vehicle
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BPTF	Blossom Point Tracking Facility
CAA	Clean Air Act
CCB	The Center for Conservation Biology
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
COMAR	Code of Maryland Regulations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DOD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESCP	Erosion-and-Sediment-Control Plan
ESD	Environmental Site Design
FEMA	Federal Emergency Management Agency
FIDS	forest interior dwelling species
FONSI	Finding of No Significant Impact
FY	fiscal year
GHG	greenhouse gas
HERO	hazards of electromagnetic radiation to ordnance
JLUS	Joint Land Use Study
kVA	kilovolt-amperes
kW	kilowatt
LID	Low Impact Development
LOA	Letter of Authorization
LOS	line-of-sight
MBTA	Migratory Bird Treaty Act
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources

MDOT	Maryland Department of Transportation
mg/m^3	milligrams per cubic meter
MHT	Maryland Historical Trust
MOU	Memorandum of Understanding
MSL	mean sea level
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRL	Naval Research Laboratory
O_3	ozone
ORS	Operationally Responsive Space
Pb	lead
PM_{10}	particulate matter equal to or less than 10 microns in diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
ppb	parts per billion
ppm	parts per million
RF	radio frequency
ROI	region of influence
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMECO	Southern Maryland Electric Company
SNEGS–E	Space Network Expansion Ground System–East
SO_2	sulfur dioxide
STP	shovel test pit
TacSat	Tactical Satellite
TDRSS	Tracking and Data Relay Satellite System
tpy	tons per year
USACE	U.S. Army Corps of Engineers
USAG	U.S. Army Garrison
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
WMA	Wildlife Management Area
USFWS	U.S. Fish and Wildlife Service

APPENDIX A

Air Emissions Calculations

Appendix A contains detailed lists of construction equipment, and associated emissions calculations for Alternative 1 and 2. This appendix also contains emission factors that were used in the air quality analysis.

Alternative 1

- A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities.
- A-2 – Estimated Emissions from Alternative 1 Proposed LOS Clearing Activities
- A-3 – Estimated Emissions from Alternative 1 Proposed Prescribed Burn Activities
- A-4 – Estimated Emissions from Alternative 1 Proposed Mechanical Removal and Herbicide Application Activities
- A-5 – Estimated Emissions from Alternative 1 Proposed Generator Operations

Alternative 2

- A-6 - Estimated Emissions from Alternative 2 Proposed Construction Activities.
- A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities
- A-8 – Estimated Emissions from Alternative 2 Proposed Prescribed Burn Activities
- A-9 – Estimated Emissions from Alternative 2 Proposed Mechanical Removal and Herbicide Application Activities

  It is anticipated that emissions from Alternative 2 generator operations would be the same as those described for Alternative 1. Repeat estimations are not provided.

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Summary	Summarizes total emissions for the Construction of Alternative 1 (Proposed Action) in 2014
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction and demolition activities including earthmoving, vehicle traffic, and windblown dust.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
Tier Report	Summarizes total emissions for the Southern Maryland Intrastate AQCR report for 2008, to be used to compare the Proposed Action to regional emissions.

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Summary of Air Emissions for Alternative 1 in 2014

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Combustion	2.395	1.344	0.082	0.588	0.701	0.588	264.402
Fugitive Dust	-	-	-	-	3.790	0.379	-
Haul Truck On-Road	0.076	0.017	0.054	0.000	0.003	0.002	32.907
Commuter	0.019	0.190	0.166	0.000	0.003	0.002	31.754
TOTAL	***2.489***	***1.552***	***0.302***	***0.588***	***4.496***	***0.971***	***329.064***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons =	***298.461***	***metric tons***	
State of Maryland's CO_2 emissions =	***70,500,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of Maryland's CO_2 emissions =	***0.00042%***		
United States' CO_2 emissions =	***5,631,300,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of USA's CO_2 emissions =	***0.000005%***		

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2012. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide).* Available online <http://www.eia.gov/environment/emissions/state/state_emissions.cfm>. Data released January 2013. Data accessed 15 September 2013.

Since future year budgets were not readily available, actual 2008 air emissions inventories for the counties were used as an approximation of the regional inventory. Because emissions from the Proposed Action in 2014 are several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Southern Maryland Intrastate AQCR Air Basin

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2008	13,691	33,110	55,798	72,267	7,193	4,191

Source: USEPA National Emissions Inventory (NEI) (http://neibrowser.epa.gov/eis-public-web/home.html). Site visited on 10 May 2013

Air Emissions from the Proposed Action in 2014

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	13,691	33,110	55,798	72,267	7,193	4,191
Emissions	2.489	1.552	0.302	0.588	4.496	0.971
% of Regional	**0.018%**	**0.005%**	**0.001%**	**0.001%**	**0.063%**	**0.023%**

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

	Construction of Facilities and Support	**Area Disturbed**		
1.)	Construction of Data Center and Power Building	4,200	ft^2	
		2,800	ft^2	Power Building
2.)	Antenna footprint & additional paving	209,100	ft^2	Total Area Disturbed
		73,500	ft^2	Paved area
	Total Construction Area:	289,600	ft^2	
		6.65	acres	
	Total Disturbed Area:	289,600	ft^2	
		6.65	acres	
	Construction Duration:	6	months	
	Annual Construction Activity:	120	days	Assume 4 weeks per month, 5 days per week.

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Emission Factors Used for Construction Equipment

References: U.S. EPA NONROAD Emissions Model, Version 2005.0.0, Environmental Assessment for the TEX Rail Corridor, and Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling-- Compression-Ignition (EPA420-P-04-009)
Emission factors are taken from the NONROAD model and rankcase Emission Factors for Nonroad Engine Modeling-- Compression-Ignition
The equipment were estimated based upon equipment used for similar antenna installation projects conducted worldwide over the past 5 years.

Construction

Equipment[c]	Anticipated Hours of Use	NO_x (lbs)	VOC[a] (lbs)	CO (lbs)	SO_2[b] (lbs)	PM_{10} (lbs)	$PM_{2.5}$ (lbs)	CO_2 (lbs)
Mobile (non-road)								
Excavator CAT® 330-B	240	680.65	368.68	21.27	168.38	141.80	168.38	74,850.27
Loader CAT® 966 G	240	665.41	360.43	20.79	164.61	138.63	164.61	73,174.52
Skid Steer CAT® 236	240	184.08	139.00	11.27	44.86	184.08	44.86	22,178.27
Water Truck	240	490.01	260.00	15.00	118.74	100.00	118.74	52,786.20
Compactor CAT® 815F	80	196.41	106.39	6.14	48.59	40.92	48.59	21,598.59
Motor Grader CAT® 140 H	266	525.85	279.02	16.10	127.43	107.32	127.43	56,647.41
Disc CAT® Challenger 45	12	6.48	4.89	0.40	1.58	6.48	1.58	780.93
Backhoe CAT® 416 C	400	328.40	247.98	20.11	80.02	328.40	80.02	39,566.87
IT Loader CAT® IT28G	235	274.17	145.48	8.39	66.44	55.95	66.44	29,535.14
Skip & Drag John Deere 210C	290	960.55	520.30	30.02	237.62	200.11	237.62	105,630.59
Scraper CAT 613 C	68	99.17	52.62	3.04	24.03	20.24	24.03	10,682.92
Machine Power Curber 5700-C	44	49.43	26.23	1.51	11.98	10.09	11.98	5,325.17
Plate Compactor	44	49.43	26.23	1.51	11.98	10.09	11.98	5,325.17
Concrete Truck	120	279.37	151.33	8.73	69.11	58.20	69.11	30,722.13
	Total over duration of the project	4,789.40	2,688.57	164.28	1,175.35	1,402.31	1,175.35	528,804.18

a) VOC emissions are assumed to be equal to 1.053 times the HC emissions.
b) The SO_2 emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used will be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.
c) The equipment were estimated based upon equipment used for similar antenna installation projects conducted worldwide over the past 5 years.
d) $PM_{2.5}$ are estimated as 0.97 times the PM_{10} emissions
e) CO_2 emission factors are based on brake-specific fuel consumption
f) Construction equipment emission rates were calculated assuming equipment would meet Tier 2 and Tier 3 emissions standards for nonroad engines.

Sample Daily Construction Emission Calculation:
(NOx emission factor - based on equipment type and horsepower)(equipment horsepower)(hours used per day)(number used)(pound/gram conversion factor)

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	4,789.40	2,688.57	164.28	1,175.35	1,402.31	1,175.35	528,804
Total Project Emissions (tons)	2.395	1.344	0.082	0.588	0.701	0.588	264.402

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

General Construction and Demolition Activities (0.19 ton PM_{10}/acre-month)

Duration of Project	6	months
Area	6.65	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
General Construction Activities	7.579	3.790	0.758	0.379
Total	**7.579**	**3.790**	**0.758**	**0.379**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Haul Truck Emissions

Emissions from hauling fill material are estimated in this spreadsheet.
Emission Estimation Method: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised December 2003).

Assumptions:
Haul trucks carry 20 cubic yards of material per trip.
The average distance from the project site to the materials source is estimated to be 25 miles; therefore, a haul truck will travel 50 miles round trip.
Estimated number of trips required by haul trucks = total amount of material/20 cubic yards per truck

Amount of Fill Material =	9,600	cubic yards	Assumes 4 feet of material is needed
Number of trucks required =	480	heavy duty diesel haul truck trips	
Miles per trip =	50	miles	

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HDDV	**2.87**	**0.6**	**2.0**	**0.012**	**0.11**	**0.08**	**1243.900**

Notes:
Emission factors for all pollutants are from USAF AFCEE 2013.
Emission factors are from Table 5-10 for 2014 calendar year, high altitude (USAF AFCEE 2013).

HDDV Haul Truck Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**151.852**	**34.339**	**108.307**	**0.635**	**5.820**	**4.392**	**65814.815**
tons	**0.076**	**0.017**	**0.054**	**0.000**	**0.003**	**0.002**	**32.907**

Example Calculation: NO_x emissions (lbs) = 50 miles per trip * 480 trips * NO_x emission factor (g/mile) * lb/453.6 g

128711.11

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2013 are used.

The average roundtrip commute for a construction worker =	30	miles
Number of construction days =	120	days
Number of construction workers (daily) =	16	people

Passenger Vehicle Emission Factors for Year 2014 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00065484	0.00660353	0.00575800	0.00001069	0.00009185	0.00005939	1.10257205

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 10 May 2013.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**37.719**	**380.364**	**331.661**	**0.616**	**5.291**	**3.421**	**63508.150**
tons	**0.019**	**0.190**	**0.166**	**0.000**	**0.003**	**0.002**	**31.754**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

A-1 – Estimated Emissions from Alternative 1 Proposed Construction Activities

Southern Maryland Intrastate AQCR Inventory

			All Emission Sources					
Row #	State	County	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
1	MD	Calvert	12,191.30	3,332.68	1,148.38	521.29	675.60	7,020.73
2	MD	Charles	21,605.34	6,282.85	4,547.09	2,873.65	70,705.84	14,456.77
3	MD	St. Mary's	22,001.40	4,075.43	1,497.73	795.63	885.51	11,632.24
Grand Total			55,798	13,691	7,193	4,191	72,267	33,110

SOURCE:
http://neibrowser.epa.gov/eis-public-web/home.html
USEPA National Emissions Inventory (NEI)
Emissions in tons per year for 2008

A-2 – Estimated Emissions from Alternative 1 Proposed LOS Clearing Activities

Summary	Summarizes total emissions for LOS Clearing in Alternative 1 (Proposed Action) in 2014
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction and demolition activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Haul Truck On-Road	Estimates emissions from haul trucks hauling fill materials to the job site.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
Emergency Generator	Estimates emissions from the operation of emergency generators.
AQCR Tier Report	Summarizes total emissions for the Southern Maryland Intrastate AQCR report for 2008, to be used to compare the Proposed Action to regional emissions.

