FINAL
ENVIRONMENTAL ASSESSMENT
FOR
THE TRANSITION FROM C-2A TO CMV-22B AIRCRAFT AT FLEET LOGISTICS CENTERS NAVAL AIR STATION NORTH ISLAND AND NAVAL STATION NORFOLK

July 2018

Image: CMV-22B Bell-Boeing

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ABSTRACT

Designation:	Environmental Assessment
Title of Proposed Action:	Transition from C-2A to CMV-22B Aircraft at Fleet Logistics Centers
Project Locations:	Naval Air Station (NAS) North Island, California and Naval Station (NS) Norfolk, Virginia
Lead Agency for the EA:	Department of the Navy
Cooperating Agency:	Department of the Air Force (for proposed transient flight activities at Joint Base Langley-Eustis' Felker Army Airfield)
Affected Regions:	San Diego County, California and Hampton Roads Metropolitan Area, Virginia
Action Proponent:	Commander, United States Fleet Forces, Department of the Navy
Point of Contact:	Naval Facilities Engineering Command, Atlantic Division Attn: Code EV21JB 6506 Hampton Boulevard Norfolk, Virginia 23508
Date:	July 2018

The Department of the Navy has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act, as implemented by the Council on Environmental Quality regulations and Navy regulations for implementing the National Environmental Policy Act. The Proposed Action would provide facilities and functions to support the replacement of the C-2A Greyhound with the new CMV-22B Osprey (Navy V-22) at existing logistics support centers, NAS North Island, California and NS Norfolk, Virginia. Under the Proposed Action, the Navy plans to replace 27 legacy C-2A aircraft operated by existing logistics support squadrons with 38 Navy V-22 aircraft operated by fleet logistics support multi-mission squadrons; establish a Navy V-22 training squadron to train pilots and aircrews, and a maintenance school for maintenance personnel; construct, renovate, and maintain facilities to accommodate Navy V-22 squadron aircraft and personnel; and conduct Navy V-22 flight training operations. This EA evaluates the potential environmental impacts associated with the transition and the alternatives for the location of the fleet training squadron and maintenance school (NAS North Island and NS Norfolk), and the No Action Alternative (as a baseline for comparing the two action alternatives) to the following resource areas: airfields and airspace, noise, land use compatibility, public health and safety, air quality, transportation, biological resources, water resources, infrastructure, cultural resources, hazardous materials and wastes, and socioeconomics.

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EXECUTIVE SUMMARY

ES.1 Proposed Action

The United States (U.S.) Department of the Navy (Navy) proposes to provide facilities and functions to support the replacement of the C-2A Greyhound aircraft with the new CMV-22B Osprey aircraft, herein referred to as "Navy V-22," at existing West and East Coast Fleet Logistics Centers Naval Air Station (NAS) North Island, California and Naval Station (NS) Norfolk, Virginia. Under this Proposed Action, the Navy plans to:

- replace 27 legacy C-2A aircraft operated by existing fleet logistics support squadrons with 38 Navy V-22 aircraft operated by fleet logistics support multi-mission squadrons;
- establish a Navy V-22 training squadron for pilots and aircrews;
- establish a maintenance school for maintenance personnel;
- construct, renovate, and maintain facilities to accommodate Navy V-22 squadron aircraft and personnel;
- make adjustments to personnel levels (increases or decreases) associated with the Navy V-22 training squadron and the maintenance school; and
- conduct Navy V-22 flight training operations.

The existing fleet logistics support squadrons are based at NAS North Island (within the consortium of Naval Base Coronado [NBC] installations), and Chambers Field located within NS Norfolk. The fleet logistics centers provide logistics, supply, and support services to fleet units and shore commands. The fleet logistics support squadrons will be replaced by the fleet logistics support multi-mission squadron.

The Proposed Action would be implemented over a 10-year period beginning in 2018 with facility renovations and some personnel actions at NAS North Island and NS Norfolk. The transition of fleet logistics support squadrons from C-2A to Navy V-22 would begin with Navy V-22 aircrews and maintenance personnel initially training at the existing U.S. Marine Corps MV-22B training squadron and maintenance school at Marine Corps Air Station (MCAS) New River, North Carolina for several years before returning to their home base location. Eventually, the Navy V-22 training squadron and a maintenance school would be established, either on the West Coast or the East Coast, to fully support Navy training requirements.

ES.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to provide the logistics support community the facilities and functions needed to support the replacement of the fixed-wing C-2A aircraft with the Navy V-22 tilt-rotor aircraft to meet updated operational requirements and enhance the logistics support mission.

The Proposed Action is needed because the older C-2A aircraft has reached the end of its service life. Increasing maintenance requirements limit the use of the aging C-2A for the aircraft carrier on-board delivery mission. The Proposed Action would provide the facilities needed to efficiently transition the C-2A to the Navy V-22 aircraft without interruption of the time-critical logistics support mission for carrier strike groups at sea.

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

ES.3 Alternatives Considered

In developing the proposed range of alternatives that meet the purpose of and need for the Proposed Action, the Navy carefully reviewed these important considerations:

- colocation with fleet logistics centers that service aircraft carriers
- maximization of existing facilities and support
- colocation of Navy V-22 training squadron with fleet logistics support squadrons

Based upon these considerations, the Navy evaluated two action alternatives that meet the purpose of and need for the Proposed Action and a No Action Alternative.

ES.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur; the Navy would not provide facilities and functions to support the replacement of C-2A aircraft with the Navy V-22 at existing West and East Coast logistics support centers that service aircraft carriers. The Navy would not renovate, expand, or construct new facilities or infrastructure. Consequently, there would be no facilities or functions to support the Navy V-22 aircraft. The carrier on-board mission would continue to be performed by VRC-30 at NAS North Island and VRC-40 at NS Norfolk using the C-2A aircraft. Personnel levels would remain the same, 390 C-2A personnel at NAS North Island and 581 C-2A personnel at NS Norfolk. Additionally, C-2A naval aviators and aircrews would continue to be trained to join the fleet operational squadrons at NS Norfolk by the existing fleet training squadron.

However, the existing C-2A aircraft have reached the end of their service life. Increasing maintenance requirements limit the use of the aging C-2A for the aircraft carrier on-board delivery mission, which would prevent the Navy from supporting its forward deployed forces effectively. The No Action Alternative would not meet the purpose of and need for the Proposed Action; however, the conditions associated with the No Action Alternative serve as reference points for describing and quantifying the potential impacts associated with the action alternatives.

The analysis in this EA first compares the No Action Alternative to the baseline conditions, and then compares the action alternatives to the No Action Alternative. The expected end-state year is 2028 for both the No Action Alternative and the action alternatives because the proposed aircraft transition would be complete by 2028. The baseline conditions for most resource areas in 2017 would be the same as No Action Alternative. However, because of known programmed aircraft actions that are ongoing, the number of aircraft and corresponding aircraft operations in the existing baseline will change by 2028 regardless of the Proposed Action; therefore, the projected 2028 operations without the Proposed Action are analyzed under the No Action Alternative as a point of reference.

ES.3.2 Alternative 1: C-2A to Navy V-22 Transition with West Coast Fleet Training Squadron and Maintenance School

Under Alternative 1, the Navy would provide facilities and functions to support the replacement of the existing C-2A aircraft with Navy V-22 aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established at NAS North Island. The Navy would begin to transition the C-2A to the Navy V-22 in 2020 when the first aircraft are expected to arrive at NAS North Island. For the next several years, there would be a mix of C-2A and Navy V-22 aircraft and personnel, until the transition from the C-2A to the Navy V-22 is complete in the 2028 timeframe. Total fleet logistics support squadron aircraft at NAS North Island would increase from 10 to 23 compared to the

No Action Alternative. At NS Norfolk, total fleet logistics support squadron aircraft would decrease from 17 aircraft to 15 aircraft compared to the No Action Alternative.

Under Alternative 1, there would be an increase of 341 personnel at NAS North Island compared to the No Action Alternative, whereas NS Norfolk would experience a reduction of 126 personnel. Alternative 1 would include construction and/or renovation of facilities at NAS North Island and NS Norfolk that would include aircraft hangars, parking aprons, taxiways, helipads, wash racks, and pilot and maintenance training facilities. Pilot training facilities would include installation of a flight simulator called a flight training device (FTD) at NAS North Island and a containerized flight training device (CFTD) at NS Norfolk. Two Navy V-22 training squadron aircraft would also require hangar space at NAS North Island under Alternative 1. Hangar space construction and pavement renovation would total approximately 156,000 square feet and 35 acres, respectively, at NAS North Island and 62,000 square feet and 24 acres at NS Norfolk. At NAS North Island, 26 existing buildings would be demolished for construction of new facilities, and the interiors of three existing NAS North Island buildings outside the project area would be partially renovated.

The Navy anticipates a total of approximately 16,000 annual airfield operations by Navy V-22 aircraft at NAS North Island under Alternative 1, which represents an increase of 11,500 from No Action Alternative C-2A operations. Total aircraft operations at NAS North Island would increase from 79,800 to 91,300, a 14 percent increase. The resulting total projected operations for Alternative 1 are well within recent historical averages at NAS North Island (e.g. 138,000 in 2002; 95,000 in 2004; 102,000 in 2010) and would not represent a significant operational change. Additionally, the Navy anticipates a total of approximately 7,000 annual Navy V-22 airfield operations at NS Norfolk, which would be about the same as C-2A operations under the No Action Alternative.

Navy V-22 flight training would also require the use of secondary training airfields in the vicinity of NAS North Island and NS Norfolk. Secondary airfield training requirements would be distributed among six West Coast and six East Coast Department of Defense (DoD) airfields. The Navy needs flexibility when scheduling and executing training operations and the usage rates at each airfield may vary from year to year due to factors such as weather, wind, facility maintenance, and scheduling conflicts with other military aircraft.

Under Alternative 1, approximately 12,500 annual operations would be distributed across six West Coast airfields in the vicinity of NAS North Island, and approximately 4,600 annual operations would be distributed across six East Coast airfields in the vicinity of NS Norfolk. On each coast, the majority of operations would be distributed among three main secondary airfields, and a smaller number could occur at three additional airfields. On the West Coast, a maximum of 80 percent (up to approximately 10,000) of the operations could occur at either Naval Auxiliary Field (NAF) El Centro, MCAS Miramar, or MCAS Camp Pendleton; and a maximum of 20 percent (up to approximately 2,500) could occur at either Naval Auxiliary Landing Field (NALF) San Clemente, Marine Corps Outlying Field (MCOLF) Camp Pendleton, or MCAS Yuma. On the East Coast under Alternative 1, a maximum of 80 percent (up to approximately 3,700) of the operations could occur at either NALF Fentress, Felker Army Airfield (AAF), or MCAS New River; and 20 percent (up to approximately 900) could occur at either Blackstone AAF, MCOLF Bogue, or MCOLF Oak Grove.

While the Navy anticipates that total Navy V-22 flight training requirements would be distributed among the six West Coast and six East Coast airfields to achieve the needed throughput, Alternative 1 assumes there is some potential, although unlikely, for the maximum number of Navy V-22 flight training

operations to occur in any year at one location, up to the stated maximum (i.e., up to 80 percent at one of the main secondary airfields and up to 20% at one of the other secondary airfields). For example, up to approximately 10,000 airfield operations may occur in any given year at any of the following: NAF El Centro, MCAS Miramar, or MCAS Camp Pendleton, and up to approximately 2,500 operations could occur at either NOLF San Clemente, MCOLF Camp Pendleton, or MCAS Yuma.