Summary of Air Emissions for Alternative 1 LOS Clearing in 2014

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Combustion	16.33	0.90	7.12	1.26	0.85	0.82	1,792.89
Fugitive Dust	-	-	-	-	23.48	2.35	-
Haul Truck On-Road	0.22	0.03	0.07	0.00	0.01	0.01	97.39
Commuter	0.02	0.19	0.17	0.00	0.00	0.00	31.75
TOTAL	***16.57***	***1.12***	***7.35***	***1.27***	***24.34***	***3.18***	***1,922.04***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons =	***1,743.293***	***metric tons***	
State of Maryland's CO_2 emissions =	***70,500,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of Maryland's CO_2 emissions =	***0.00247%***		
United States' CO_2 emissions =	***5,631,300,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of USA's CO_2 emissions =	***0.000031%***		

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2013. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide).* Available online <http://www.eia.gov/environment/emissions/state/state_emissions.cfm>. Data released January 2013. Data accessed 15 September 2013.

Since future year budgets were not readily available, actual 2008 air emissions inventories for the counties were used as an approximation of the regional inventory. Because emissions from the Proposed Action in 2014 are several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Southern Maryland Intrastate AQCR Air Basin

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2008	13,691	33,110	55,798	72,267	7,193	4,191

Source: USEPA National Emissions Inventory (NEI) (http://neibrowser.epa.gov/eis-public-web/home.html). Site visited on 10 May 2013

Air Emissions from the Proposed Action in 2014

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	13,691	33,110	55,798	72,267	7,193	4,191
Emissions	16.565	1.120	7.350	1.266	24.340	3.176
% of Regional	**0.121%**	**0.0034%**	**0.0132%**	**0.002%**	**0.338%**	**0.076%**

A-2 – Estimated Emissions from Alternative 1 Proposed LOS Clearing Activities

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction and Demolition

General Construction and Modification Activities	Approximate Area Disturbed		
1.) Site Clearing and Grubbing (LOS Zones)	1,581,228	ft^2	Total Area Disturbed
2.) Site Clearing and Grubbing (Antenna site)	209,100	ft^2	Total Area Disturbed
3.) Trenching	4,350	ft^2	Approximately 725 feet of trenching, 6 feet wide

Total Clearing Area	1,794,678	ft^2	
	41.20	acres	
Total Disturbed Area:	1,794,678	ft^2	
	41.20	acres	
Site Clearing Duration:	6	months	
Annual Clearing Activity:	120	days	Assume 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	3.45	2.55	2.47	4941.53

Site Clearing & Trenching

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Feller Buncher/Skidder	1	20.74	0.85	11.00	1.46	0.63	0.61	2007.72
Bulldozer	2	27.19	1.91	11.00	2.03	1.79	1.74	2913.81
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	4	66.29	3.66	29.01	5.13	3.41	3.31	7264.50

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.
c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.
d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

A-2 – Estimated Emissions from Alternative 1 Proposed LOS Clearing Activities

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	4	166.565	10.308	62.840	13.797	10.182	9.877	19766.105
Site Clearing Equipment	4	265.156	14.635	116.035	20.502	13.660	13.245	29057.992

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	1,794,678	41.20	5	(from "Grading" worksheet)
Site Clearing:	1,794,678	41.20	120	

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	832.82	51.54	314.20	68.99	50.91	49.38	98,831
Site Clearing	31,818.74	1,756.22	13,924.20	2,460.20	1,639.14	1,589.44	3,486,959
Total Emissions (lbs):	**32,651.57**	**1,807.76**	**14,238.39**	**2,529.19**	**1,690.05**	**1,638.82**	**3,585,790**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	32,651.57	1,807.76	14,238.39	2,529.19	1,690.05	1,638.82	3,585,790
Total Project Emissions (tons)	16.326	0.904	7.119	1.265	0.845	0.819	1,792.895

A-2 – Estimated Emissions from Alternative 1 Proposed LOS Clearing Activities

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

General Site Clearing Activities (0.19 ton PM_{10}/acre-month)

Duration of Project	6	months
Area	41.20	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
General Site Clearing Activities	46.968	23.484	4.697	2.348
Total	**46.968**	**23.484**	**4.697**	**2.348**

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters
Clearing area: 41.20 acres/yr (from Combustion Worksheet)
Qty Equipment: 17.00 (calculated based on 4 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	41.20	5.15
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	41.20	20.14
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	20.60	20.77
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	20.60	8.52
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	41.20	14.45
TOTAL								69.04

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 69.04
Qty Equipment: 17.00
Grading days/yr: 4.06

A-2 – Estimated Emissions from Alternative 1 Proposed LOS Clearing Activities

Haul Truck Emissions

Emissions from hauling excavation material and construction supplies are estimated in this spreadsheet.

Emission Estimation Method: United States Air Force (USAF), Air Force Center for Environmental Excellence (AFCEE), Air Emissions Guide for Air Force Mobile Sources (Revised January 2013).

Assumptions:
Haul trucks carry 20 cubic yards of material per trip.
The average distance from the project site to the materials source is estimated to be 15 miles; therefore, a haul truck will travel 30 miles round trip.
Estimated number of trips required by haul trucks = total amount of material/20 cubic yards per truck

Amount of Tree Material Removed =	82	tons	Assumes approximately 15 trees per acre would be removed. Assumes roughly 7.5 trees per ton.
Amount of Building Materials (Above Ground) =	1,037	cubic yards	Assumes 4 feet of building material are needed for each floor
Amount of Building Materials (Below Ground) =	1,296	cubic yards	Assumes 5 feet of material are needed for the below ground portion of the building
Amount of Excavation Material (Buildings) =	3,111	cubic yards	Assumes 12 feet of material would need to be excavated on average
Amount of Excavation Material (Antenna) =	40,833	cubic yards	Assumes 15 feet of material would need to be excavated on average
Amount of Excavation Material (Trenching)=	967	cubic yards	Assumes 6 feet of material would need to be excavated on average
Number of trucks required =	2,368	heavy duty diesel haul truck trips	
Miles per trip =	30	miles	

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO_x	VOC	CO	SO_2	PM10	$PM_{2.5}$	CO_2
HDDV	**2.817**	**0.325**	**0.832**	**0.012**	**0.110**	**0.083**	**1243.900**

Notes:
Emission factors for all pollutants are from USAF AFCEE 2013.
Emission factors are from Tables 5-10 for the 2014 calendar year, high altitude (USAF AFCEE 2013).

HDDV Haul Truck Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**441.125**	**50.893**	**130.286**	**1.879**	**17.225**	**12.997**	**194787.354**
tons	**0.221**	**0.025**	**0.065**	**0.001**	**0.009**	**0.006**	**97.394**

Example Calculation: NO_x emissions (lbs) = 30 miles per trip * 369 trips * NO_x emission factor (g/mile) * lb/453.6 g

Haul Truck On-Road
Estimated Emissions for LOS Clearing in Alternative 1 (Proposed Action) in 2014

A-2 – Estimated Emissions from Alternative 1 Proposed LOS Clearing Activities

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2014 are used.

The average roundtrip commute for a construction worker =	30	miles
Number of construction days =	120	days
Number of construction workers (daily) =	16	people

Passenger Vehicle Emission Factors for Year 2014 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00065484	0.00660353	0.00575800	0.00001069	0.00009185	0.00005939	1.10257205

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 10 May 2013.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**37.719**	**380.364**	**331.661**	**0.616**	**5.291**	**3.421**	**63508.150**
tons	**0.019**	**0.190**	**0.166**	**0.000**	**0.003**	**0.002**	**31.754**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

A-3 – Estimated Emissions from Alternative 1 Proposed Prescribed Burn Activities

Estimated Emissions For Prescribed Burns

Estimated PM_{10} and CO emissions for Prescribed Burns under Alternative 1

Emission Estimation Method: Emission factors and fuel loading factors for the Southeast Region from Section 13.1 *Wildfires and Prescribed Burning* of AP-42 were used.

Assumptions:
The Proposed Action is located within the northeast corner of the Southeast region as depicted in Figure 13.1-1 of Section 13.1 of AP-42.
Approximate size of Alternative 1 LOS requiring prescribed burning = 36.3 acres Based on GIS provided measurements
Estimated Average Fuel Loading = 20 Mg/hectare

Emission Factors for Prescribed Burning for the Southeast Region (g/kg)

Fuel Type	PM_{10}	$PM_{2.5}$[1]	CO	NO_X[2]	CO_2 equivalent[3]
Palmetto/gallberry	15	15	125	-	-
Underburning pine	30	30	163	-	-
Logging slash	13	13	126	-	-
Grassland	10	10	75	-	-
Other	17	17	175	-	-
Temperate and Boreal Forests	-	-	-	-	6.1
Average for Region	**18.8**	**18.8**	**134.0**	**4.0**	**6.1**

Source: Section 13.1 of the AP-42

1 Based on the limited available data, it is assumed that $PM_{2.5}$ emissions are equivalent to PM_{10} emissions.

2 AP-42 assumes that NO_X is emitted at rates from 1 to 4 g/kg burned, depending on combustion temperatures.

Estimated Prescribed Burn Emissions for Alternative 1

	Alternative 1 LOS				
	PM_{10}	$PM_{2.5}$	CO	NO_X	CO_2
tons	**6.089**	**6.089**	**43.397**	**1.295**	**41.487**

A-4 – Estimated Emissions from Alternative 1 Proposed Mechanical Removal and Herbicide Application Activities

Summary	Summarizes total emissions for Maintenance Activities in Alternative 1 (Proposed Action) in 2015
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from maintenance activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Haul Truck On-Road	Estimates emissions from haul trucks hauling fill materials to the job site.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
Emergency Generator	Estimates emissions from the operation of emergency generators.
AQCR Tier Report	Summarizes total emissions for the Southern Maryland Intrastate AQCR report for 2008, to be used to compare the Proposed Action to regional emissions.

Suammry of Air Emissions for the Maintenance Activities (Alternative 1) in 2015

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Combustion	0.82	0.06	0.33	0.06	0.05	0.05	87.41
Fugitive Dust	-	-	-	-	1.72	0.17	-
Commuter	0.00	0.00	0.00	0.00	0.00	0.00	0.83
TOTAL	***0.82***	***0.06***	***0.33***	***0.06***	***1.78***	***0.22***	***88.24***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons =	***80.035***	***metric tons***	
State of Maryland's CO_2 emissions =	***70,500,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of Maryland's CO_2 emissions =	***0.00011%***		
United States' CO_2 emissions =	***5,631,300,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of USA's CO_2 emissions =	***0.000001%***		

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2013. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide).* Available online <http://www.eia.gov/environment/emissions/state/state_emissions.cfm>. Data released January 2013. Data accessed 15 September 2013.