Existing operations at the other DoD airfields where most of the Navy V-22 secondary airfield training operations are proposed, including those of fixed-wing jet and rotary-wing aircraft, have been previously analyzed in other NEPA documents listed in **Section 1.6** (Key Documents). Proposed annual operations at secondary airfields would be similar to existing operations and would represent a small percentage of the operations that have already been analyzed under NEPA. There would be no more than a 15 percent increase in total airfield operations per year at any one airfield. Actual operations proposed would be variable, and the maximum operations occurring at any one airfield would be unlikely in any given year, and even more unlikely in consecutive years. The Navy V-22 operations would be expected to have negligible environmental impacts to the airspace and airfield environments. Therefore, environmental and operational impacts associated with Navy V-22 use of secondary training airfields would not be significant.

ES.3.3 Alternative 2: C-2A to Navy V-22 Transition with East Coast Fleet Training Squadron and Maintenance School

Under Alternative 2, the Navy would provide facilities and functions to support the replacement of the existing C-2A aircraft with Navy V-22 aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established on the East Coast at NS Norfolk under Alternative 2, as compared with Alternative 1 where it would be established on the West Coast. The Navy would begin to transition the C-2A to the Navy V-22 in 2020, as described in Alternative 1, except that the last C-2A would leave NAS North Island in 2024, while the last C-2A would leave NS Norfolk by 2026. The transition at both NAS North Island and NS Norfolk would be completed by 2028. Total fleet logistics squadron aircraft at NAS North Island would increase from 10 to 18 compared to the No Action Alternative, and at NS Norfolk would increase from 17 aircraft to 20 aircraft.

Under Alternative 2, there would be an increase of 161 personnel at NAS North Island compared to the No Action Alternative, and NS Norfolk would experience an increase of 54 personnel. Alternative 2 would include construction and/or renovation of facilities at NAS North Island and NS Norfolk that would include aircraft hangars, parking aprons, taxiways, helipads, wash racks, and pilot and maintenance training facilities. Pilot training facilities would include installation of an FTD at NAS North Island and a CFTD at NS Norfolk. Two Navy V-22 training squadron aircraft would also require hangar space at NS Norfolk under Alternative 2. Hangar space construction and pavement renovation would total approximately 102,200 square feet and 24 acres, respectively, at NAS North Island and approximately 96,100 square feet and 36 acres at NS Norfolk. At NAS North Island, 17 existing buildings would be demolished for construction of new facilities, and the interiors of three existing NAS North Island buildings outside the project area would be partially renovated.

The Navy anticipates a total of approximately 10,300 annual airfield operations by Navy V-22 aircraft at NAS North Island under Alternative 2, which represents an increase of 5,800 operations from No Action Alternative C-2A operations. Total annual operations of all aircraft at NAS North Island would increase from 79,800 to 85,600, a 7 percent increase. This level of operations at NAS North Island is consistent with recent historical operations. Additionally, the Navy anticipates a total of approximately 12,700

annual airfield operations at NS Norfolk, which represents an increase of 5,700 operations from No Action Alternative C-2A operations. Total annual operations of all aircraft at NS Norfolk would increase from 66,900 to 72,600, an 8.5 percent increase.

Under Alternative 2, Navy V-22 flight training would also occur at secondary training airfields. Approximately 7,500 annual Navy V-22 operations would be distributed across six West Coast airfields in the vicinity of NAS North Island, and approximately 9,600 annual operations would be distributed across six East Coast airfields in the vicinity of NS Norfolk. On the West Coast, a maximum of 80 percent (up to approximately 6,000) of the operations could occur at either NAF El Centro, MCAS Miramar, or MCAS Camp Pendleton; and a maximum of 20 percent (up to approximately 1,500) could occur at either NALF San Clemente, MCOLF Camp Pendleton, or MCAS Yuma. On the East Coast under Alternative 2, a maximum of 80 percent (up to approximately 7,700) of the operations could occur at either NALF Fentress, Felker AAF, or MCAS New River; and 20 percent (up to approximately 1,900) could occur at Blackstone AAF, MCOLF Bogue, or MCOLF Oak Grove.

As described under Alternative 1, while the Navy anticipates that total Navy V-22 flight training requirements would be distributed among the six West Coast and six East Coast airfields, Alternative 2 also assumes there is some potential, although unlikely, for the maximum number of Navy V-22 secondary airfield operations to occur in any year at one location, up to the stated maximum of 80 percent at one of the main secondary airfields and 20 percent at one of the other secondary airfields. For example, up to approximately 6,000 airfield operations may occur in any given year at any of the following: NAF El Centro, MCAS Miramar, or MCAS Camp Pendleton; and up to approximately 1,500 operations could occur at either NOLF San Clemente, MCOLF Camp Pendleton, or MCAS Yuma.

Proposed annual operations at the secondary airfields would be similar to existing operations and would represent a small percentage of the operations that have already been analyzed under NEPA. There would be no more than an 11 percent increase in total airfield operations per year at any one airfield. Alternative 2 impacts would be the same as described for Alternative 1. The Navy V-22 secondary airfield operations would be expected to have negligible environmental impacts to the airspace and airfield environments and would not be significant.

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

CEQ regulations, NEPA, and Navy instructions for implementing NEPA, specify that an EA should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. The following resource areas have been analyzed in detail in this EA: airfields and airspace, noise, public health and safety, air quality, transportation, biological resources, water resources, infrastructure, cultural resources, hazardous materials and waste, and socioeconomics.

Because potential impacts were considered to be negligible or nonexistent, the following resource areas were not analyzed in detail in this EA: land use compatibility, community/emergency services, parks, recreation, geological resources, and visual resources.

ES.5 Summary of Potential Environmental Consequences of the Action Alternatives and Major Mitigating Actions

Potential impacts to resources at NAS North Island and NS Norfolk are described below. The analysis contained in this EA has determined that the Proposed Action and alternatives would not result in significant environmental impacts. **Table ES-1** provides a tabular summary of the potential impacts to

the resources associated with each of the alternatives analyzed and compares the potential impacts at NAS North Island and NS Norfolk.

Airfields and Airspace. Alternative 1 and Alternative 2 would result in an increase of 14 percent and 7 percent in total airfield operations at NAS North Island, respectively. The increase would be well within recent historical operations levels in the last 15 years at NAS North Island and would not be significant. At NS Norfolk under Alternative 1, annual airfield operations of Navy V-22 would be about the same as C-2A operations under the No Action Alternative. Therefore, Alternative 1 would have no impact to airfields and airspace at Chambers Field. Alternative 2 would increase annual airfield operations at NS Norfolk by approximately 8.5 percent. This small increase would not impact civilian aircraft or other users in the vicinity of NAS North Island and NS Norfolk, as existing standard operating procedures and course rules would continue to apply to minimize safety risks. Navy V-22 usage of associated airspace would be consistent with current operations, and there would be no direct or indirect impact to airspace.

Under Alternative 1 and Alternative 2 at NAS North Island and NS Norfolk, transit flights to secondary airfields would be dispersed throughout the available airspace and would have negligible impact to airspace. No changes to airspace would be required for Alternative 1 or Alternative 2. Navy V-22 transits would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, noise impacts or impacts to other environmental resources are negligible or nonexistent. Navy V-22 operations would be managed in accordance with existing procedures and established local approach and departure patterns at each airfield to avoid conflicts and minimize safety risks.

Noise. Construction and operations of Alternative 1 or Alternative 2 would not result in a perceptible change to noise at NAS North Island or NS Norfolk. For noise from aircraft operations, none of the alternatives would result in a perceptible change in the DoD's primary noise metric, Community Noise Equivalent Level (CNEL) at NAS North Island or Day-Night Average Sound Level (DNL) at NS Norfolk. Noise levels for the alternatives would be nearly indistinguishable from the baseline. This indicates that the aircraft and types of events that cause the primary contribution to the CNEL or DNL are not affected by the proposed alternatives at NAS North Island or NS Norfolk. The alternatives would have no impact to the Air Installations Compatible Use Zones (AICUZ) Programs at NAS North Island or NS Norfolk.

Supplemental noise analysis was conducted to determine the noise exposure (DNL or CNEL), loudest noise events (Sound Exposure Level and maximum sound level), and probability of sleep disturbance at specific locations (percent probability of awakening). Results of supplemental noise metric analysis showed that at 13 points of interest (POIs) in the NAS North Island community and 18 POIs in the NS Norfolk community, there would be no perceptible change in noise exposure in either community under Alternative 1 or 2. The loudest events showed no difference at any of the POIs at NAS North Island or NS Norfolk from the baseline or in comparing the alternatives.

For sleep disturbance with windows closed, there would be no change in the probability of awakening at 12 of the 13 POIs at NAS North Island during any given night under any of the alternatives. Under Alternative 2 at one POI, near the approach end of Runway 29 (Coronado Municipal Beach), there would be a 1 percent increase in the probability of awakening under the condition that a person would be trying to sleep there with the windows open during night flying activity at NAS North Island.

Supplemental noise analysis was performed at three representative locations (P1, P2, and P3) on the California least tern nesting area at NAS North Island. The modeling results from the noise study show that under Alternative 1 or 2, the CNEL change at each point on the California least tern nesting area

would be less than 1 decibel (dB) to 1 dB at P1, P2, and P3, which is assumed to be imperceptible to the least terns. The noisiest events are all produced by aircraft that would not change under the Proposed Action.

For 16 of the 18 POIs at NS Norfolk, there would be no change in the probability of awakening under Alternative 1 or Alternative 2. At two POIs immediately adjacent to the east end of the main runway, there would be a 2 to 3 percent increase in the probability of awakening under Alternative 1, and a 1 to 3 percent increase under Alternative 2. The 3 percent increase would result at the POI closest to the runway under the condition that a person would be trying to sleep there with the windows open during night flying activity at the NS Norfolk.

While vibration may be a component of the noise from Navy V-22, the level of noise would not be high enough to cause structural damage. The loudest Sound Exposure Level from Navy V-22 operations would not exceed thresholds for rattling of objects in buildings (110 dB) or damage (130 dB) at any of the POIs. Therefore, vibration effects from Navy V-22 operations would be expected to be minor.

The Navy would continue to implement noise abatement procedures published in the 2013 NBC Instruction 3710.7V for NAS North Island and in the 2009 AICUZ Study at NS Norfolk.

Public Health and Safety. With implementation of the Alternative 1 or Alternative 2, the Navy would continue to meet the primary goal of the AICUZ Programs at NAS North Island and NS Norfolk, which is to protect the public's health, safety, and welfare through collaboration with the local communities. Alternative 1 would slightly increase the volume of air operations at NAS North Island, compared to the No Action Alternative, and Alternative 2 would slightly increase the volume of air operations at NAS North Island and NS Norfolk. However, this would not change each installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfields.

The analysis determined that potential environmental impacts would be negligible, and the alternatives would not change each installation's ability to comply with military airfield safety procedures. Therefore, in accordance with Executive Order 13045 Protection of Children from Environmental Health Risks and Safety Risks, the EA analysis has determined that Alternatives 1 and 2 would not result in environmental health risks or safety risks that may disproportionately affect children.

The operation of the Navy V-22 would not change airfield habitat or its attractiveness to birds and other wildlife; therefore, the alternatives would not impact the bird/animal aircraft strike hazard (BASH) programs at NAS North Island or NS Norfolk.

Air Quality. Total air pollutant emissions associated with construction activities under Alternative 1 and 2 at NAS North Island and NS Norfolk, even if all construction activities were to occur in one year and not two, would be well below the applicable annual significance thresholds. Navy V-22 transits would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, emissions are above the U.S. Environmental Protection Agency's presumed mixing height for criteria air pollutants.

The Navy has determined that the potential emissions of Alternatives 1 and 2 at NAS North Island would not cause or contribute to a violation of any National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards. Emissions would be below the applicable General Conformity *de minimis* thresholds. NS Norfolk is in the City of Norfolk, which is within the Hampton Roads Intrastate Air Quality Control Region (AQCR). The Hampton Roads Intrastate AQCR is in attainment of all NAAQS; therefore, the Proposed Action does not require a General Conformity evaluation. The net increase in

emissions from the replacement of existing C-2A aircraft operations with the proposed Navy V-22 operations at NAS North Island or NS Norfolk under Alternatives 1 and 2 would not exceed any Prevention of Significant Deterioration (PSD) thresholds. Emissions increases to the global inventory of greenhouse gases under Alternatives 1 or 2 would produce a negligible contribution to future climate change.

Transportation. Alternatives 1 and 2 would result is a short-term increase in construction delivery trucks and construction worker vehicles at NAS North Island and NS Norfolk, which would have a temporary impact on the cities of Coronado and Norfolk roadways. On average, approximately five truck trips per work day (Monday through Friday) would travel to NAS North Island over a construction period of 24 months. Under Alternative 2, approximately four truck trips per work day would travel to the construction site over a period of 24 months. At NS Norfolk, on average, approximately one truck trip per work day would travel over a construction period of 24 months. To minimize the impacts of construction traffic at NAS North Island or NS Norfolk, the Navy would consider establishment of construction truck routes and/or construction worker carpooling.

Under Alternative 1 at NAS North Island, an additional 341 personnel would generate an estimated 340 commuter trips, referred to as average daily traffic (ADT), which is less than 1 percent of existing NAS North Island daily traffic. This increase in ADT was previously accounted for in projected future cumulative projects analyzed by the Navy in a 2008 traffic impact study. Cumulative traffic impacts are discussed in **Section 5.4.5** (Cumulative Impacts – Transportation). Under Alternative 2, an additional 161 personnel would generate an estimated 160 ADT, less than 1 percent of existing NAS North Island daily traffic.

Under Alternative 1 at NS Norfolk, a reduction of 126 personnel would result in an estimated decrease of 125 ADT, less than 1 percent of existing NS Norfolk daily traffic. Under Alternative 2, an increase of 54 personnel would generate an estimated increase of 55 ADT, less than 1 percent of existing NS Norfolk daily traffic. These changes would have a negligible effect on traffic.

Alternatives 1 and 2 would have a minimal impact on the capacity of carpool, vanpool, and other alternative transportation at NAS North Island and NS Norfolk. The Navy continues to work together with the communities and the transportation authorities to plan for the enhancement of the local and regional transportation system to provide residents and military personnel with increased options for transportation.

Biological Resources. Implementation of Alternative 1 or Alternative 2 would not result in significant impacts to biological resources at NAS North Island or NS Norfolk.

Alternative 1 would result in an increase in aircraft operations at NAS North Island, and Alternative 2 would increase aircraft operations at NAS North Island and NS Norfolk. The operations increases have the potential to result in an increase in BASH, including takes of migratory birds, as defined by the Migratory Bird Treaty Act (MBTA). Aircraft operations would be conducted in accordance with the BASH Plan and the NBC and NS Norfolk Integrated Natural Resources Management Plans (INRMPs), which would minimize the risk of collision impacts to wildlife at NAS North Island and NS Norfolk. Additionally, no attractants would be created under Alternatives 1 or 2 that would increase the concentration of birds at the airfields.

To ensure that construction activities would avoid impacting birds protected under the MBTA (including Birds of Conservation Concern) building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season (non-breeding season is September 1 to February

14). If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. At NAS North Island, if an active nest is found in the project area, any nest removal action must be overseen by the NBC Wildlife Biologist. The NBC Wildlife Biologist, in coordination with the qualified biologist, must confirm that there would be no impacts to active nests before construction work could resume. In addition, new buildings at NAS North Island would incorporate bird-friendly design to prevent migratory birds from colliding with buildings, primarily through consideration of glass and lighting design. Therefore, impacts to MBTA-protected bird species and their active nests would be avoided during construction. Aircraft operations under the Proposed Action are a military readiness activity. The risk of impacts to MBTA species would be expected to remain similar to existing conditions. Therefore, Alternatives 1 and 2 are not anticipated to have a significant adverse effects on a population of migratory bird species (including Birds of Conservation Concern) that would result in the need for mitigation and consultation with the U.S. Fish and Wildlife Service (USFWS).

The Navy has determined that implementing Alternatives 1 or 2 at NAS North Island *may affect, but is not likely to adversely affect* the California least tern and the western snowy plover; therefore, the Navy has conducted informal consultation with the USFWS. In a letter dated March 26, 2018, the USFWS concurred with the Navy's determination. Correspondence with the USFWS is included in **Appendix D**. In its concurrence letter, the USFWS stated, "Based on the site and species information [described in the concurrence letter] and the Navy's commitment to implement the proposed conservation measures, we conclude that all potential impacts of the project on the California least tern and western snowy plover will be avoided or reduced to a level of insignificance warranting our concurrence with the Navy's determination that the project is not likely to adversely affect the California least tern and western snowy plover." No construction within 300 feet of the MAT site and no heavy construction within 500 feet of the MAT site would occur during the California least tern breeding season. Construction greater than 500 feet from the MAT site that could result in noise or visual impacts to nesting terns (e.g., building demolition, jackhammering) would be conducted outside of the California least tern breeding season to the maximum extent practicable. Western snowy plover nests found on the airfield would be collected for captive-rearing in accordance with the Ongoing Airfield Operations and Management Strategies at NAS North Island Biological Opinion (BO) (FWS-SDG-3908.3, 1 April 2005). Therefore, construction would not impact nesting western snowy plovers. Aircraft operations within the taxiway and parking apron at NAS North Island would not result in significant impacts to California least tern and western snowy plover. However, the proposed increase in aircraft operations under Alternatives 1 or 2 could result in a minor increase in BASH potential at NAS North Island, and there is a potential for individual California least tern and western snowy plover to be affected by a strike. Aircraft occasionally strike California least tern and western snowy plovers at the NAS North Island airfield under baseline conditions. Given the overall very low numbers of BASH incidents involving these species over the past 35 years (a total of 7 incidents of aircraft striking California least tern and 2 incidents of aircraft striking western snowy plover) compared to the number of existing aircraft operations, a minor increase in aircraft operations would not be expected to increase take of California least tern or western snowy plover above that already authorized in the Ongoing Airfield Operations and Management Strategies at NAS North Island BO (FWS-SDG-3908.3, 1 April 2005). Continued adherence to the BASH Plan would minimize the risk of collision impacts to wildlife at NAS North Island.

No federally endangered, threatened, or candidate species of flora or fauna have been confirmed at NS Norfolk. Calls made by the state-listed Rafinesque's eastern big-eared bat and tri-colored bat have been recorded at NS Norfolk.

Ecosystems can serve as natural buffers from extreme events such as flooding. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Climate change may influence the geographic distribution of species, bringing in additional species to the area while driving out others. However, it is not likely that any additional species would be significantly impacted by the Proposed Action.

Water Resources. Implementation of Alternative 1 or Alternative 2 would not result in significant impacts to water resources at NAS North Island or NS Norfolk. The operation of facilities at NAS North Island and NS Norfolk proposed under Alternatives 1 and 2 would comply with applicable standards and policies for post-construction stormwater management under the Energy Independence and Security Act of 2007; Navy Low Impact Development standards; Chief of Naval Operation Instruction 4100.5E; Executive Order 13834, *Efficient Federal Operations*; the NBC National Pollutant Discharge Elimination System (NPDES) Permit; and the NS Norfolk Virginia Pollutant Discharge Elimination System (VPDES) permit. Post-construction stormwater management features would be incorporated into the project planning and site design. Non-stormwater discharges from the wash racks would be diverted to the sanitary system.

At NAS North Island, both alternatives could require dewatering activities during construction because of the shallow depth to groundwater within the project area. In the event groundwater is encountered during construction, the construction contractor would comply with applicable requirements under either NPDES General Permit, Limited Threat Discharges to Surface Waters (Board Order R6T-200S-0023), or General Waste Discharge Requirements for Discharges to Land with a Low Threat To Water Quality (WQO-2003-0003). The Navy would obtain authorization from the California State Water Resources Control Board under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities for construction activities associated with Alternatives 1 and 2. Impacts to surface water during construction would be minimized through implementing a site-specific stormwater pollution prevention plan (SWPPP) and applicable construction best management practices (BMPs).

At NS Norfolk, Alternatives 1 and 2 could also require dewatering activities during construction because of the shallow depth to groundwater within the project area. In the event groundwater is encountered during construction, the construction contractor would contact NS Norfolk environmental staff to determine if a permit is needed. If the groundwater is uncontaminated, it may be discharged to an authorized non-stormwater discharge under the Virginia Stormwater Management Program Construction General Permit as long as it has been filtered, settled, or similarly treated. The Navy would obtain authorization under the Virginia Stormwater Management Program Construction General Permit from the Virginia Department of Environmental Quality (VDEQ) before starting construction activities. Impacts to surface water during construction would be minimized through implementing a site-specific SWPPP and applicable construction BMPs.

Based on current plans for Alternatives 1 and 2 at NS Norfolk for widening the runway, impacts to wetlands present adjacent to the Chambers Field runway would be avoided. Should project developments require any impact to wetlands, appropriate permits would be obtained and impacts would be mitigated. Alternatives 1 and 2 include expanding the taxiway including an area that is within the floodplain. Widening the taxiway would increase the amount of impervious surface in the floodplain, reducing floodplain capacity and floodwater infiltration. The taxiway expansion would be designed in compliance with Executive Order 11988 to minimize potential harm within the floodplain. Therefore, it is not anticipated that the Proposed Action would significantly impact flooding at NS Norfolk.

Project facilities proposed at NAS North Island under Alternatives 1 and 2 would be unlikely to be impacted by flooding under current sea levels. However, if according to a 2015 study future sea level rises by as much as 7 feet, a small portion of the project area located at lower elevations (roadways, landing areas, etc.) could be temporarily under water during flood events. At NS Norfolk, proposed facilities under both alternatives could be impacted by flooding in the future if sea level rises by 7 feet. As part of the 2014 *Climate Change Adaptation Roadmap*, the Navy is actively participating with the DoD in developing installation-level vulnerability assessments. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

Infrastructure. At NAS North Island, Alternative 1 would increase water use by 87,000 gallons per day (98 acre-feet per year) and wastewater collection by 0.053 million gallons per day. Alternative 2 would result in increases of approximately 45,000 gallons per day (50 acre-feet per year) water demand and 0.025 million gallons per day wastewater collection. This would result in a 1 percent increase in water demand for California American Water San Diego County District service area; sufficient capacity would be available to accommodate this increase. The existing wastewater system at NAS North Island would adequately handle the increase in wastewater from additional personnel and operational activities. The Navy V-22 wash rack use would increase wastewater sent to oil recovery plant by 3,250 gallons per day under Alternative 1 and by 2,000 gallons per day under Alternative 2, and may exceed the current permitted industrial discharge (26,100 gallons per day). If necessary, the Navy would obtain an increase in the permitted discharge of industrial wastewater.