Since future year budgets were not readily available, actual 2008 air emissions inventories for the counties were used as an approximation of the regional inventory. Because emissions from the Proposed Action in 2015 are several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Southern Maryland Intrastate AQCR Air Basin

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2008	13,691	33,110	55,798	72,267	7,193	4,191

Source: USEPA National Emissions Inventory (NEI) (http://neibrowser.epa.gov/eis-public-web/home.html). Site visited on 10 May 2013

Air Emissions from the Proposed Action in 2015

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	13,691	33,110	55,798	72,267	7,193	4,191
Emissions	0.816	0.062	0.334	0.061	1.778	0.225
% of Regional	**0.006%**	**0.0002%**	**0.0006%**	**0.000%**	**0.025%**	**0.005%**

A-4 – Estimated Emissions from Alternative 1 Proposed Mechanical Removal and Herbicide Application Activities

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction and Demolition

	General Construction and Modification Activities	**Approximate Area Disturbed**		
1.)	Maintenance Activities (Three tractors for Bush Hogging or Herbicide Application)	1,581,228	ft^2	Total Area Disturbed
	Total Site Clearing Area	1,581,228	ft^2	
		36.30	acres	
	Total Disturbed Area:	1,581,228	ft^2	
		36.30	acres	
	Site Clearing Duration:	0.5	months	
	Annual Clearing Activity:	10	days	Assume 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Bush Hogging or Herbicide Application - Maintenance Activities

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Tractor	3	40.79	2.87	16.51	3.05	2.68	2.60	4370.71
Total per 10 acres of activity	3	40.79	2.87	16.51	3.05	2.68	2.60	4370.71

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.
c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.
d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Site Clearing Equipment	4	163.159	11.489	66.026	12.204	10.734	10.412	17482.846

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days
Bush Hogging or Herbicide Application	1,581,228	36.30	10

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Site Clearing	1,631.59	114.89	660.26	122.04	107.34	104.12	174,828
Total Emissions (lbs):	**1,631.59**	**114.89**	**660.26**	**122.04**	**107.34**	**104.12**	**174,828.46**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	1,631.59	114.89	660.26	122.04	107.34	104.12	174,828
Total Project Emissions (tons)	0.816	0.057	0.330	0.061	0.054	0.052	87.414

A-4 – Estimated Emissions from Alternative 1 Proposed Mechanical Removal and Herbicide Application Activities

Maintenance Activities Fugitive Dust Emissions

Maintenance Activities Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Maintenance Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

General Site Clearing Activities (0.19 ton PM_{10}/acre-month)

Duration of Project	1	months
Area	36.30	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
General Site Clearing Activities	3.449	1.724	0.345	0.172
Total	**3.449**	**1.724**	**0.345**	**0.172**

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2015 are used.

The average roundtrip commute for a construction worker =	30	miles
Number of construction days =	10	days
Number of construction workers (daily) =	5	people

Passenger Vehicle Emission Factors for Year 2015 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00065484	0.00660353	0.00575800	0.00001069	0.00009185	0.00005939	1.10257205

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 10 May 2013.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**0.982**	**9.905**	**8.637**	**0.016**	**0.138**	**0.089**	**1653.858**
tons	**0.000**	**0.005**	**0.004**	**0.000**	**0.000**	**0.000**	**0.827**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

A-5 – Estimated Emissions from Alternative 1 Proposed Generator Operations

Generator emissions

Generator Kilowatts
800

Diesel Industrial Engine Emission Factors from 40 CFR 89.112(a)	NOx	CO	PM-10	PM-2.5
	g/KW-hr	g/KW-hr	g/KW-hr	g/KW-hr
Emission Factor	6.4	3.5	0.2	0.192

Assume max. 500 hr/yr operation and testing for each genereatior	NOx	CO	PM-10	PM-2.5
	(lbs/yr)	(lbs/yr)	(lbs/yr)	(lbs/yr)
	5,643.84	3,086.47	176.37	169.32

Generator Kilowatts	Generator Engine (hp)
800	1207

Diesel Industrial Engine Emission Factors from AP-42, Section 3.4	VOC	SO2	CO2
	lb/hp-hr	lb/hp-hr	lb/hp-hr
Emission Factor	0.00064	0.000012	1.16

Assume max. 500 hr/yr operation and testing	VOC	SO2	CO2
	(lbs/yr)	(lbs/yr)	(lbs/yr)
	386.24	7.24	700,060.00

Emissions Per Year	NOx	CO	PM-10	PM-2.5	VOC	SO2	CO2
	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
	2.822	**1.543**	**0.0882**	**0.0847**	**0.193**	**0.004**	**350.030**

Sources: 40 CFR 89.112(a). Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards.Table 1.

USEPA 1996. AP-42. Large Stationary Diesel And All Stationary Duel-fuel Engines. Table 3.4-1. Page 3.4-5.

A-6 - Estimated Emissions from Alternative 2 Proposed Construction Activities

Summary	Summarizes total emissions for the Construction of Alternative 2 in 2014
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction and demolition activities including earthmoving, vehicle traffic, and windblown dust.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
Tier Report	Summarizes total emissions for the Southern Maryland Intrastate AQCR report for 2008, to be used to compare the Proposed Action to regional emissions.

Summary of Air Emissions for Alternative 2 in 2014

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Combustion	2.395	1.344	0.082	0.588	0.701	0.588	264.402
Fugitive Dust	-	-	-	-	3.790	0.379	-
Haul Truck On-Road	0.130	0.030	0.093	0.001	0.005	0.004	56.560
Commuter	0.019	0.190	0.166	0.000	0.003	0.002	31.754
TOTAL	***2.544***	***1.564***	***0.341***	***0.589***	***4.498***	***0.972***	***352.716***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons =	***319.913***	***metric tons***	
State of Maryland's CO_2 emissions =	***70,500,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of Maryland's CO_2 emissions =	***0.00045%***		
United States' CO_2 emissions =	***5,631,300,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of USA's CO_2 emissions =	***0.000006%***		

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2012. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide).* Available online <http://www.eia.gov/environment/emissions/state/state_emissions.cfm>. Data released January 2013. Data accessed 15 September 2013.

Since future year budgets were not readily available, actual 2008 air emissions inventories for the counties were used as an approximation of the regional inventory. Because emissions from the Proposed Action in 2014 are several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Southern Maryland Intrastate AQCR Air Basin

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2008	13,691	33,110	55,798	72,267	7,193	4,191

Source: USEPA National Emissions Inventory (NEI) (http://neibrowser.epa.gov/eis-public-web/home.html). Site visited on 10 May 2013

Air Emissions from Alternative 2 in 2014

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	13,691	33,110	55,798	72,267	7,193	4,191
Emissions	2.544	1.564	0.341	0.589	4.498	0.972
% of Regional	**0.019%**	**0.005%**	**0.001%**	**0.001%**	**0.063%**	**0.023%**

A-6 - Estimated Emissions from Alternative 2 Proposed Construction Activities

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

	Construction of Facilities and Support	**Area Disturbed**		
1.)	Construction of Data Center and Power Building	4,200	ft^2	
		2,800	ft^2	Power Building
2.)	Antenna footprint & additional paving	209,100	ft^2	Total Area Disturbed
		73,500	ft^2	Paved area
	Total Construction Area:	289,600	ft^2	
		6.65	acres	
	Total Disturbed Area:	289,600	ft^2	
		6.65	acres	
	Construction Duration:	6	months	
	Annual Construction Activity:	120	days	Assume 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: U.S. EPA NONROAD Emissions Model, Version 2005.0.0, Environmental Assessment for the TEX Rail Corridor, and Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling-- Compression-Ignition (EPA420-P-04-009)
Emission factors are taken from the NONROAD model and rankcase Emission Factors for Nonroad Engine Modeling-- Compression-Ignition
The equipment were estimated based upon equipment used for similar antenna installation projects conducted worldwide over the past 5 years.

Construction

Equipment[c]	Anticipated Hours of Use	NO_x (lbs)	VOC[a] (lbs)	CO (lbs)	SO_2[b] (lbs)	PM_{10} (lbs)	$PM_{2.5}$ (lbs)	CO_2 (lbs)
Mobile (non-road)								
Excavator CAT® 330-B	240	680.65	368.68	21.27	168.38	141.80	168.38	74,850.27
Loader CAT® 966 G	240	665.41	360.43	20.79	164.61	138.63	164.61	73,174.52
Skid Steer CAT® 236	240	184.08	139.00	11.27	44.86	184.08	44.86	22,178.27
Water Truck	240	490.01	260.00	15.00	118.74	100.00	118.74	52,786.20
Compactor CAT® 815F	80	196.41	106.39	6.14	48.59	40.92	48.59	21,598.59
Motor Grader CAT® 140 H	266	525.85	279.02	16.10	127.43	107.32	127.43	56,647.41
Disc CAT® Challenger 45	12	6.48	4.89	0.40	1.58	6.48	1.58	780.93
Backhoe CAT® 416 C	400	328.40	247.98	20.11	80.02	328.40	80.02	39,566.87
IT Loader CAT® IT28G	235	274.17	145.48	8.39	66.44	55.95	66.44	29,535.14
Skip & Drag John Deere 210C	290	960.55	520.30	30.02	237.62	200.11	237.62	105,630.59
Scraper CAT 613 C	68	99.17	52.62	3.04	24.03	20.24	24.03	10,682.92
Machine Power Curber 5700-C	44	49.43	26.23	1.51	11.98	10.09	11.98	5,325.17
Plate Compactor	44	49.43	26.23	1.51	11.98	10.09	11.98	5,325.17
Concrete Truck	120	279.37	151.33	8.73	69.11	58.20	69.11	30,722.13
	Total over duration of the project	4,789.40	2,688.57	164.28	1,175.35	1,402.31	1,175.35	528,804.18

a) VOC emissions are assumed to be equal to 1.053 times the HC emissions.
b) The SO_2 emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used will be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.
c) The equipment were estimated based upon equipment used for similar antenna installation projects conducted worldwide over the past 5 years.
d) $PM_{2.5}$ are estimated as 0.97 times the PM_{10} emissions
e) CO_2 emission factors are based on brake-specific fuel consumption
f) Construction equipment emission rates were calculated assuming equipment would meet Tier 2 and Tier 3 emissions standards for nonroad engines.

Sample Daily Construction Emission Calculation:

(NOx emission factor - based on equipment type and horsepower)(equipment horsepower)(hours used per day)(number used)(pound/gram conversion factor)

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	4,789.40	2,688.57	164.28	1,175.35	1,402.31	1,175.35	528,804
Total Project Emissions (tons)	2.395	1.344	0.082	0.588	0.701	0.588	264.402

A-6 - Estimated Emissions from Alternative 2 Proposed Construction Activities

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

General Construction and Demolition Activities (0.19 ton PM_{10}/acre-month)

Duration of Project	6	months
Area	6.65	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
General Construction Activities	7.579	3.790	0.758	0.379
Total	**7.579**	**3.790**	**0.758**	**0.379**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Haul Truck Emissions

Emissions from hauling fill material are estimated in this spreadsheet.
Emission Estimation Method: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised December 2003).

Assumptions:
Haul trucks carry 20 cubic yards of material per trip.
The average distance from the project site to the materials source is estimated to be 25 miles; therefore, a haul truck will travel 50 miles round trip.
Estimated number of trips required by haul trucks = total amount of material/20 cubic yards per truck

Amount of Fill Material =	16,500	cubic yards	Assumes 4 feet of material is needed
Number of trucks required =	825	heavy duty diesel haul truck trips	
Miles per trip =	50	miles	

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HDDV	**2.87**	**0.6**	**2.0**	**0.012**	**0.11**	**0.08**	**1243.900**

Notes:
Emission factors for all pollutants are from USAF AFCEE 2013.
Emission factors are from Table 5-10 for 2014 calendar year, high altitude (USAF AFCEE 2013).