Construction and operations would increase solid waste at NAS North Island. However, the waste flow would be minimized through mandatory recycling practices, and the existing landfill capacity would be able to accommodate the waste. Existing electrical infrastructure and utilities have ample capacity to absorb additional demand of the minor population increase.

At NS Norfolk, Alternative 1 would increase water demand and wastewater collection for the wash rack; this impact would generally be offset by the reduction of 126 personnel. Construction and operations would increase solid waste; area landfills have capacity to accept the additional waste. Existing electrical infrastructure and utilities would adequately handle the demand of proposed facilities.

At NS Norfolk under Alternative 2, additional personnel, families, and the wash rack would increase water use in the City of Norfolk, but the increase would not be significant. The existing wastewater system at NS Norfolk would adequately handle the minor increase in wastewater that would result from additional personnel and operational activities. Construction and operations would increase solid waste at NS Norfolk. However, the solid waste flow would be minimized through mandatory recycling practices, and the existing landfill capacity would be able to accommodate the waste. The NS Norfolk electrical infrastructure has ample capacity to absorb the population and facilities operations increase.

Cultural Resources. Pursuant to the National Historic Preservation Act (NHPA) Section 106 implementing regulations, the Navy has determined that no historic properties would be affected at NAS North Island with implementation of any of the alternatives. Therefore, in accordance with Stipulation VIII-B of the NBC Programmatic Agreement, NBC has satisfied its Section 106 responsibilities for the Proposed Action, and no further NHPA Section 106 review is required.

No adverse effect to National Register of Historic Places (NRHP)-eligible or NRHP-listed architectural or archaeological resources is anticipated at NS Norfolk. In compliance with Section 106 of the NHPA, the Navy consulted with the Virginia Department of Historic Resources, which acts as the State Historic Preservation Officer (SHPO); federally recognized tribes; and interested parties regarding its

determination of effects for the proposed construction and flight operations activities at NS Norfolk. In a letter dated January 3, 2018, the Virginia Department of Historic Resources concurred with the Navy's determination that implementing the Proposed Action would have no adverse effect on historic properties. The Navy would coordinate with the Virginia Department of Historic Resources during the hangar design process. It is not expected that undiscovered cultural resources would be found during implementation of the Proposed Action; however, in the unlikely event of an inadvertent discovery of previously unrecorded or unevaluated cultural resources during ground disturbing operations, the Navy would manage these resources in accordance with the NHPA and other federal and state laws, Navy and DoD regulations and instructions. Correspondence from the SHPO, tribes, and interested parties is included in **Appendix E**.

Hazardous Materials and Waste. The quantity of hazardous wastes generated from demolishing existing buildings and construction/renovation activities associated with Alternatives 1 and 2 at NAS North Island and NS Norfolk would be minor and would not be expected to exceed the capacities of existing hazardous waste disposal facilities. The installations have established measures and programs for managing construction activities to ensure they are conducted in compliance with federal and state environmental laws and regulations.

Maintaining and operating Navy V-22s under both alternatives at NAS North Island and NS Norfolk would require using hazardous materials and would also generate hazardous wastes. These materials and wastes would be similar to those currently generated during fixed-wing and rotary-wing aircraft maintenance and operations, including for C-2A aircraft that the Navy V-22 would replace. Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous materials. Alternatives 1 and 2 would not result in a significant increase in hazardous materials and wastes and would not impact the generator status of the installations.

Due to the age of the buildings, asbestos-containing materials (ACMs) and materials containing regulated levels of lead-based paint (LBP) and polychlorinated biphenyl (PCBs) are assumed to be present at NAS North Island and NS Norfolk and must be removed before the initiation of demolition and construction/renovation activities. These activities would be conducted by a licensed contractor and disposed of in accordance with all applicable federal, state, and local requirements.

At NS Norfolk, a portion of the project area for Alternatives 1 and 2 is located within the contaminant plume for Installation Restoration Program (IRP) Site 20. Construction would be avoided in the boundaries of IRP Site 20 to the extent feasible; however, the CFTD would be installed within the boundary of the site. A concrete pad would be constructed for placement of the CFTD. If construction cannot be avoided within the boundaries of IRP Site 20, established land use controls would be adhered to during construction activities. These are, (1) the use of shallow groundwater and Yorktown aquifer groundwater would be prohibited, and (2) concrete and asphalt pavement would be maintained to minimize exposure to site soils. Because the CFTD is containerized and would be placed on a pad, vapor intrusion risk is limited. However, per the land use controls, vapor intrusion risks would be investigated, and if necessary, mitigation measures would be employed.

Aqueous film forming foam (AFFF) is used for fire suppression at NAS North Island and NS Norfolk and has the potential to release of perfluorinated compounds (PFC) and polyfluoroalkyl substances (PFAS) to the environment. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are the primary PFOSs of concern. No areas of concern (AOCs) for PFAS/PFC contamination have been identified at NAS North Island. At NS Norfolk, one AOC with potential PFAS/PFC contamination is located within the

project area for Alternatives 1 and 2. The site will undergo a systematic investigation to determine the presence of and address any PFAS/PFC contamination. At NAS North Island and NS Norfolk, the new hangars' AFFF fire-fighting system would conform to specifications found in Unified Facilities Criteria 4-211-01, *Aircraft Maintenance Hangars* including an underground containment system for spent AFFF. The spent AFFF would be disposed of in accordance with applicable Navy, federal, state, and local laws and regulations. In addition, the Navy is switching over to non-PFOS and low PFOA formulations and Navy policy does not allow non-emergency use of AFFF. Therefore, impacts from AFFF releases would not be expected.

Socioeconomics. There would be both short- and long-term minor beneficial economic impacts from construction activities under both Alternatives 1 and 2 at NAS North Island and NS Norfolk.

At NAS North Island, there would be increases in personnel of 341 under Alternative 1 and 161 under Alternative 2 that would generate minor beneficial economic impacts. At NS Norfolk, under Alternative 1, there would be a decrease of 126 personnel at NS Norfolk and an increase of 54 personnel under Alternative 2. Given the scale of the regional economies and total employment at NAS North Island and NS Norfolk, these levels of loss or gain of jobs would not have significant direct or indirect impacts on local economic resources.

No significant adverse impacts are anticipated from the proposed minor population increases. While new Navy personnel may have to find housing in the community, assuming that all 341 or 161 new personnel at NAS North Island (Alternatives 1 and 2, respectively) seek community housing at the same time in 2020, this would represent 1 percent or less of the San Diego County Central major statistical area (MSA 0) total housing units, and 1 to 2 percent of vacant housing units projected for 2020. These increases would not result in a significant direct or indirect impact.

While 54 new Navy personnel at NS Norfolk may have to find housing in the community under Alternative 2, this would represent less than 1 percent of City of Norfolk housing units and would not result in a significant direct or indirect impact.

Based on the number and capacity of child care centers in proximity to NAS North Island and NS Norfolk, there is assumed to be ample child care capacity for 88 or 44 preschool-aged children (Alternative 1 or Alternative 2, respectively) at NAS North Island, and for 15 preschool-aged children at NS Norfolk (Alternative 2).

The EA analysis determined that potential environmental impacts would be negligible at NAS North Island and NS Norfolk. Therefore, Alternatives 1 and 2 would not result in disproportionately high and adverse human health or environmental effects on minority populations or low-income populations in the NAS North Island or NS Norfolk communities.

Cumulative Impacts. Based on the analysis of each resource potentially impacted by the Proposed Action, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant cumulative impacts at NAS North Island or NS Norfolk.

Coastal Consistency. The Navy has determined that Alternative 1 or Alternative 2 at NAS North Island would have no effect on coastal use or resources of the State of California's coastal zone. The Navy consulted with the California Coastal Commission on this determination. During consultation with the Commission, the Navy reiterated its commitment to continued cooperation with the City of Coronado on planning efforts to monitor and, where feasible and practicable, examine ways to reduce effects of

aircraft and traffic on residents, recreation, and wildlife. A copy of the Coastal Consistency Negative Determination and concurrence from the California Coastal Commission are provided in **Appendix F**.

The Navy determined that Alternative 1 or Alternative 2 at NS Norfolk may have an effect on a coastal use or resources of the Commonwealth of Virginia's coastal zone and would be consistent to the maximum extent practicable with the applicable enforceable policies of the Virginia Coastal Zone Management Program. The Navy has consulted with VDEQ on this determination. A copy of the Coastal Consistency Determination and concurrence from VDEQ are provided in **Appendix F**.

Table ES-1 provides a tabular summary of the potential impacts to the resources associated with Alternative 1 and Alternative 2 and compares the potential impacts at NAS North Island and NS Norfolk. The No Action Alternative would not meet the purpose of and need for the Proposed Action and is not a viable alternative. However, the No Action Alternative serves as reference point for describing and quantifying the potential impacts associated with Alternatives 1 and 2.

ES.6 Public Involvement

The Navy circulated the Draft EA for public review from January 4 to February 26, 2018. Comments received from the public and federal, state, and local agencies were considered in finalizing this EA. During the Draft EA public review period, public open house information meetings were held at two locations near the project areas as follows:

- Mary D. Pretlow Anchor Branch Library in Norfolk, Virginia (Thursday, January 18, 2018)
- Coronado Community Center in Coronado, California (Wednesday, February 7, 2018)

Table ES-1: Summary of Potential Impacts to Resource Areas at NAS North Island and NS Norfolk

No Action Alternative[1]		*Alternative 1*		*Alternative 2*	
NAS North Island	***NS Norfolk***	***NAS North Island***	***NS Norfolk***	***NAS North Island***	***NS Norfolk***
Airfields and Airspace					
Baseline airfield and airspace conditions would remain unchanged.	Baseline airfield and airspace conditions would remain unchanged.	Negligible impact from 14% increase in operations. Would not adversely affect airspace management, local air traffic, or noise contours.	No impact. Number and type of operations are about the same as No Action Alternative.	Negligible impact from 7% increase in operations. Would not adversely affect airspace management, local air traffic, or noise contours.	Negligible impact from 8.5% increase in operations. Would not adversely affect airspace management, local air traffic, or noise contours.
Noise					
No perceptible change compared to baseline CNEL noise contours or sound exposure at POIs from minor ongoing increase in operations.	No perceptible change compared to baseline DNL noise contours or sound exposure at POIs from minor ongoing increase in operations.	No perceptible impact to CNEL noise contours, sound exposure, or vibration effects at POIs.	No perceptible change to DNL noise contours, sound exposure, or vibration effects at POIs.	Impacts and impact minimization would be the same as, but slightly less than, Alternative 1.	No perceptible change to DNL noise contours, sound exposure, or vibration effects at POIs from minor increase in operations.
Public Health and Safety					
No change to baseline safety risk. All regulations and plans that pertain to airfield and other flight safety considerations would continue to be followed.	No change to baseline safety risk. All regulations and plans that pertain to airfield and other flight safety considerations would continue to be followed.	Negligible impact with minor increase in operations and potential BASH events. Existing management strategies, regulations, and plans that pertain to airfield and other flight safety considerations would continue to minimize risk. No change to AICUZ Program. No change to environmental health risks or safety risks that may disproportionately affect children.	Negligible impact. No change to AICUZ Program. No change to environmental health risks or safety risks that may disproportionately affect children.	Impacts and impact minimization would be the same as, but slightly less than, Alternative 1.	Negligible impact with minor increase in operations and potential BASH events. No change to AICUZ Program. Existing management strategies, regulations, and plans that pertain to airfield and other flight safety considerations would continue to minimize risk. No change to environmental health risks or safety risks that may disproportionately affect children.

ES-1: Summary of Potential Impacts to Resource Areas at NAS North Island and NS Norfolk (cont.)

No Action Alternative		*Alternative 1*		*Alternative 2*	
NAS North Island	***NS Norfolk***	***NAS North Island***	***NS Norfolk***	***NAS North Island***	***NS Norfolk***
Air Quality					
Baseline regional air quality conditions would remain unchanged. Minor increase in emissions would be below the applicable General Conformity *de minimis* or PSD thresholds.	Since Hampton Roads Intrastate AQCR is in attainment of all NAAQS, the Proposed Action at NS Norfolk would not require a General Conformity evaluation. Minor increase in emissions would be below the applicable PSD thresholds.	Emissions would be below the applicable General Conformity *de minimis* or PSD thresholds.	Since Hampton Roads Intrastate AQCR is in attainment of all NAAQS, the Proposed Action at NS Norfolk would not require a General Conformity evaluation. Emissions would be below the applicable PSD thresholds.	Impacts would be the same as, but slightly less than, Alternative 1.	Impacts would be the same as Alternative 1, except emissions would be slightly higher with increase in operations.
Transportation					
Baseline traffic conditions in the vicinity of the installation would remain unchanged.	Baseline traffic conditions in the vicinity of the installation would remain unchanged.	Minor direct impact from additional 340 ADT (less than 1% of total ADT). Previously accounted for in Navy 2008 traffic study. Short-term construction truck traffic (average of five truck trips per work day) and construction worker vehicles.	Minor beneficial impact from reduction of 125 ADT. Temporary minor impact from construction delivery trucks and construction worker vehicles.	Minor direct impact from additional 160 ADT (less than 1% of total ADT). Previously accounted for in Navy 2008 traffic study. Short-term construction truck traffic (average of four truck trips per work day) and construction worker vehicles.	Minor direct impact from additional 55 ADT (less than 1% of total ADT). Temporary minor impact from construction delivery trucks and construction worker vehicles.

ES-1: Summary of Potential Impacts to Resource Areas at NAS North Island and NS Norfolk (cont.)

No Action Alternative		*Alternative 1*		*Alternative 2*	
NAS North Island	***NS Norfolk***	***NAS North Island***	***NS Norfolk***	***NAS North Island***	***NS Norfolk***
Biological Resources					
No impact.	No impact.	Minor increases in potential BASH. Existing management strategies would continue to minimize BASH risk. Impacts to MBTA-protected bird species and their active nests would be avoided during construction. Potential for takes of migratory birds during operations would not result in a significant adverse effect on a population of migratory birds and would continue to be in compliance with the MBTA as military readiness activity. *May affect, not likely to adversely affect* the California least tern and western snowy plover; informal consultation with USFWS was conducted. Agency documentation is provided in **Appendix D**.	No impacts to biological resources associated with construction or climate change. Number and type of operations are about the same as No Action Alternative; therefore, no increased take of migratory birds and bats. Existing management strategies would continue to minimize risk. Impacts to MBTA-protected bird species and their active nests would be avoided during construction. Potential for takes during operations would not result in significant adverse effect on a population of migratory birds and would continue to be in compliance with MBTA as military readiness activities.	Impacts and impact minimization would be the same as, but slightly less than, Alternative 1.	No impacts to biological resources associated with construction or climate change. Negligible potential for increased strikes of bats, including potential state listed species. Existing BASH management strategies would continue to minimize risk. Impacts to MBTA-protected bird species and their active nests would be avoided during construction. Potential for takes of migratory birds during operations would not result in significant adverse effect on a population of migratory birds and would be in compliance with the MBTA as military readiness activity.

ES-1: Summary of Potential Impacts to Resource Areas at NAS North Island and NS Norfolk (cont.)

No Action Alternative		*Alternative 1*		*Alternative 2*	
NAS North Island	***NS Norfolk***	***NAS North Island***	***NS Norfolk***	***NAS North Island***	***NS Norfolk***
Water Resources					
No impact.	No impact.	Minimal impacts to groundwater and surface water with minimization measures. Potential for future sea level rise to contribute to 100-year event flooding in a portion of the project area (roadways, landing areas, etc.).	Minimal impacts to groundwater and surface water with minimization measures. Increase of 2.4 acres of impervious surface would be expected to increase stormwater runoff. Wetlands adjacent to proposed taxiway expansion would be avoided. Existing taxiway is within the floodplain; floodplain modifications would be minimal. Potential for future sea level rise to contribute to 100-year event flooding of most of the project area.	Impacts and impact minimization would be the same as, but slightly less than, Alternative 1.	Impacts and impact minimization would be the same as Alternative 1.

ES-1: Summary of Potential Impacts to Resource Areas at NAS North Island and NS Norfolk (cont.)

No Action Alternative		*Alternative 1*		*Alternative 2*	
NAS North Island	***NS Norfolk***	***NAS North Island***	***NS Norfolk***	***NAS North Island***	***NS Norfolk***
Infrastructure					
No impact.	No impact.	Increases in water demand/ wastewater of 87,000 gallons per day (98 acre-feet per year). Increase of industrial discharge of wastewater of 3,250 gallons per day, which would result in an increase in the permitted discharge of industrial wastewater. Additional solid waste and energy demand from construction, demolition and operations. Water, wastewater, solid waste, and energy capacities sufficient to meet additional demand.	Additional solid waste and energy demand from construction and demolition. Solid waste and energy capacities sufficient to meet additional demand. Minor reduced water demand/wastewater, energy, and solid waste with reduced personnel.	Increases in water demand/ wastewater of 45,000 gallons per day (50 acre-feet per year). Increase of industrial discharge of wastewater of 2,000 gallons per day, which would result in an increase in the permitted discharge of industrial wastewater. Additional solid waste and energy demand from construction, demolition and operations. Water, wastewater, solid waste, and energy capacities sufficient to meet additional demand.	Additional solid waste and energy demand from construction, demolition and operations. Minimal increases in water demand/wastewater. Water, wastewater, solid waste, and energy capacities sufficient to meet additional demand.

ES-1: Summary of Potential Impacts to Resource Areas at NAS North Island and NS Norfolk (cont.)

No Action Alternative		*Alternative 1*		*Alternative 2*	
NAS North Island	***NS Norfolk***	***NAS North Island***	***NS Norfolk***	***NAS North Island***	***NS Norfolk***
Cultural Resources					
No impact.	No impact.	No historic properties affected.	No adverse effect to historic properties.	No historic properties affected.	No adverse effect to historic properties.
Hazardous Materials and Wastes					
No impact.	No impact.	Minor hazardous materials and wastes generated from demolition, construction, operations, and maintenance. Potential ACM, LBP, and PCB generated during demolition. Potential PFAS/PFC generated from AFFF during operations. Impacts would be minimized with implementation of appropriate and established handling procedures.	Minor hazardous materials and wastes generated from demolition (ACM, LBP, PCB), construction, operations, and maintenance. Potential PFAS/PFC generated from AFFF during operations. Impacts minimized with implementation of appropriate and established handling procedures. Construction of CFTD within IRP Site 20 would adhere to land use controls. Vapor intrusion risks would be limited, but would be investigated, and if necessary, measures would be employed to minimize risk.	Impacts and impact minimization would be the same as, but slightly less than, Alternative 1.	Impacts and impact minimization would be the same as Alternative 1.

ES-1: Summary of Potential Impacts to Resource Areas at NAS North Island and NS Norfolk (cont.)

No Action Alternative		*Alternative 1*		*Alternative 2*	
NAS North Island	***NS Norfolk***	***NAS North Island***	***NS Norfolk***	***NAS North Island***	***NS Norfolk***
Socioeconomics					
No impact.	No impact.	Minor beneficial economic impacts. Minor impacts to population (750 personnel and family) with minor associated impacts to housing, child care, and schools in San Diego County. No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.	Minor beneficial economic impacts. Minor reduction in to population (277 personnel and family) with minor associated reduction in housing, child care, and schools in City of Norfolk and Hampton Roads. No disproportionately high and adverse human health or environmental effects on minority or low-income populations.	Impacts would be the same as, but slightly less (354 personnel and family), than Alternative 1.	Minor beneficial economic impacts. Minor increase in population (124 personnel and family) with minor associated increase in demand for housing, child care, and schools in City of Norfolk and Hampton Roads. No disproportionately high and adverse human health or environmental effects on minority or low-income populations.
Other considerations - Coastal Consistency					
No impact.	No impact.	Coastal Consistency Negative Determination based on no effect on coastal use or resources of the State of California's coastal zone. California Coastal Commission concurrence with this determination is provided in **Appendix F**.	Coastal Consistency Determination documents effects on coastal use or resources of the Commonwealth of Virginia's coastal zone and consistency to the maximum extent practicable with the applicable enforceable policies of the Virginia Coastal Zone Management Program. VDEQ concurrence with this determination is provided in **Appendix F**.	Same as Alternative 1.	Same as Alternative 1.

Note: [1]The No Action Alternative does not meet the purpose of and need for the action and is not a viable alternative; however, it serves as reference point for describing and quantifying the potential impacts of Alternatives 1 and 2.

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Final
Environmental Assessment for
Transition from C-2A to CMV-22B Aircraft at
Fleet Logistics Centers NAS North Island and NS Norfolk

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ABBREVIATIONS AND ACRONYMS

Acronym	Definition
ACM	asbestos-containing material
ADT	average daily traffic
AESO	Aircraft Environmental Support Office
AFFF	aqueous film forming foam
AICUZ	Air Installations Compatible Use Zones
AMSL	above mean seal level
AMT	Aircraft Maintenance Trainer
AOC	Area of Concern
APCD	Air Pollution Control District
APE	area of potential effect
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
ARB	Air Resources Board
BASH	Bird/Animal Aircraft Strike Hazard
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CATEX	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFTD	containerized flight training device
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
CONUS	Continental United States
CVN	nuclear-powered aircraft carrier
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	Decibel
dBA	A-weighted sound level
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DoD	United States Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
FRC	Fleet Readiness Center
FRS	Fleet Replacement Squadron
FTD	flight training device
FY	Fiscal Year
GCA	ground-controlled approach
GHG	greenhouse gas
HAP	hazardous air pollutant
I	Interstate
ICRMP	Integrated Cultural Resources Management Plan
IFR	Instrument Flight Rules
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Conservation
IRP	Installation Restoration Program
LBP	lead-based paint
L_{max}	maximum A-weighted sound level
LOS	level of service
LUC	land use control
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
MCOLF	Marine Corps Outlying Landing Field
MGD	million gallons per day
MSA	major statistical area or metropolitan statistical area
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NBC	Naval Base Coronado
NEPA	National Environmental Policy Act