HDDV Haul Truck Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**260.995**	**59.020**	**186.152**	**1.091**	**10.003**	**7.548**	**113119.213**
tons	**0.130**	**0.030**	**0.093**	**0.001**	**0.005**	**0.004**	**56.560**

Example Calculation: NO_x emissions (lbs) = 50 miles per trip * 480 trips * NO_x emission factor (g/mile) * lb/453.6 g

128711.11

A-6 - Estimated Emissions from Alternative 2 Proposed Construction Activities

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2013 are used.

The average roundtrip commute for a construction worker =	30	miles
Number of construction days =	120	days
Number of construction workers (daily) =	16	people

Passenger Vehicle Emission Factors for Year 2014 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00065484	0.00660353	0.00575800	0.00001069	0.00009185	0.00005939	1.10257205

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 10 May 2013.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**37.719**	**380.364**	**331.661**	**0.616**	**5.291**	**3.421**	**63508.150**
tons	**0.019**	**0.190**	**0.166**	**0.000**	**0.003**	**0.002**	**31.754**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities

Summary	Summarizes total emissions for LOS Clearing in Alternative 2 in 2014
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from construction and demolition activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Haul Truck On-Road	Estimates emissions from haul trucks hauling fill materials to the job site.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
Emergency Generator	Estimates emissions from the operation of emergency generators.
AQCR Tier Report	Summarizes total emissions for the Southern Maryland Intrastate AQCR report for 2008, to be used to compare the Proposed Action to regional emissions.

Summary of Air Emissions for Alternative 2 LOS Clearing in 2014

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Combustion	12.18	0.67	5.32	0.94	0.63	0.61	1,337.26
Fugitive Dust	-	-	-	-	19.01	1.90	-
Haul Truck On-Road	0.23	0.03	0.07	0.00	0.01	0.01	102.49
Commuter	0.02	0.19	0.17	0.00	0.00	0.00	31.75
TOTAL	***12.43***	***0.89***	***5.55***	***0.94***	***19.66***	***2.52***	***1,471.50***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons =	***1,334.654***	***metric tons***	
State of Maryland's CO_2 emissions =	***70,500,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of Maryland's CO_2 emissions =	***0.00189%***		
United States' CO_2 emissions =	***5,631,300,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of USA's CO_2 emissions =	***0.000024%***		

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2013. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide).* Available online <http://www.eia.gov/environment/emissions/state/state_emissions.cfm>. Data released January 2013. Data accessed 15 September 2013.

Since future year budgets were not readily available, actual 2008 air emissions inventories for the counties were used as an approximation of the regional inventory. Because emissions from the Proposed Action in 2015 are several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Southern Maryland Intrastate AQCR Air Basin

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2008	13,691	33,110	55,798	72,267	7,193	4,191

Source: USEPA National Emissions Inventory (NEI) (http://neibrowser.epa.gov/eis-public-web/home.html). Site visited on 10 May 2013

Air Emissions from the Proposed Action in 2015

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	13,691	33,110	55,798	72,267	7,193	4,191
Emissions	12.433	0.891	5.550	0.945	19.656	2.521
% of Regional	**0.091%**	**0.0027%**	**0.0099%**	**0.001%**	**0.273%**	**0.060%**

A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction and Demolition

	General Construction and Modification Activities	Approximate Area Disturbed		
1.)	Site Clearing and Grubbing (LOS Zones)	1,228,392	ft^2	Total Area Disturbed
2.)	Site Clearing and Grubbing (Antenna site)	209,100	ft^2	Total Area Disturbed
3.)	Trenching	15,600	ft^2	Approximately 2,600 feet of trenching, 6 feet wide

Total Site Clearing Area	1,453,092	ft^2	
	33.36	acres	
Total Disturbed Area:	1,453,092	ft^2	
	33.36	acres	
Site Clearing Duration:	6	months	
Annual Clearing Activity:	120	days	Assume 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	3.45	2.55	2.47	4941.53

Site Clearing

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Feller Buncher/Skidder	1	20.74	0.85	11.00	1.46	0.63	0.61	2007.72
Bulldozer	2	27.19	1.91	11.00	2.03	1.79	1.74	2913.81
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	4	66.29	3.66	29.01	5.13	3.41	3.31	7264.50

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.
c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.
d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	3	124.924	7.731	47.130	10.348	7.637	7.407	14824.579
Site Clearing Equipment	3	198.867	10.976	87.026	15.376	10.245	9.934	21793.494

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	1,453,092	33.36	4	(from "Grading" worksheet)
Site Clearing:	1,453,092	33.36	120	

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	499.69	30.92	188.52	41.39	30.55	29.63	59,298
Site Clearing	23,864.06	1,317.16	10,443.15	1,845.15	1,229.36	1,192.08	2,615,219
Total Emissions (lbs):	**24,363.75**	**1,348.09**	**10,631.67**	**1,886.54**	**1,259.90**	**1,221.71**	**2,674,518**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	24,363.75	1,348.09	10,631.67	1,886.54	1,259.90	1,221.71	2,674,518
Total Project Emissions (tons)	12.182	0.674	5.316	0.943	0.630	0.611	1,337.259

A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

General Site Clearing Activities (0.19 ton PM_{10}/acre-month)

Duration of Project	6	months
Area	33.36	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
General Site Clearing Activities	38.029	19.014	3.803	1.901
Total	**38.029**	**19.014**	**3.803**	**1.901**

A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities

Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 33.36 acres/yr (from Combustion Worksheet)
Qty Equipment: 14.00 (calculated based on 4 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	33.36	4.17
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	33.36	16.31
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	16.68	16.82
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	16.68	6.90
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	33.36	11.70
TOTAL								55.90

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 55.90
Qty Equipment: 14.00
Grading days/yr: 3.99

A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities

Haul Truck Emissions

Emissions from hauling excavation material and construction supplies are estimated in this spreadsheet.

Emission Estimation Method: United States Air Force (USAF), Air Force Center for Environmental Excellence (AFCEE), Air Emissions Guide for Air Force Mobile Sources (Revised January 2013).

Assumptions:
Haul trucks carry 20 cubic yards of material per trip.
The average distance from the project site to the materials source is estimated to be 15 miles; therefore, a haul truck will travel 30 miles round trip.
Estimated number of trips required by haul trucks = total amount of material/20 cubic yards per truck

Amount of Tree Clearing Material Removed =	66	tons	Assumes approximately 15 trees per acre would be removed. Assumes roughly 7.5 trees per ton.
Amount of Building Materials (Above Ground) =	1,037	cubic yards	Assumes 4 feet of building material are needed for each floor
Amount of Building Materials (Below Ground) =	1,296	cubic yards	Assumes 5 feet of material are needed for the below ground portion of the building
Amount of Excavation Material (Buildings) =	3,111	cubic yards	Assumes 12 feet of material would need to be excavated on average
Amount of Excavation Material (Antenna) =	40,833	cubic yards	Assumes 15 feet of material would need to be excavated on average
Amount of Excavation Material (Trenching)=	3,467	cubic yards	Assumes 6 feet of material would need to be excavated on average
Number of trucks required =	2,492	heavy duty diesel haul truck trips	
Miles per trip =	30	miles	

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO_x	VOC	CO	SO_2	PM10	$PM_{2.5}$	CO_2
HDDV	**2.817**	**0.325**	**0.832**	**0.012**	**0.110**	**0.083**	**1243.900**

Notes:
Emission factors for all pollutants are from USAF AFCEE 2013.
Emission factors are from Tables 5-10 for the 2015 calendar year, high altitude (USAF AFCEE 2013).

HDDV Haul Truck Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**464.213**	**53.557**	**137.105**	**1.977**	**18.127**	**13.678**	**204982.069**
tons	**0.232**	**0.027**	**0.069**	**0.001**	**0.009**	**0.007**	**102.491**

Example Calculation: NO_x emissions (lbs) = 30 miles per trip * 369 trips * NO_x emission factor (g/mile) * lb/453.6 g

Haul Truck On-Road
Estimated Emissions for LOS Clearing in Alternative 2 in 2014

A-7 – Estimated Emissions from Alternative 2 Proposed LOS Clearing Activities

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2015 are used.

The average roundtrip commute for a construction worker =	30	miles
Number of construction days =	120	days
Number of construction workers (daily) =	16	people

Passenger Vehicle Emission Factors for Year 2015 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00065484	0.00660353	0.00575800	0.00001069	0.00009185	0.00005939	1.10257205

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 10 May 2013.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**37.719**	**380.364**	**331.661**	**0.616**	**5.291**	**3.421**	**63508.150**
tons	**0.019**	**0.190**	**0.166**	**0.000**	**0.003**	**0.002**	**31.754**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

A-8 – Estimated Emissions from Alternative 2 Proposed Prescribed Burn Activities

Estimated Emissions For Prescribed Burns

Estimated PM_{10} and CO emissions for Prescribed Burns under Alternative 2

Emission Estimation Method: Emission factors and fuel loading factors for the Southeast Region from Section 13.1 *Wildfires and Prescribed Burning* of AP-42 were used.

Assumptions:
The Proposed Action is located within the northeast corner of the Southeast region as depicted in Figure 13.1-1 of Section 13.1 of AP-42.
Approximate size of Alternative 2 LOS requiring prescribed burning = 28.2 acres Based on GIS provided measurements
Estimated Average Fuel Loading = 20 Mg/hectare

Emission Factors for Prescribed Burning for the Southeast Region (g/kg)

Fuel Type	PM_{10}	$PM_{2.5}$[1]	CO	NO_X[2]	CO_2 equivalent[3]
Palmetto/gallberry	15	15	125	-	-
Underburning pine	30	30	163	-	-
Logging slash	13	13	126	-	-
Grassland	10	10	75	-	-
Other	17	17	175	-	-
Temperate and Boreal Forests	-	-	-	-	6.1
Average for Region	**18.8**	**18.8**	**134.0**	**4.0**	**6.1**

Source: Section 13.1 of the AP-42

1 Based on the limited available datat, it is assumed that $PM_{2.5}$ emissions are equivalent to PM_{10} emissions.

2 AP-42 assumes that NO_X is emitted at rates from 1 to 4 g/kg burned, depending on combustion temperatures.

Estimated Prescribed Burn Emissions for Alternative 2

	Alternative 2 LOS				
	PM_{10}	$PM_{2.5}$	CO	NO_X	CO_2
tons	**4.730**	**4.730**	**33.714**	**1.006**	**32.229**

A-9 – Estimated Emissions from Alternative 2 Proposed Mechanical Removal and Herbicide Application Activities

Summary	Summarizes total emissions for Maintenance Activities in Alternative 2 in 2015
Combustion	Estimates emissions from non-road equipment exhaust.
Fugitive	Estimates particulate emissions from maintenance activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Haul Truck On-Road	Estimates emissions from haul trucks hauling fill materials to the job site.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
Emergency Generator	Estimates emissions from the operation of emergency generators.
AQCR Tier Report	Summarizes total emissions for the Southern Maryland Intrastate AQCR report for 2008, to be used to compare the Proposed Action to regional emissions.