Acronym	Definition
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NS	Naval Station
NSR	New Source Review
NTIA	Navy Triangle Influence Area
OEIS	Overseas Environmental Impact Statement
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction
PA	Programmatic Agreement
Pb	Lead
PCB	polychlorinated biphenyl
PFAS	polyfluoroalkyl substances
PFC	perfluorinated compounds
PFOA	Perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PM_{10}	particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
POI	point of interest
POV	privately owned vehicle
PSD	Prevention of Significant Deterioration
RCRA	Resource, Conservation, and Recovery Act
ROD	Record of Decision
ROI	region of influence
RONA	Record of Non-Applicability
RPA	Resource Protection Area
SANDAG	San Diego Association of Governments
SDAB	San Diego Air Basin
SDG&E	San Diego Gas and Electric
SDMSS	San Diego Metropolitan Sewerage System
SDWA	Safe Water Drinking Act
SEIS	Supplemental Environmental Impact Statement
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SR	State Route
SUA	Special Use Airspace
SWPPP	Stormwater Pollution Prevention Plan
TCP	traditional cultural property
TMDL	Total Maximum Daily Load
U.S.	United States
U.S.C.	United States Code
UCMR	Unregulated Contaminant Monitoring Rule
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Games and Inland Fisheries
VDOT	Virginia Department of Transportation
VFR	Visual Flight Rules
VOC	volatile organic compound
VPDES	Virginia Pollutant Discharge Elimination System
VRC	Fleet Logistics Support Squadron
VRM	Fleet Logistics Support Multi-Mission Squadron
VSMP	Virginia Stormwater Management Program

1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States (U.S.) Department of the Navy (Navy) proposes to provide facilities and functions to support the replacement of the C-2A Greyhound (**Figure 1.1-1**) with the new CMV-22B Osprey, herein referred to as "Navy V-22," (**Figure 1.1-2**) at existing West and East Coast logistics support centers Naval Air Station (NAS) North Island, California and Naval Station (NS) Norfolk, Virginia. Under this Proposed Action, the Navy plans to:

- replace 27 legacy C-2A aircraft operated by existing fleet logistics support squadrons with 38 Navy V-22 aircraft operated by fleet logistics support multi-mission squadrons;
- establish a Navy V-22 training squadron for pilots and aircrews;
- establish a maintenance school for maintenance personnel;
- construct, renovate, and maintain facilities to accommodate Navy V-22 squadron aircraft and personnel;
- make adjustments to personnel levels (increases or decreases) associated with the aircraft transition; and
- conduct Navy V-22 flight training operations.

Figure 1.1-1: Navy C-2A Greyhound

Figure 1.1-2: Navy V-22 Osprey

The existing fleet logistics support squadrons are based at NAS North Island (within the consortium of Naval Base Coronado [NBC] installations), and Chambers Field located within NS Norfolk, Virginia. The fleet logistics centers provide logistics, supply, and support services to fleet units and shore commands.

The Proposed Action would be implemented over a 10-year period beginning in 2018 with facility renovations and some personnel actions at NAS North Island and NS Norfolk. The transition from C-2A to Navy V-22 would begin with Navy V-22 aircrews and maintenance personnel initially training at the existing U.S. Marine Corps MV-22B training squadron and maintenance school at Marine Corps Air Station (MCAS) New River, North Carolina for several years before returning to their home base location. Eventually, the Navy V-22 training squadron and a maintenance school would be established, either on the West Coast or the East Coast, to fully support Navy training requirements.

The training squadron, also known as a Fleet Replacement Squadron (FRS), is responsible for training of newly designated Navy pilots and enlisted aircrews, those returning to flight status after non-flying assignments, or those transitioning to a new aircraft for duty in the fleet. The maintenance school, operated by the Center for Naval Aviation Technical Training, develops, delivers, and supports the aviation maintenance personnel training necessary to meet fleet requirements.

For over 30 years, the C-2A has been performing the carrier on-board delivery mission. The C-2A is a fixed wing, cargo aircraft designed to land on aircraft carriers. The aircraft can carry up to 10,000 pounds composed of high-priority cargo and/or passengers (up to 26 passengers). The aircraft is capable of carrying jet engines or delivering the mail, and can air drop supplies and personnel with its open-ramp flight capabilities. The C-2A aircraft are assigned to fleet logistics support squadrons, serving carriers at sea from shore installations at NAS North Island and NS Norfolk.

Thirteen C-2A aircraft are assigned to West Coast Fleet Logistics Support Squadron (VRC-30) (**Figure 1.1-3**). The 13 aircraft consist of:

- Ten C-2A aircraft assigned to VRC-30 at NAS North Island consisting of four sea-going detachments and a shore "home guard," which supports local operational commitments.
- Three C-2A aircraft assigned to VRC-30 DET 5 which is permanently forward deployed (i.e., positioned outside the United States) to Japan.

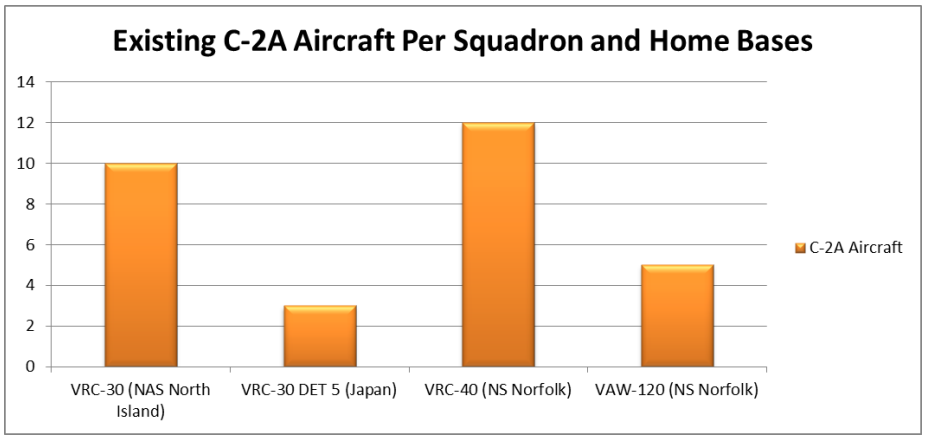

Figure 1.1-3: Existing C-2A Aircraft per Squadron and Home Base Assignments

Currently, 17 C-2A aircraft are assigned to NS Norfolk (Chambers Field) (**Figure 1.1-3**). The 17 aircraft consist of:

- Twelve C-2A aircraft assigned to East Coast Fleet Logistics Support Squadron (VRC-40) consisting of five sea-going detachments and a shore home guard to support local operational commitments.
- Five C-2A aircraft assigned to the training squadron (VAW-120).

Sea-going detachments deploy routinely with Navy Carrier Air Wings to support Navy Carrier Strike Groups.

Table 1.1-1 illustrates the current C-2A force structure including primary aircraft authorized and personnel. As shown in **Table 1.1-1**, NAS North Island currently has 10 Continental United States (CONUS) fleet operational squadron C-2A aircraft and NS Norfolk has 12 CONUS fleet operational squadron C-2A aircraft and five C-2A aircraft in the fleet training squadron. NAS North Island has 387 personnel associated with C-2A and NS Norfolk has 581.

Table 1.1-1: Existing C-2A Force Structure at NAS North Island and NS Norfolk

	NAS North Island	***NS Norfolk***
Fleet Squadrons	1	1
CONUS Fleet Detachments	4	5
Home Guard	1	1
Squadron Aircraft (Total)	10	12
Squadron Personnel	372	401
Fleet Training Squadron	0	1
Fleet Training Squadron Aircraft	0	5
Fleet Training Squadron Personnel	0	151
Additional Personnel		
Wing Staff	0	0
Weapon School Staff	0	7
Maintenance School Personnel	0	7
I-Level Maintenance FRC Personnel	15	15
TOTAL AIRCRAFT	10	17
TOTAL PERSONNEL	387	581

Notes:
West and East Coast C-2A squadrons have two aircraft per sea-going detachment and shore home guard. Forward Deployed Naval Force Detachment (VRC-30 DET 5) is based in Japan and consists of three C-2A aircraft.
Wing Staff support includes three persons on the Commander Airborne Command Control and Logistics Wing, located at Naval Base Ventura County/NAS Point Mugu. I-Level = Intermediate Level; FRC=Fleet Readiness Center

In accordance with the President's Budget for Fiscal Year 2016 and the *Required Operational Capabilities/Projected Operational Environment for the CMV-22B Osprey*, the Navy V-22 (see **Figure 1.1-2**) was chosen to replace the C-2A in the carrier on-board delivery mission. The Navy V-22 will have greater capacity and an added capability to perform vertical carrier on-board delivery to aircraft carriers and other ships. The Navy V-22 Osprey is a modified longer-range variant of the Marine Corps' MV-22B that meets the warfighting logistics capability requirements of the Navy. The aircraft adds an extended range fuel system, high-frequency radio, and a public address system to the baseline V-22 Osprey aircraft. The Navy V-22 will operate in vertical and short take-off and landing modes at shore airfields.

1.2 LOCATION

The locations of NAS North Island and NS Norfolk are briefly described in the next paragraphs and shown in **Figure 1.2-1**.

Figure 1.2-1: Navy V-22 West and East Coast Project Locations

1.2.1 NAVAL AIR STATION NORTH ISLAND, CALIFORNIA

NAS North Island is the largest naval aviation industrial complex on the West Coast. NAS North Island occupies 2,800 acres at the north end of the Coronado peninsula on San Diego Bay. NAS North Island's mission is to arm, repair, provision, service, and support the U.S. Pacific Fleet and other operating forces.

NAS North Island is the anchor base of NBC. NBC is located in both San Diego County and Los Angeles County, California, and is a consortium of eight installations, including NAS North Island, Naval Amphibious Base Coronado, Silver Strand Training Complex, Naval Outlying Landing Field Imperial Beach, Naval Auxiliary Landing Field San Clemente Island, Camp Michael Monsoor, Camp Morena, and Remote Training Site Warner Springs.

NAS North Island hosts multiple tenant commands including Commander, Naval Air Forces and Commander Naval Air Force, U.S. Pacific Fleet. NAS North Island has three nuclear-powered aircraft carrier (CVN) berths, with two carriers currently homeported. NAS North Island serves as the Navy's West Coast master helicopter base. NAS North Island is currently home to approximately 25,000 active duty military, reserve, and civilian personnel.

The proposed location for the Navy V-22 on the West Coast is Halsey Field, the same location at NAS North Island that currently supports the C-2A. Halsey Field provides training and flight operations for a number of fixed-wing and helicopter squadrons with various mission requirements. **Figure 1.2-2** illustrates NAS North Island and the general location of the project area for proposed facilities and functions within the installation boundary.

1.2.2 NAVAL STATION NORFOLK, VIRGINIA

NS Norfolk, the center of naval operations on the East Coast, is part of the world's largest naval complex and is the primary homeport of the U.S. Atlantic Fleet. The station occupies 4,600 acres of land on a peninsula known as Sewell's Point in the northwest corner of Norfolk, Virginia, near the mouth of the Chesapeake Bay. NS Norfolk includes Chambers Field (formerly known as Naval Air Station Norfolk), Fleet Industrial Supply Center, Naval Facilities Engineering Command Mid-Atlantic, Fleet Training Center, and numerous other tenants.

The station is home to 63 ships, 165 aircraft, 17 aircraft squadrons, and 386 tenant commands, and has 13 large piers, several small piers, and 11 aircraft hangars. NS Norfolk supports the operational readiness of the U.S. Atlantic Fleet, providing facilities and services to enable mission accomplishment.

The proposed location for the Navy V-22 on the East Coast is Chambers Field, the same location at NS Norfolk that currently supports the C-2A. The mission of NS Norfolk Chambers Field is to support the operational readiness of the U.S. Atlantic Fleet, primarily by providing facilities and services to support the missions of its tenant commands (Navy, 2009a). NS Norfolk Chambers Field provides training and flight operations for a number of fixed-wing and helicopter squadrons with various mission requirements. U.S. Marine Corps Reserve Squadron VMM-774 currently operates four MV-22B at NS Norfolk. **Figure 1.2-3** illustrates NS Norfolk Chambers Field and the general location of the project area for proposed facilities.

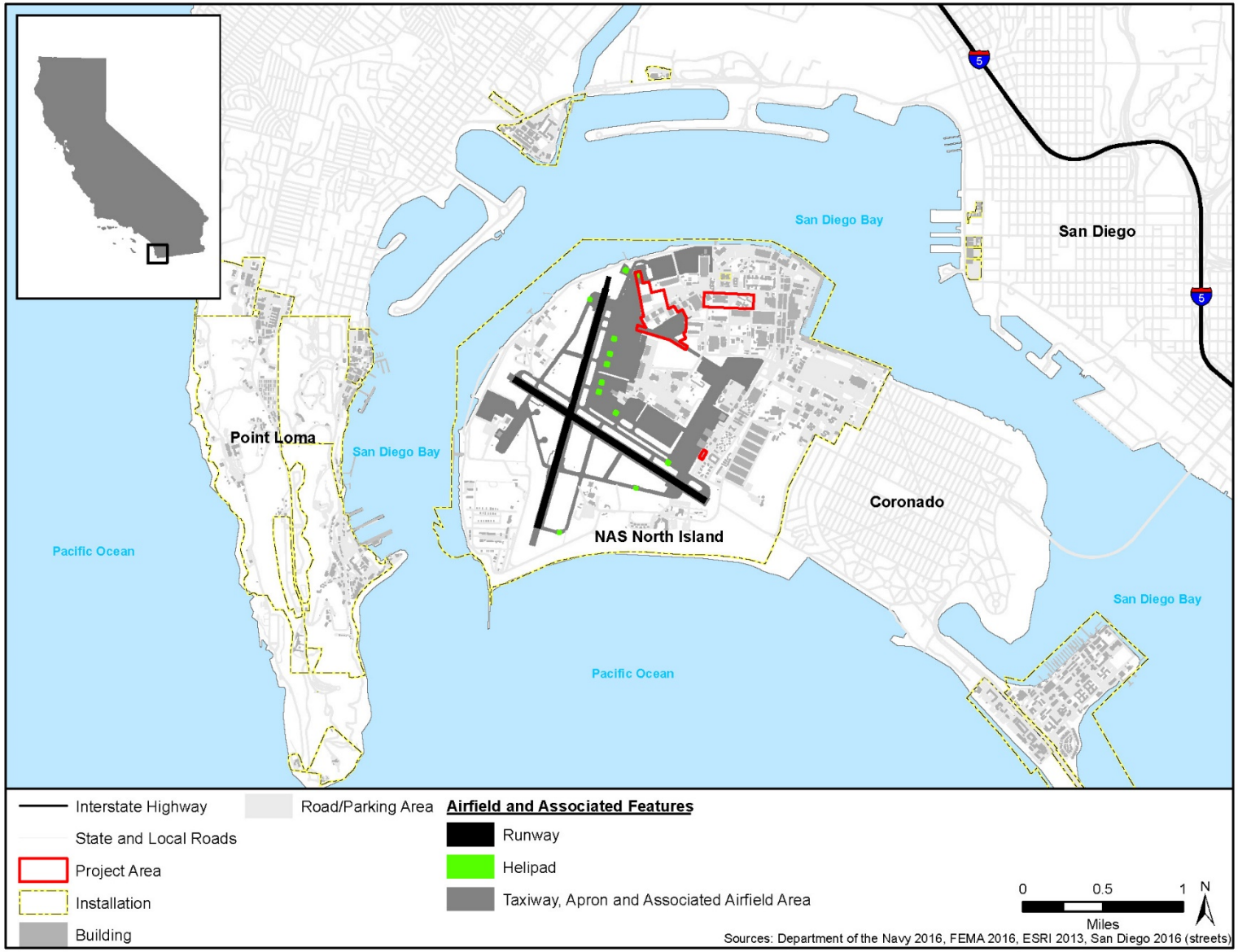

Figure 1.2-2: NAS North Island and General Project Area

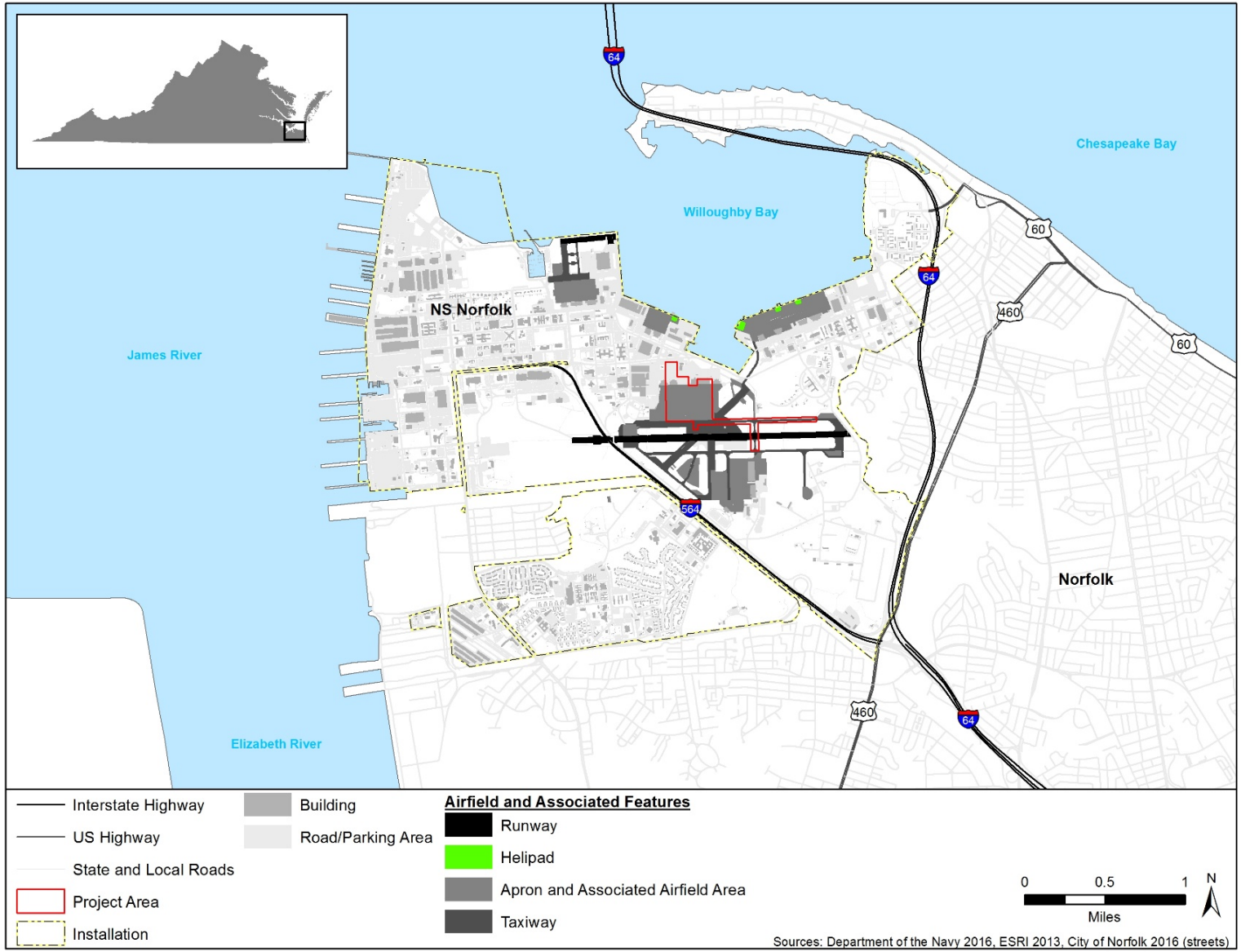

Figure 1.2-3: NS Norfolk and General Project Area

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to provide the logistics support community the facilities and functions needed to support the replacement of the fixed-wing C-2A aircraft with the Navy V-22 tilt-rotor aircraft to meet updated operational requirements and enhance the logistics support mission.

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

The Proposed Action is needed because the older C-2A aircraft has reached the end of its service life. Increasing maintenance requirements limit the use of the aging C-2A for the aircraft carrier on-board delivery mission. The Proposed Action would provide the facilities needed to efficiently transition the C-2A to the Navy V-22 aircraft without interruption of the time-critical logistics support mission for carrier strike groups at sea. Moreover, the need for the Proposed Action is to provide capabilities for training and equipping combat-capable naval forces ready to deploy worldwide. In this regard, the Proposed Action furthers the Navy's execution of its congressionally mandated roles and responsibilities under 10 U.S. Code (U.S.C.) section 5062.

According to the 2015 National Military Strategy, the presence of U.S. military forces in key locations around the world underpins the international order and provides opportunities to engage with other countries while positioning forces to respond to crises (Joint Chiefs of Staff, 2015). A military presence is essential to maintaining regional peace and building capabilities to provide for missile defense, cyber security, maritime security, and disaster relief in the vastness of the ocean.

The Navy V-22 is well suited to modern logistics mission challenges including covering vast distances and servicing widely distributed overseas bases. Unlike the C-2A, the Navy V-22 would not be tied to runways ashore. Because the Navy V-22 can be refueled in the air, it can span vast ocean distances on deployment and achieve its carrier on-board delivery mission despite a paucity of land bases. The Navy V-22 will be able to handle greater cargo weight capacity than the C-2A, fly at comparable speeds and land vertically on carriers and smaller naval surface combatant vessels. These enhanced capabilities will ensure effective and efficient fleet logistics support in any theater.

1.4 FLEET LOGISTICS SUPPORT SQUADRONS ORGANIZATION STRUCTURE AND MISSION

The NAS North Island-based fleet logistics support squadron, VRC-30 "Providers," consists of five detachments. Four of the detachments, consisting of eight total C-2A aircraft, are based at NAS North Island and one detachment, consisting of three C-2A aircraft, is permanently deployed to Atsugi, Japan. Each detachment consists of two C-2A aircraft and is usually manned with seven pilots. Two additional C-2A aircraft are stationed at NAS North Island and make up the home guard component. VRC-30 provides logistics support to the Navy's Third, Fifth, and Seventh Fleets. The squadron's goal is the movement of cargo, mail, and passengers to and from Pacific Fleet aircraft carriers. VRC-30 will be replaced by fleet logistics support multi-mission squadron (VRM-30).

The NS Norfolk-based fleet logistics support squadron, VRC-40 "Rawhides," consists of 12 C-2A aircraft (in five detachments of two aircraft each and one home guard consisting of two aircraft). VRC-40 provides logistics support to the Navy's Atlantic, Fifth, and Sixth Fleets. The squadron's goal is to facilitate the movement of cargo, mail, and passengers to and from Atlantic Fleet aircraft carriers. VRC-40 will be replaced by fleet logistics support multi-mission squadron (VRM-40).

Carrier Airborne Early Warning Squadron ONE TWO ZERO (VAW-120 "Greyhawks") is also based at NS Norfolk. VAW-120 is the existing fleet training squadron and currently has five C-2A aircraft based at NS Norfolk. The mission of VAW-120 is to fly and train naval aviators, naval flight officers, and naval aircrews to safely and effectively operate E-2 and C-2A aircraft, preparing them to join the fleet.

1.5 SCOPE OF ENVIRONMENTAL ANALYSIS

In accordance with Office of the Chief of Naval Operations Instruction (OPNAVINST) 5400.44A of 13 Oct 2011, the Secretary of the Navy is responsible for the home basing decision. To support informed decision-making, Commander, U.S. Fleet Forces Command has prepared this Environmental Assessment (EA) and, if warranted by the findings, will sign a Finding of No Significant Impact (FONSI). The Navy has prepared this EA in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) Regulations and Navy regulations for implementing NEPA.