Summary of Air Emissions for Alternative 2 Maintenance Activities in 2015

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Combustion	0.61	0.04	0.25	0.05	0.04	0.04	65.56
Fugitive Dust	-	-	-	-	1.34	0.13	-
Commuter	0.00	0.00	0.00	0.00	0.00	0.00	0.83
TOTAL	***0.61***	***0.05***	***0.25***	***0.05***	***1.38***	***0.17***	***66.39***

Note: Total $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons =	***60.214***	***metric tons***	
State of Maryland's CO_2 emissions =	***70,500,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of Maryland's CO_2 emissions =	***0.00009%***		
United States' CO_2 emissions =	***5,631,300,000***	***metric tons***	*(U.S. DOE/EIA 2013)*
Percent of USA's CO_2 emissions =	***0.000001%***		

Source: U.S. Department of Energy, Energy Information Administration (U.S. DOE/EIA). 2013. *Table 1. State Emissions by Year (Million Metric Tons of Carbon Dioxide).* Available online <http://www.eia.gov/environment/emissions/state/state_emissions.cfm>. Data released January 2013. Data accessed 15 September 2013.

Since future year budgets were not readily available, actual 2008 air emissions inventories for the counties were used as an approximation of the regional inventory. Because emissions from Alternative 2 in 2014 are several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Southern Maryland Intrastate AQCR Air Basin

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2008	13,691	33,110	55,798	72,267	7,193	4,191

Source: USEPA National Emissions Inventory (NEI) (http://neibrowser.epa.gov/eis-public-web/home.html). Site visited on 10 May 2013

Air Emissions from Alternative 2 Maintenance Activities in 2015

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	13,691	33,110	55,798	72,267	7,193	4,191
Emissions	0.612	0.048	0.252	0.046	1.380	0.173
% of Regional	**0.004%**	**0.0001%**	**0.0005%**	**0.000%**	**0.019%**	**0.004%**

A-9 – Estimated Emissions from Alternative 2 Proposed Mechanical Removal and Herbicide Application Activities

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction and Demolition

	General Construction and Modification Activities	**Approximate Area Disturbed**	
1.)	Maintenance Activities (Three tractors for Bush Hogging or Herbicide Application)	1,228,392 ft^2	Total Area Disturbed

Total Tree Clearing Area	1,228,392 ft^2	
	28.20 acres	
Total Disturbed Area:	1,228,392 ft^2	
	28.20 acres	
Site Clearing Duration:	0.5 months	
Annual Clearing Activity:	10 days	Assume 4 weeks per month, 5 days per week.

Project Combustion
Estimated Emissions for Maintenance Activities in Alternative 2 in 2015

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Bush Hogging or Herbicide Application - Maintenance Activities

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Tractor	3	40.79	2.87	16.51	3.05	2.68	2.60	4370.71
Total per 10 acres of activity	3	40.79	2.87	16.51	3.05	2.68	2.60	4370.71

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.
c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.
d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Tree Clearing Equipment	3	122.369	8.617	49.520	9.153	8.051	7.809	13112.135

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days
Bush Hogging or Herbicide Application	1,228,392	28.20	10

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Tree Clearing	1,223.69	86.17	495.20	91.53	80.51	78.09	131,121
Total Emissions (lbs):	**1,223.69**	**86.17**	**495.20**	**91.53**	**80.51**	**78.09**	**131,121.35**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	1,223.69	86.17	495.20	91.53	80.51	78.09	131,121
Total Project Emissions (tons)	0.612	0.043	0.248	0.046	0.040	0.039	65.561

A-9 – Estimated Emissions from Alternative 2 Proposed Mechanical Removal and Herbicide Application Activities

Maintenance Activities Fugitive Dust Emissions

Maintenance Activities Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Maintenance Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
$PM_{2.5}$ Emissions			
$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

General Site Clearing Activities (0.19 ton PM_{10}/acre-month)

Duration of Project	1	months
Area	28.20	acres

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	**PM_{10} controlled**	**$PM_{2.5}$ uncontrolled**	**$PM_{2.5}$ controlled**
General Site Clearing Activities	2.679	1.340	0.268	0.134
Total	**2.679**	**1.340**	**0.268**	**0.134**

Project Fugitive
Estimated Emissions for Maintenance Activities in Alternative 2 in 2015

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: Emission factors from the South Coast Air Quality Management District (SCAQMD) EMFAC 2007 (v 2.3) Model (on-road) were used. These emission factors are available online at http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Assumptions:
Passenger vehicle emission factors for scenario year 2014 are used.

The average roundtrip commute for a construction worker =	30	miles
Number of construction days =	10	days
Number of construction workers (daily) =	5	people

Passenger Vehicle Emission Factors for Year 2014 (lbs/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
0.00065484	0.00660353	0.00575800	0.00001069	0.00009185	0.00005939	1.10257205

Source: South Coast Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emissions Factors. Last updated April 24, 2008. Available online: <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>. Accessed 10 May 2013.
Notes:
The SMAQMD 2007 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**0.982**	**9.905**	**8.637**	**0.016**	**0.138**	**0.089**	**1653.858**
tons	**0.000**	**0.005**	**0.004**	**0.000**	**0.000**	**0.000**	**0.827**

Example Calculation: NO_x emissions (lbs) = 60 miles/day * NO_x emission factor (lb/mile) * number of construction days * number of workers

APPENDIX B

Eagle Nest Permit Application

Department of the Interior
U.S. Fish and Wildlife Service

Federal Fish and Wildlife Permit Application Form

OMB Control No. 1018 - 0022
Expires 02/28/2014

Click here for addresses.

Return to: U.S. Fish and Wildlife Service (USFWS)

P.O. Box 779
Hadley, MA 01035-0779

Type of Activity: Eagle Nest Take

✓ New Application

____ Requesting Renewal or Amendment of Permit # _____

Complete Sections A or B, and C, D, and E of this application. U.S. address may be required in Section C, see instructions for details.
See attached instruction pages for information on how to make your application complete and help avoid unnecessary delays.

A. Complete if applying as an individual				
1.a. Last name		1.b. First name	1.c. Middle name or initial	1.d. Suffix
2. Date of birth (mm/dd/yyyy)	3. Social Security No.	4. Occupation	5. Affiliation/ Doing business as (see instructions)	
6.a. Telephone number	6.b. Alternate telephone number	6.c. Fax number	6.d. E-mail address	

B. Complete if applying on behalf of a business, corporation, public agency, tribe, or institution			
1.a. Name of business, agency, tribe, or institution US Department of the Army		1.b. Doing business as (dba) U.S. Army Garrison Adelphi Laboratory Center	
2. Tax identification no.	3. Description of business, agency, or institution U.S. Army Garrison Adelphi Laboratory Center - Blossom Point Research Facility		
4.a. Principal officer Last name Krake	4.b. Principal officer First name James	4.c. Principal officer Middle name/ initial	4.d. Suffix
5. Principal officer title Chief, Environmental Division - Directorate of Public Works		6. Primary contact Anna Lubetski	
7.a. Business telephone number 202-685-8479	7.b. Alternate telephone number 202-685-8469	7.c. Business fax number	7.d. Business e-mail address anna.lubetski@navy.mil

C. All applicants complete address information				
1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes) 10050 Blossom Point Road				
1.b. City Welcome	1.c. State Maryland	1.d. Zip code/Postal code: 20693	1.e. County/Province Charles	1.f. Country United States
2.a. Mailing Address (include if different than physical address; include name of contact person if applicable)				
2.b. City	2.c. State	2.d. Zip code/Postal code:	2.e. County/Province	2.f. Country

D. All applicants MUST complete

1. Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount** $500.00 (standard) or $1,000 (programmatic) if you are applying for a new permit or $150.00 (standard) or $500 (programmatic) if you are requesting a substantive amendment of your existing valid permit. Federal, tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – ***attach documentation of fee exempt status as outlined in instructions.*** (50 CFR 13.11(d))
2. Do you currently have or have you ever had any Federal Fish and Wildlife permits?
   Yes ☐ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: _____ No ☑
3. Certification: I hereby certify that I have read and am familiar with the regulations contained in ***Title 50, Part 13 of the Code of Federal Regulations*** and the other ***applicable parts in subchapter B of Chapter I of Title 50***, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

James Krake — 12/12/2013

Signature (in blue ink) of applicant/person responsible for permit (No photocopied or stamped signatures) — Date of signature (mm/dd/yyyy)

Please continue to next page

E. Eagle Nest Take
(Bald and Golden Eagle Protection Act, 50 CFR 22.27)

Note: ***A Federal eagle nest take permit authorizes the removal of bald eagle or golden eagle nests for human safety, the safety of eagles, or the public's welfare. Permits are available to individuals, agencies, businesses, and other organizations. This permit does not authorize possession of any eagle or eagle parts including nests or the lethal take of any eagle eggs. Please read "What You Should Know About a Federal Permit for Eagle Nest Removal" and the regulations at 50 CFR 21.27 before you sign and submit your application.***

Please provide the following information numbered accordingly to the questions below on a separate sheet of paper. You should be as specific as possible in your responses. Please do not send pages that are over 8.5" x 11", videotapes, or DVDs. Although you may send supplemental documents that contain some of this information, you must include a separate attachment that responds to each specific application requirement and only the specific application requirements included on this form.

We strongly recommend that you submit your application at least 60 days prior to the date you need your permit, as required by 50 CFR 13.11(c).

1. A description of the situation that necessitates removal of the eagle nest(s), including:

(a) (1) The number of nests proposed to be taken;

(2) Whether the nest is a bald eagle or golden eagle nest; and

(3) Whether the nest is active or inactive. (An active nest may only be taken to alleviate an immediate safety emergency. A "safety emergency" means "a situation that necessitates immediate action to alleviate a threat of bodily harm to humans or eagles." An inactive nest is one that is not currently used by eagles as determined by the absence of any adult, egg, or dependent young at the nest during the 10 days before the nest is taken.)

(b) Is the nest take necessary to alleviate a safety emergency? ☐ Yes ☑ No

(1) If Yes, describe the safety emergency and why removal of the nest is necessary to alleviate it.

(2) If No, Provide the following:

A. An explanation for why removal of the nest(s) is necessary)

B. A calculation of the bald eagle or golden eagle area nesting population, including an appropriately scaled map or plat showing the location of each eagle nest used to calculate the area nesting population unless the Service has sufficient data to independently calculate the area nesting population.

C. A description of the avoidance, minimization, and mitigation measures you have used to reduce the need to take the nest, to offset the take, or in some situations (see 50 CFR 22.27(b)(7)) to provide a net benefit to eagles.

(c) Is the nest built on a human-engineered structure, creating a functional hazard that renders the structure inoperable for its intended use? ☐ Yes ☑ No

If yes, provide maps, digital photographs and a detailed description of the situation and functional hazard.

(d) A description of the property, including maps and digital photographs that show the location of the nest in relation to buildings, infrastructure, and human activities;

(e) The location of the property, including city, country and latitude and longitude geographic coordinates;

(f) The length of time for which the permit is requested, including beginning and ending dates; and

(g) When an active nest must be removed under this permit, any take of nestlings or eggs must be conducted by a Service-approved, qualified, and permitted agent, and all nestlings and viable eggs must be immediately transported to foster/recipient nests or a rehabilitation facility permitted to care for eagles, as directed by the Service. Provide a statement outlining how the eagle's nest will be removed, indicating the intended disposition of the nest, and if active, a description of how the nestlings or eggs will be removed, including the recipient nest(s) or federally permitted rehabilitation facility that is authorized for the possession of live eagle(s) or eggs, and/or eagle nest(s).

2. If the nest will be removed or relocated (rather than destroyed in the course of an activity), provide the name, address, phone number, and e-mail address of the qualified party conducting the removal and/or relocation.

3. You must retain records relating to the activities conducted under your permit for at least 5 years from the date of expiration of the permit. Please provide the address where these records will be kept.

4. **Any permit issued as a result of this application is not valid unless you also have any required State or tribal permits or approvals associated with the activity.** Have you obtained all required State or tribal permits or approvals to conduct this activity?

☐ Yes If "yes", attach a copy of the approval(s). ☐ Have applied **(Send copy when issued)** ☑ None required

Blossom Point
Eagle Nest Take Permit Application

1. A description of the situation that necessitates removal of the eagle nest(s), including:

(a) (1) The number of nests proposed to be taken: **2 or 3 (see table below for explanation)**

(2) Whether the nest is a bald eagle or golden eagle nest: **Bald eagle**

(3) Whether the nest is active or inactive
Nest removal will only occur after the breeding season, when all nests will be considered inactive (between July and December).

Nest Number	May 2013 Status	GPS Coordinates X	Y	Removal Plan
Nest 1	**Unoccupied**	**-77.0802**	**38.4293**	**Will be removed if Alternative 1 is chosen**
Nest 2	**Unoccupied**	**-77.0801**	**38.429**	**Will be removed if Alternative 1 is chosen**
Nest 3	**Active**	**-77.08**	**38.4281**	**Will be removed as this nest is located in a common clearance area**
Nest 4	**Unoccupied**	**-77.0835**	**38.4274**	**Will be removed if Alternative 2 is chosen**

(b) Is the nest take necessary to alleviate a safety emergency? **No**

(1) If Yes, describe the safety emergency and why removal of the nest is necessary to alleviate it.

(2) If No, Provide the following:

A. An explanation for why removal of the nest(s) is necessary
Communications antennas require direct visibility to the satellites that they communicate with, which are in orbit around the earth. This line-of-sight (LOS) must be uninterrupted and interference-free. Physical obstructions, such as trees, buildings, and any other relatively high natural or man-made objects, create interruption and interference if present within or close to the LOS. If physical obstructions are not removed, it is not possible for antennas to communicate with the satellites, in which case they would not meet their intended purposes.

The nests located within the LOS zones at Blossom Point would be removed when the trees and surrounding vegetation are removed. Vegetation falling within the LOS zones would need to be removed at ground level and maintained at that height for the duration of the lifespans of the SNEGS–E and Southern Drawl antennas.

The NRL BPTF is an integral part of NRL's Space Systems Development Department, which develops space systems to support Navy mission requirements and develops new technologies for use in space. The numerous BPTF antennas receive data from and transmit commands to various types of satellites. These capabilities support national security by providing tactical communications and surveillance, space situational awareness, and space protection. BPTF antennas support several objectives including missions that require dwell, such as communications for the warfighter and Blue Force Tracking, which provides military commanders and forces with location information about friendly forces. The BPTF is in continuous operation 24 hours a day, 7 days a week and supports numerous spacecraft.

B. A calculation of the bald eagle or golden eagle area nesting population, including an appropriately scaled map or plat showing the location of each eagle nest used to calculate the area nesting population unless the Service has sufficient data to independently calculate the area nesting population.
Figure 1 is a map depicting the Bald Eagle nest locations and Table 1 is a list of all GPS coordinates and the nest statuses as of May of 2013.

C. A description of the avoidance, minimization, and mitigation measures you have used to reduce the need to take the nest, to offset the take, or in some situations (see 50 CFR 22.27(b)(7)) to provide a net benefit to eagles.
Two other potential Southern Drawl siting options on the Blossom Point property were identified, but eliminated from detailed analysis. The first was located east of the BPTF beyond the collimation tower. The other Southern Drawl Blossom Point siting option which was eliminated from consideration was on an elevated area south of the BPTF. Due to the location of the second option, the length of the cable run between the antennas and Building 10 would be excessive, which would not allow Building 10 to be used as the data center. This would require the construction of a new data center, resulting in additional tree clearing and the potential for additional nests requiring removal.

Both of these locations would not border the BPTF fence or the NASA SNEGS–E site, eliminating the opportunity to minimize the combined LOS area by overlapping with the SNEGS–E LOS area. Both of these options would also have extensive wetland impacts, fragmented wildlife habitat and increased impact area sizes by creating stand-alone LOS zones. These other reasonable sites would have the same impacts to eagle nests as the two still being considered, but there would be greater impacts with tree clearing and habitat fragmentation for the eagles.

(c) Is the nest built on a human-engineered structure, creating a functional hazard that renders the structure inoperable for its intended use? **No**

(d) A description of the property, including maps and digital photographs that show the location of the nest in relation to buildings, infrastructure, and human activities
The Proposed Action evaluated in the Blossom Point Research Facility Environmental Assessment (EA) is to expand satellite ground communications terminal facilities and operations at the Blossom Point Tracking Facility, which is located on the U.S. Army Garrison (USAG) Adelphi Laboratory Center (ALC) Blossom Point Research Facility in Welcome, Maryland in Charles County. The Proposed Action includes installation of up to two 13-meter parabolic satellite communication antennas, related facilities, and infrastructure in support of the Navy Research Laboratory's (NRL's) Southern Drawl project, as well as clearance of vegetation which would obstruct communications signals in the line-of-sight (LOS) zones for both the proposed NRL Southern Drawl antennas and the previously installed National Aeronautics and Space Administration (NASA) Space Network Expansion Ground System–East (SNEGS–E) antennas.

Figure 2 is a map showing the location of the 4 nests within the LOS zones which need to be removed. Table 1 is a list of the nest coordinates associated with Figure 2. Please see the above table as the nests that need to be removed differ between Alternatives 1 and 2.

(e) The location of the property, including city, country and latitude and longitude geographic coordinates
10050 Blossom Point Road
Welcome, MD 20693
Charles County
United States

(f) The length of time for which the permit is requested, including beginning and ending dates
Between July and December 2014

(g) When an active nest must be removed under this permit, any take of nestlings or eggs must be conducted by a Service- approved, qualified, and permitted agent, and all nestlings and viable eggs must be immediately transported to foster/recipient nests or a rehabilitation facility permitted to care for eagles, as directed by the Service. Provide a statement outlining how the eagle's nest will be removed, indicating the intended disposition of the nest, and if active, a description of how the nestlings or eggs will be removed, including the recipient nest(s) or federally permitted rehabilitation facility that is authorized for the possession of live eagle(s) or eggs, and/or eagle nest(s).
n/a

2. If the nest will be removed or relocated (rather than destroyed in the course of an activity), provide the name, address, phone number, and e-mail address of the qualified party conducting the removal and/or relocation.
Anticipated that the nests will not be able to be removed intact and will be destroyed when trees are cleared

3. You must retain records relating to the activities conducted under your permit for at least 5 years from the date of expiration of the permit. Please provide the address where these records will be kept.

Anna Lubetski, Environmental

1314 Harwood St SE

Washington, DC 20374

4. Any permit issued as a result of this application is not valid unless you also have any required State or tribal permits or approvals associated with the activity. Have you obtained all required State or tribal permits or approvals to conduct this activity?
None required

Figure 1 – Blossom Point Eagle Nest Map

Table 1 – Blossom Point Eagle Nest Coordinates

Nest Code	May 2013 Status	Survey Method	X	Y
Nest 1	Inactive	Ground	-77.0802	38.4293
Nest 2	Inactive	Ground	-77.0801	38.429
Nest 3	Active	Ground	-77.08	38.4281
BP-01	Unoccupied	Aerial	-77.1076	38.4075
BP-02	Unknown	Aerial	-77.1066	38.4176
BP-03	Unknown	Aerial	-77.1024	38.4235
BP-04	Active	Aerial	-77.0991	38.4317
BP-05 and/or Nest 4	Unoccupied	Aerial	-77.0835	38.4274
BP-06	Unoccupied	Aerial	-77.0803	38.4233
BP-07	Unknown	Aerial	-77.0885	38.4226
BP-08	Active	Aerial	-77.0993	38.4137
BP-09	Active	Aerial	-77.0914	38.4201

Figure 2 – Map of Nest Locations and LOS Zones

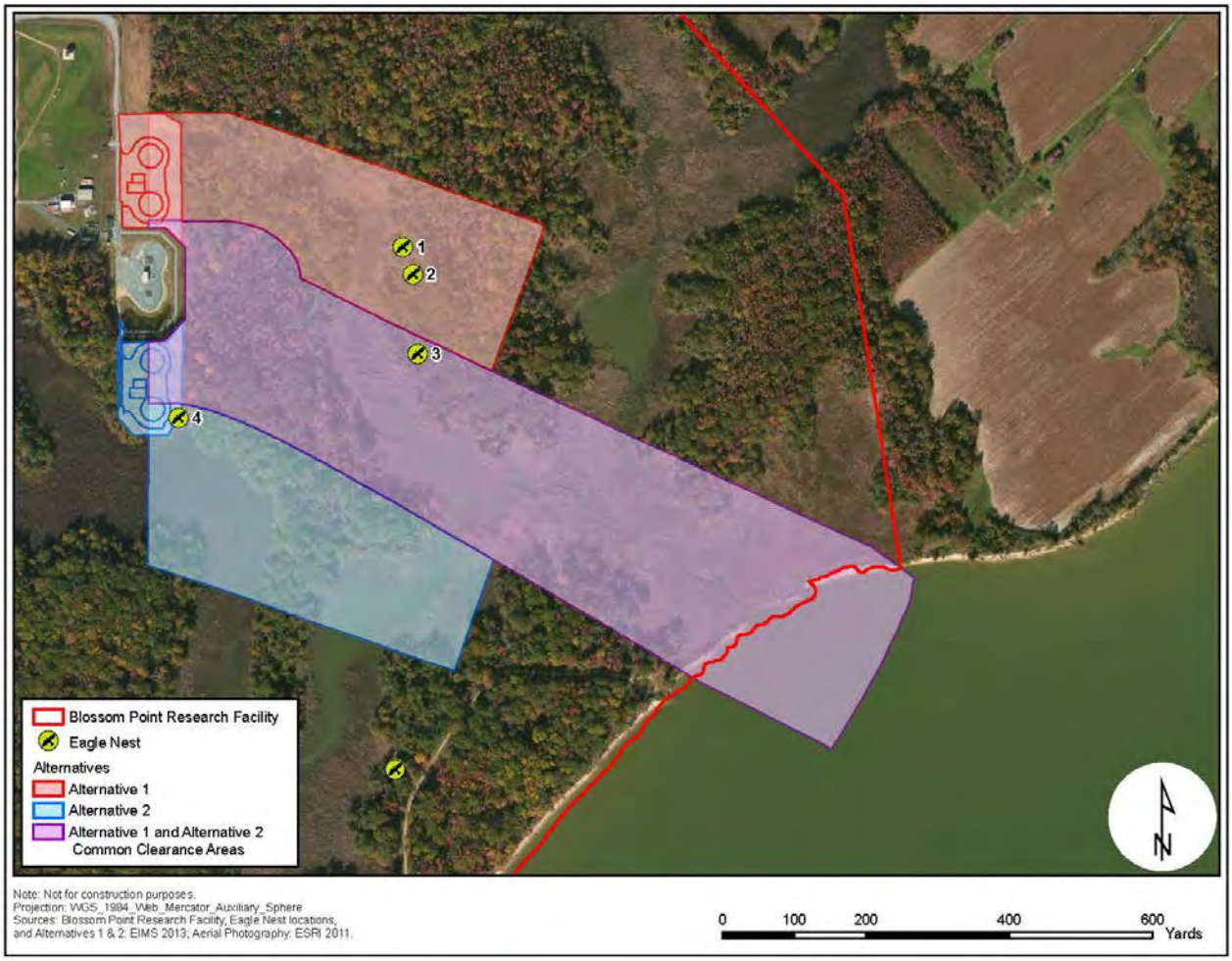


Figure 3 – Photograph of Nest 1

Figure 4 – Photograph of Nest 1

Figure 5 – Photograph of Nest 2

Figure 6 – Photograph of Nest 2

Figure 7 – Photograph of Nest 3

Figure 8 – Photograph of Nest 3

Figure 9 – Photograph of Nest 4

Figure 10 – Photograph of Nest 4

APPENDIX C

Agency Correspondence

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND WASHINGTON
1314 HARWOOD STREET SE
WASHINGTON NAVY YARD DC 20374-5018

IN REPLY REFER TO
11010
Ser 00/539

OCT 21 2013

Mr. Rodney Little
State Historic Preservation Officer
Maryland Historical Trust
100 Community Place
Crownsville, MD 21032-2023
Attn: Ms. Elizabeth Cole

Dear Ms. Cole:

SUBJECT: PROPOSED EXPANSION OF SATELLITE GROUND COMMUNICATIONS TERMINAL FACILITIES AND OPERATIONS AT BLOSSOM POINT TRACKING FACILITY, CHARLES COUNTY

The purpose of this letter is to open Section 106 consultation concerning a proposed expansion of satellite ground communications terminal facilities and operations at the Blossom Point Tracking Facility (BPTF) by the United States Naval Research Laboratory (NRL) and the National Aeronautics and Space Administration (NASA). The NRL's BPTF is located on the U.S. Army Garrison Blossom Point Research Facility (Blossom Point), which sits on approximately 1600 acres of land in Charles County, Maryland (see Enclosure 1). The undertaking would consist of installation of two, 13-meter parabolic satellite communication antennas with related facilities and infrastructure, and line-of-site (LOS) vegetation clearance between the antennas and the Potomac River. NAVFAC Washington is the executing agency for the undertaking.

The Navy has determined that the undertaking has the potential to affect historic properties. At present, there are two alternatives for the placement of the antennas and the resulting LOS clearance. The Navy has defined the Area of Potential Effects (APE) to be the maximum extent of the two alternatives combined. On Enclosure 2, this comprises the entire area shaded in blue, red and purple. The APE incorporates the proposed facilities expansion and the forest clearance activities needed to provide LOS visibility.

Built Resources: According to the *Adelphi Laboratory Center and Blossom Point Research Facility Integrated Cultural Resources Management Plan* (U.S. Army Corps of Engineers, 2009), there are presently no identified historic structures at the BPTF. The architectural survey for the facility is out of date. However, because the undertaking involves the addition of structures of the same type and function as those that already exist, it does not have

the potential to have adverse effects on historic structures should they exist.

Archaeological Resources: The Navy reviewed previous archaeological surveys within and adjacent to the APE. As shown on Enclosure 3, previous Phase I surveys resulted in identification of three archaeological sites at the southeastern corner of the APE: 18CH213, 18CH225 and 18CH226 (Wilke et al, 1980; Thomas and Reinbold, 1996). None of the sites has undergone Phase II evaluation. The Navy proposes to conduct additional Phase I survey on all remaining unsurveyed land within the APE, plus a small buffer area. On Enclosure 2, this is the forested part of the area outlined in green, minus the yellow hatched areas. The survey will cover 66 acres with shovel test pits at 15 meter (50 foot) intervals. If artifacts are discovered, the shovel test pit spacing will be reduced to identify sites and define site boundaries. The survey will be performed and the resulting report will be prepared by staff and contractors who meet the Secretary of the Interior's Professional Qualifications Standards for Archaeology. The survey and report will comply with MHT's *Standards and Guidelines for Archaeological Investigations in Maryland*.

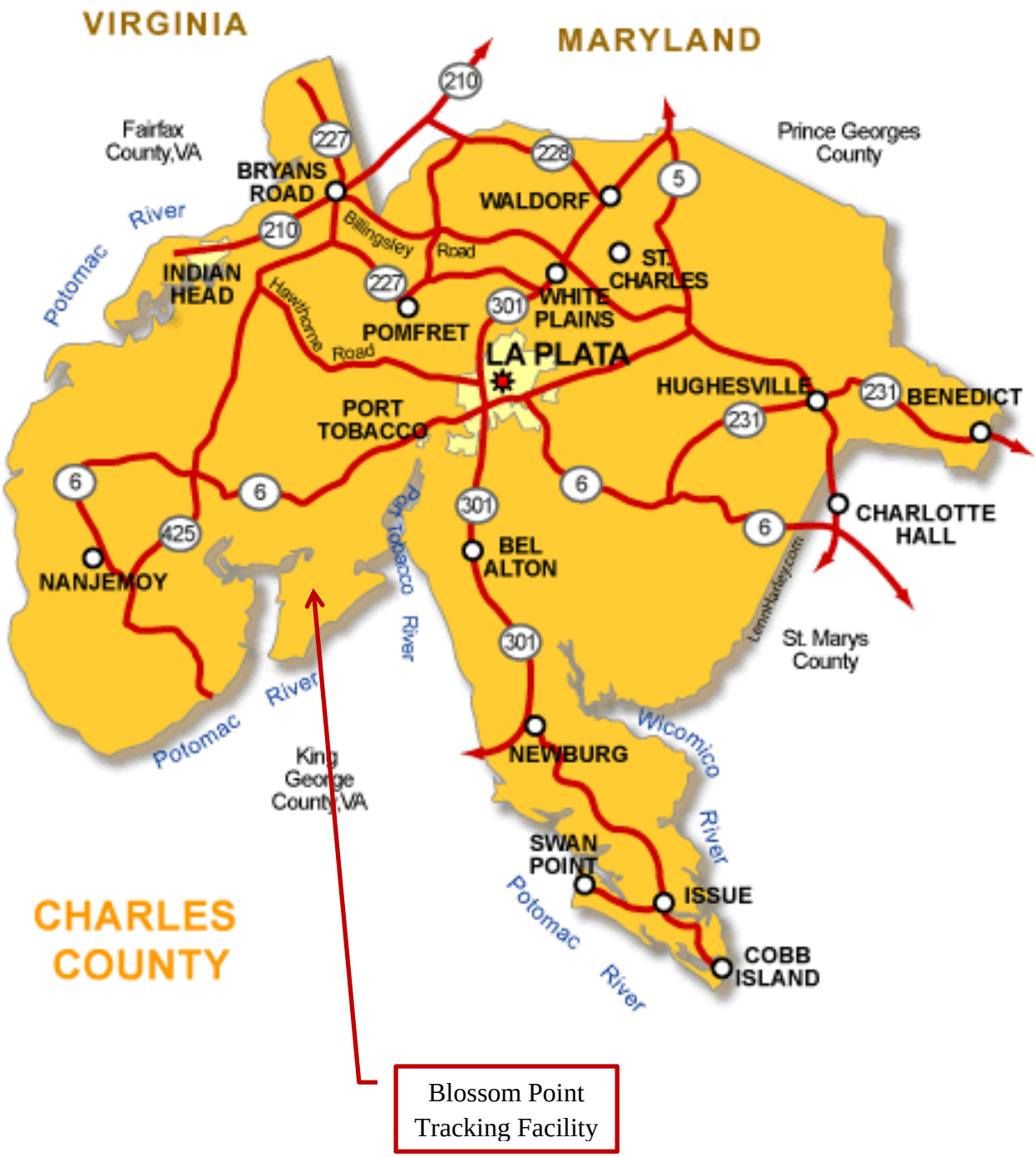
The Navy believes that the above-described efforts are sufficient to identify historic properties that could be affected by the undertaking and requests MHT's concurrence with the methodology. After identification of historic properties is complete and an alternative is selected, the Navy will continue to consult with MHT in order to avoid, minimize and/or mitigate effects. If you have any questions or require any further information, the POCs for this project are Julie Darsie at 202.685.1754 or julie.darsie@navy.mil and Mike Smolek at 301.757.4774 or michael.a.smolek@navy.mil.

Respectfully,

THOMAS P. LEWIS
Director, Environmental Business Line
By direction

Enclosures: (1) Location Map
(2) Area of Potential Effect (APE) and Proposed Survey Areas
(3) Previous Surveyed Areas and Identified Archaeological Sites

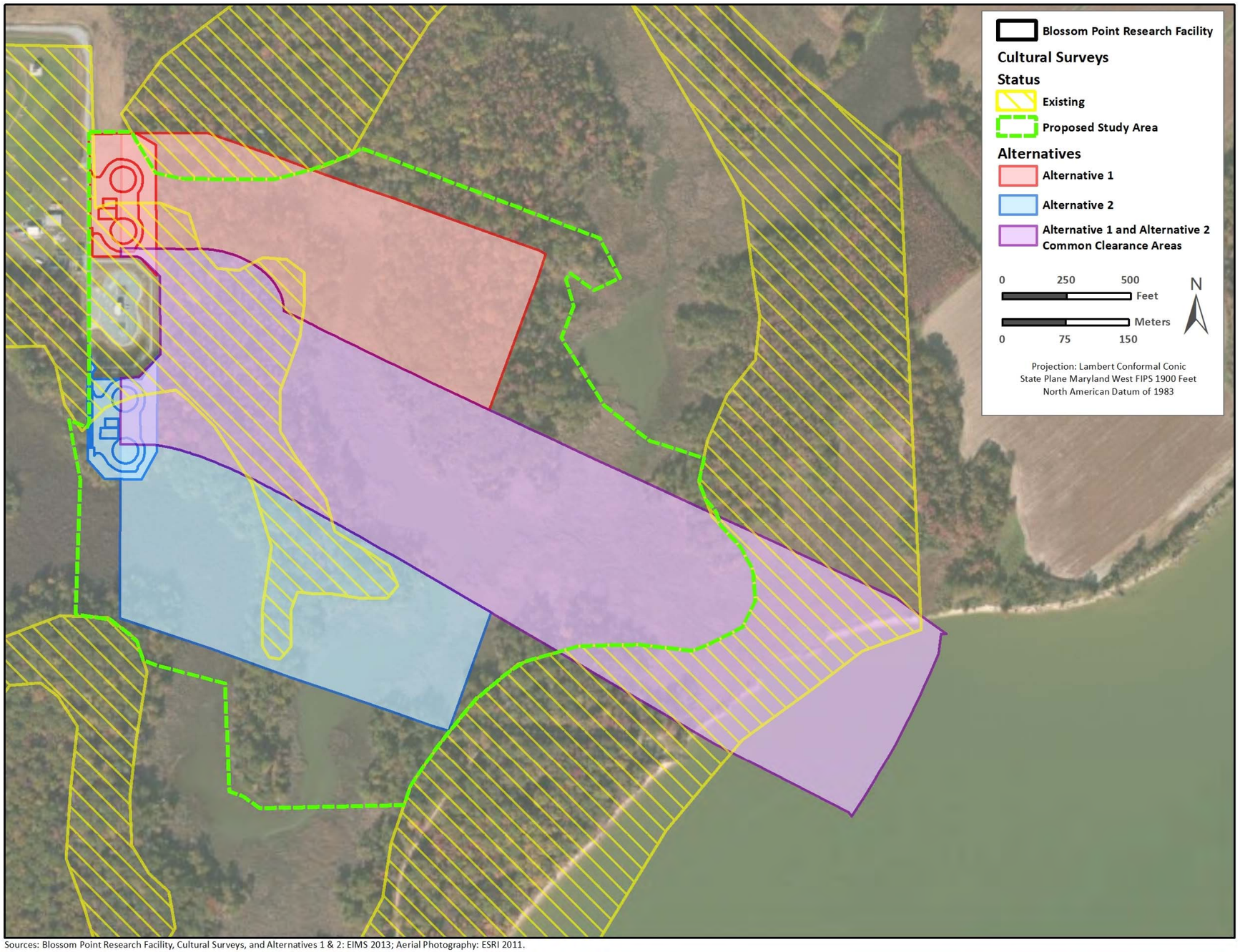
Enclosure 1: Location Map



Enclosure 2: Area of Potential Effect (APE) and Proposed Survey Areas

Note 1: Total area of proposed Phase I survey, including buffer zones, outlined in green, excluding water, wetlands, and previous survey areas.

Note 2: Red shaded area represents Alternative 1. Blue shaded area represents Alternative 2. Inner purple shaded area represents the Alternative 1 & 2 common clearance area.



Sources: Blossom Point Research Facility, Cultural Surveys, and Alternatives 1 & 2: EIMS 2013; Aerial Photography: ESRI 2011.

Enclosure 3: Previous Surveyed Areas and Identified Archaeological Sites

Note: Enclosure not for public release.

-----Original Message-----
From: Beth Cole
Sent: Monday, November 18, 2013 2:51 PM
To: Smolek, Michael A Sr. CIV NAVFAC Washington, ENV; Darsie, Julie CIV NAVFAC Washington
Subject: Satellite Ground Communications Terminal Facilities at Blossom Point

Mike and Julie,

The Maryland Historical Trust reviewed the Navy's letter dated October 21, 2013 regarding the above-referenced undertaking. Based on the information provided, MHT concurs with the proposed methodology to identify historic properties that may be affected by the proposed project. We look forward to receiving the draft report on the Phase I archeological survey, when available. Thank you for notifying us of this upcoming investigation and providing us this opportunity to comment. Let me know if you have questions or need further assistance. Have a good day.

Beth

Beth Cole
Administrator, Project Review and Compliance
Maryland Historical Trust
100 Community Place
Crownsville, MD 21032

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 POWDER MILL ROAD
ADELPHI, MD 20783-1197

REPLY TO
ATTENTION OF

12 March 2014

Environmental Division

Mr. Rodney Little
State Historic Preservation Officer
Maryland Historical Trust
100 Community Place
Crownsville, MD 21032 - 2023
Attn: Ms. Elizabeth Cole

SUBJECT: PROPOSED EXPANSION OF SATELLITE GROUND COMMUNCATIONS TERMINAL FACILITIES AND OPERATIONS AT BLOSSOM POINT TRACKING FACILITY, CHARLES COUNTY

Dear Ms. Cole:

By this letter U.S. Army Garrison, Adelphi Laboratory Center submits the *Phase I Archaeological Survey for the Expansion of Satellite Ground Communications Terminal Facilities and Operations at Blossom Point Research Facility, Charles County, Maryland*, prepared by HDR, Inc and completed on February 25, 2013. As stated in the attached letter from Naval Faculties Engineering Command (NAVFAC), Washington, Section 106 consultation with Maryland Historical Trust (MHT) for the proposed undertaking was opened by letter from NAVFAC dated October 21, 2013. The Army (specifically, the US Army Garrison Adelphi Laboratory Center), as the landholder at Blossom Point, will now take over as the Lead Federal Agency for the remainder of the Section 106 consultation process for this undertaking.

The October 21, 2013 letter described the undertaking, the Area of Potential Effects (APE), previously-identified historic properties, and the proposed methodology to complete identification of historic properties through additional Phase I archaeology survey. MHT concurred with the methodology via email on November 18, 2013. As described in the report by HDR, Inc., no additional historic properties were found as a result of the Phase I archaeological survey. The Army believes that identification of historic properties within the APE is complete, and that the historic properties consist of three previously-identified archaeological sites along the shoreline: 18CH213, 18CH225 and 18CH226. The Army requests MHTs concurrence with this finding.

The Army will continue consultation regarding the alternatives and their effects on historic properties. The POC at the US Army Garrison Adelphi Laboratory Center will be Mr. James Krake at 301-394-3579 or james.n.krake2.civ@mail.mil. The POCs at NAVFAC remain Julie Darsie at 202 - 685- 1754 or julie.darsie@navy.mil and Mike Smolek at 301-757-4774 or michael.a.smolek@navy.mil.

Respectfully,

James Krake

James Krake
Chief, Environmental Division
US Army Garrison Adelphi Laboratory Center

Enclosures:
(1) March 10, 2014 Letter from NAVFAC Washington to MHT transmitting Survey Report
(2) *Phase I Archaeological Survey for the Expansion of Satellite Ground Communications Terminal Facilities at Blossom Point Research Facility, Charles County, Maryland*

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND WASHINGTON
1314 HARWOOD STREET SE
WASHINGTON NAVY YARD DC 20374-5018

IN REPLY REFER TO:
5090
Ser EV/111-14

Mr. Rodney Little
State Historic Preservation Officer
Maryland Historical Trust
100 Community Place
Crownsville, MD 21032-2023
Attn: Ms. Elizabeth Cole

Dear Ms. Cole:

SUBJECT: PROPOSED EXPANSION OF SATELLITE GROUND COMMUNICATIONS TERMINAL FACILITIES AND OPERATIONS AT BLOSSOM POINT TRACKING FACILITY, CHARLES COUNTY

By this letter, NAVFAC Washington wishes to transmit the *Phase I Archaeology Survey for the Expansion of Satellite Ground Communications Terminal Facilities and Operations at Blossom Point Research Facility, Charles County, Maryland,* prepared by HDR, Inc. By letter dated October 21, 2013, NAVFAC Washington opened consultation with the Maryland Historic Trust (MHT) and identified the undertaking, its potential to affect historic properties, and the proposed methodology to identify historic properties. MHT concurred with the proposed methodology via email on November 18, 2013. NAVFAC Atlantic contracted with HDR, Inc. to complete the Phase I Archaeology survey. HDR, Inc. completed the enclosed report on February 25, 2013.

Also by this letter, NAVFAC wishes to notify MHT that the Army, as the landholder at Blossom Point, will act as the Lead Federal Agency for the remainder of the Section 106 consultation process for this undertaking. As the project proceeds, the Army will continue to consult with MHT regarding the two alternatives and their potential effects on archaeological resources along the shoreline at Blossom Point. NAVFAC will continue to assist the Army throughout the process.

The POC at the Army will be Mr. Jim Krake at 301-394-3579 or james.n.krake2.civ@mail.mil. The POCs at NAVFAC remain Julie Darsie at 202-685-1754 or julie.darsie@navy.mil and Mike Smolek at 301-757-4774 or michael.a.smolek@navy.mil.

Respectfully,

THOMAS P. LEWIS
Environmental Business Line
Coordinator
By direction

Enclosure: (1) *Phase I Archaeology Survey for the Expansion of Satellite Ground Communications Terminal Facilities and Operations at Blossom Point Research Facility, Charles County, Maryland*

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 POWDER MILL ROAD
ADELPHI, MD 20783-1197

REPLY TO
ATTENTION OF

12 March 2014

Environmental Division

Sara Rivers Cofield
Curator, Federal Collections
Maryland Archaeological Conservation Laboratory
Jefferson Patterson Park and Museum
10515 Mackall Road
St. Leonard, MD 20685

SUBJECT: PHASE I ARCHAEOLOGICAL SURVEY FOR THE EXPANSION OF SATELLITE GROUND COMMUNICATIONS TERMINAL FACILITIES AT BLOSSOM POINT RESEARCH FACILITY, CHARLES COUNTY, MARYLAND

Dear Ms. Rivers Cofield:

Enclosed is the Phase I Archaeological Survey for the Expansion of Satellite Ground Communications Terminal Facilities and Operations at Blossom Point Research Facility, Charles County, Maryland. The survey was conducted by a contractor of the Navy (HDR Inc.). The proposed expansion of the satellite ground communications terminal facilities would take place at the Naval Research Laboratory tracking facility located on the Blossom Point Research Facility, which is owned by the US Army Garrison Adelphi Laboratory Center.

Of specific interest for the MAC Lab is the discovery of a chert flake in one of the shovel test pits. This artifact is a single piece of chipped stone 24 mm long by 4.7 mm wide by 2.4 mm thick. The flake will be delivered to the MAC Lab for curation along with the US Army Garrison Adelphi Laboratory Center's other archaeological materials.

Please feel free to contact me with any questions regarding the survey or the chert flake.

Respectfully,

James Krake

James Krake
Chief, Environmental Division
US Army Garrison Adelphi Laboratory Center

Enclosure:
Phase I Archaeological Survey for the Expansion of Satellite Ground Communications Terminal Facilities at Blossom Point Research Facility, Charles County, Maryland

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Maryland Department of Planning
Maryland Historical Trust

Sustain Attain

April 8, 2014

James Krake
Chief, Environmental Division
US Army Garrison Adelphi Laboratory Center
2800 Powder Mill Road
Adelphi, Maryland 20783-1197

Re: Proposed Expansion of Satellite Ground Communications Terminal
Facilities and Operation at Blossom Point Tracking Facility
Charles County, Maryland
Section 106 Review – Army

Dear Mr. Krake:

Thank you for your recent letter, dated March 12, 2014 and received by the Maryland Historical Trust (Trust) on March 13, 2014, regarding the above-referenced undertaking. Your letter initiated consultation with the Trust, Maryland's State Historic Preservation Office, pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and provided us with a copy of a Phase I archeological survey report for review. We understand that the Army is the lead federal agency for the Section 106 consultation on this undertaking. We reviewed the submittal and offer the following comments.

Trust staff reviewed the following report submitted with your letter, prepared on behalf of the Army and the US Naval Research Laboratory by HDR, Inc.: *Phase I Archaeological Survey for the Expansion of Satellite Ground Communications Terminal Facilities and Operations at Blossom Point Research Facility, Charles County, Maryland* (Parker et al. 2014). The report provides documentation on the goals, methods, results, and recommendations of Phase I archeological survey conducted within previously unsurveyed portions of the area of potential effects. The level of survey and resulting report are consistent with the recommended approaches in the Trust's *Standards and Guidelines for Archeological Investigations in Maryland* (Shaffer and Cole 1994). The survey did not identify any archeological sites within the areas examined. As noted in your letter, there are three inventoried, yet unevaluated, archeological sites (18CH213, 18CH225 and 18CH226) located east of the project area along the shoreline of the Potomac River. We await further coordination with the Army to successfully conclude the Section 106 consultation for this undertaking, as project planning proceeds.

We appreciate the Army and the Navy's efforts to complete the identification of archeological sites early in project planning for this undertaking. If you have questions or need further assistance, please contact me at beth.cole@maryland.gov or 410-514-7631. Thank you for providing us this opportunity to comment.

Sincerely,

Beth Cole

Beth Cole
Administrator, Project Review and Compliance

EJC/201401160
cc: Julie Darsie (NAVFAC)
Mike Smolek (NAVFAC)