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

Resource areas that would be unaffected by the Proposed Action evaluated in this EA or any impacts that would be minimal and clearly bounded by analyses in prior NEPA documents were eliminated from detailed analysis in this EA. For example, because the Proposed Action would involve construction in previously disturbed parts of the installations, there would be no potential impacts to geological resources. Consequently, the environmental conditions for these resource areas are not further discussed. **Table 1.5-1** identifies the unaffected resource areas and provides the rationale for eliminating these resources from detailed analysis.

Table 1.5-1: Resources Eliminated from Detailed Analysis

Resource Area Eliminated from Detailed Analysis	*Rationale*
Land Use Compatibility	Construction of facilities and operations would occur at an established airfield where proposed airfield support facilities would be consistent with existing land uses. Noise and safety are analyzed in Sections 4.2, 4.3, 7.2, and 7.3, and impacts were found to be negligible. Therefore, there would be no impacts to land use compatibility in the surrounding community. Compliance with the Coastal Zone Management Program is discussed in Chapter 9, Other Considerations Required by NEPA. The Proposed Action would be consistent with existing land uses, plans, programs, and policies. Therefore, land use was eliminated from further analysis.
Community/Emergency Services, Parks, and Recreation	New personnel and family members would represent less than 1 percent of the population in the areas they would be expected to live in the vicinity of NAS North Island or NS Norfolk. This level of population increase would not significantly impact the demand for community/emergency services, or parks and recreation facilities in any one area. Therefore, impacts to community/emergency services, and recreation resources would be negligible, and these resources were eliminated from further analysis. Population, employment, housing, schools, and child care are discussed further in Sections 3.11 and 6.11 Socioeconomics.
Geological Resources	Construction associated with the Proposed Action would occur upon previously disturbed areas at NAS North Island and NS Norfolk. With the exception of minimal ground disturbance caused by heavy machinery during the demolition and construction process, the areas around the buildings would not be disturbed and no topographic features would be modified or otherwise altered. Therefore, geological resources were eliminated from further analysis.
Visual Resources	The aesthetic quality of an area or community is composed of visual resources. Physical features that make up the visible landscape include land, water, vegetation and man-made features, such as buildings, roadways and structures. The Proposed Action includes demolition of certain buildings at NAS North Island, renovation of buildings at NS Norfolk, and construction of new facilities at NAS North Island and NS Norfolk in keeping with installation architectural standards. Since no negative impacts are expected on the visual resources from the proposed demolition and construction, this resource was eliminated from further analysis.

1.6 KEY DOCUMENTS

- **Environmental Impact Statement (EIS) for Introduction of the V-22 to the Second Marine Aircraft Wing (1999)**. In 1999, the U.S. Marine Corps published an EIS that analyzed the introduction of the V-22 to the Second Marine Aircraft Wing. On December 20, 1999, the U.S. Marine Corps signed its Record of Decision (ROD) to base the V-22 aircraft at MCAS New River, North Carolina. The V-22 introduction was mandated by Congress as a replacement for the aging CH-46E helicopters. Between 2000 and 2006, the Second Marine Aircraft Wing would receive 48 V-22 aircraft. In 2000, the V-22 FRS staff was to begin training in the operation and

maintenance of the V-22 and then in 2001 begin training tactical squadron personnel. In support of the EIS analysis, the U.S. Marine Corps conducted aircraft noise modeling at MCAS New River and MCAS Cherry Point and additional noise analysis at supporting outlying landing fields (e.g., Marine Corps Outlying Landing Field (MCOLF) Oak Grove and MCOLF Bogue), special use airspace, military operations areas, restricted areas, military training routes, terrain-following routes, low altitude routes, targets and landing zones, and civilian airports.

- **EA for the Home Basing of the MH-60R/S on the East Coast of the United States (2002)**. On May 17, 2002, a FONSI was signed (Navy 2002) for home basing 102 MH-60S helicopters and 105 MH-60R helicopters on the East Coast of the United States. The selected alternative was Alternative 1: Home base all or most MH-60S aircraft, associated personnel, and infrastructure at NS Norfolk, Virginia and home base all or most MH-60R aircraft, associated personnel, and infrastructure at the Jacksonville Fleet Concentration Area. No significant, adverse short-term or long-term impacts would occur at any of the installations as a result of implementing the proposed action.
- **EIS for the Introduction of the F/A-18 Super Hornet Aircraft to the East Coast of the United States (Navy, 2003a).** In 2003, the Navy published an EIS that analyzed the introduction of the F/A-18 Super Hornet aircraft to the East Coast of the United States. On September 10, 2003, the Navy announced its ROD to home base 8 fleet squadrons (96 aircraft) and the FRS (24 aircraft) at Naval Air Station Oceana, Virginia and 2 fleet squadrons (24 aircraft) at MCAS Cherry Point, North Carolina. The Super Hornet aircraft were assigned to replace the aging F-14 (Tomcat) and earlier model F/A-18 (Hornet) aircraft. In support of the EIS analysis, the Navy conducted aircraft noise modeling at the three alternative home basing locations, and outlying landing fields including Naval Auxiliary Landing Field Fentress in Chesapeake, Virginia.
- **EA and FONSI for the Relocation of HM-15 from Naval Air Station Corpus Christi, Texas to Naval Station Norfolk, Virginia (2007).** In 2007, the Navy prepared an EA and FONSI that analyzed the potential effects associated with relocating Helicopter Mine Countermeasures Squadron ONE FIVE (HM-15) from NAS Corpus Christi, Texas to NS Norfolk, Virginia. The proposed action included relocating 11 MH-53E helicopters, the squadron's airborne mine countermeasures equipment, approximately 600 Navy personnel and their families, building demolition, and construction of a single module, Type II aircraft maintenance hangar and maintenance facility within the V Area of Chambers Field.
- **Supplemental EIS for Developing Homeport Facilities for Three Nimitz-Class Aircraft Carriers in Support of the U.S. Pacific Fleet (Navy, 2008a).** On February 2, 2009, the Navy announced its decision to implement minor infrastructure improvements to upgrade carrier berthing (Berth LIMA) at NAS North Island to comply with updated CVN facility requirements (Navy, 2008a). The Supplemental EIS addressed new circumstances and information, related infrastructure improvements, vehicular traffic, and public comments on shoreline erosion that emerged after 1999 Final EIS and ROD.
- **EIS for the West Coast Basing of the MV-22 (2009).** In 2009, the U.S. Marine Corps published an EIS that analyzed the West Coast home basing and maintaining of the MV-22 aircraft for the U.S. Marine Corps squadrons. On November 23, 2009, the Navy announced its ROD to base up to eight MV-22 squadrons at MCAS Miramar, in San Diego, California, and up to two MV-22 squadrons at MCAS Camp Pendleton, north of San Diego, California. The EIS recognized significant unmitigable ground traffic and transportation impacts in the vicinity of MCAS Miramar and significant but mitigable impacts to biological resources and cultural resources.

- **EIS for U.S. Marine Corps F-35B West Coast Basing (2010).** In 2010, the U.S. Marine Corps published an EIS that analyzed the West Coast home basing of the F-35B aircraft. On December 9, 2010, the U.S. Marine Corps signed its ROD to split-base its F-35B squadrons at MCAS Miramar (six operational squadrons) and MCAS Yuma (five operational squadrons and one Operational Test and Evaluation squadron). In support of the EIS analysis, the U.S. Marine Corps conducted aircraft noise modeling at the two home basing locations, MCAS Miramar and MCAS Yuma.
- **EA for Future Mission Requirements 2011 at Maneuver Training Center Fort Pickett (2011).** In 2011, the Virginia Department of Military Affairs and Virginia National Guard published an EA that analyzed future mission requirements at Maneuver Training Center Fort Pickett. The EA analyzed potential impacts associated with development and construction of support facilities as well as mission support and training facilities recommended in the Real Property Development Plan, the Master Plan, and the Range Complex Management Plan. In addition, the EA analyzed various post operations and military training activities at MTC Fort Pickett. Among the many activities analyzed, the EA analyzed air operations in special use airspace, the Farmville Military Operations Area, restricted area R-6602, Blackstone AAF, landing zones and low level routes. The aircraft that predominantly operate on Blackstone AAF and in the Fort Pickett airspace include: UH-60 Blackhawk, UH-72 Lakota, CH-46 Sea Knight, CH-53 Super Sea Stallion, AH-1 Super Cobra, UH-1 Huey, CH-47 Chinook, MH-6 Little Bird, C-17 Globemaster, C-130 Hercules, and V22 Osprey.
- **EA for the Proposed Helicopter Wings Realignment and MH-60R/S Helicopter Transition, Naval Base Coronado, California (2011).** In 2011, the Navy published an EA that analyzed the potential effects adding four helicopter squadrons (standing up three new squadrons and relocating one East Coast squadron),increasing the number of helicopters home based at NAS North Island by 52, from 151 to 203, and adding 800 personnel by 2016. Most existing and future helicopter squadrons would transition to the MH-60R/S helicopters replacing older type, model, series H-60 helicopters. Eighteen older HH-60H and SH-60F helicopters would remain in use by Reserve Squadron HSC-85 due to their specific mission requirements. The action included construction of a 112,000 square foot organizational maintenance hangar and helicopter parking apron space. A FONSI was signed on August 17, 2011.
- **EIS for U.S. Navy F-35C West Coast Home Basing (2014).** In 2014, the Navy published an EIS that analyzed the West Coast home basing of the F-35C aircraft (Navy, 2014a). On October 10, 2014, the Navy announced its ROD to base up to 100 F-35C aircraft at NAS Lemoore beginning in 2016 and completing by approximately 2028. The 100 F-35C aircraft will replace aging FA-18 aircraft. In support of the EIS analysis, the Navy conducted aircraft noise modeling at the two alternative home basing locations, NAS Lemoore and NAF El Centro, California.
- **EA for Transition of HMM-774 to VMM-774 (2015).** In 2015, the Navy and Marine Corps prepared an EA that analyzed the potential environmental effects associated with the transition of HMM-774 to VMM-774 at NS Norfolk. The proposed action was to transition the existing HMM-774 (CH-46E helicopters) to VMM-774 (MV-22B tilt-rotor aircraft). The proposed action included replacing 12 CH-46E aircraft with 12 MV-22B aircraft; accommodating and maintaining MV-22B aircraft; and continuing to conduct approximately 4,752 annual operations at NS Norfolk airfield utilizing MV-22B aircraft in place of the CH-46E aircraft. On September 22, 2015, a FONSI was signed (Marine Corps, 2015).
- **EA for Military Training at Joint Base Langley-Eustis, Fort Eustis, Virginia (U.S. Air Force, 2017).** The U.S. Air Force assessed the potential environmental consequences associated with the

actions required to maintain present and future military training activities at the training areas, ranges, rail operations, and port facilities within Joint Base Langley-Eustis, Fort Eustis, Virginia. Among other base areas, the EA included analysis of potential environmental impacts associated with training at the Felker AAF, including V-22 aircraft. This EA was withdrawn prior to FONSI signature in October 2017 when it was determined that some training activities were no longer required.

- **EA for Management of Vegetation Airfield Clearances at Felker Army Airfield (Department of the Air Force, 2017).** The Department of the Air Force assessed the potential environmental consequences of actions to manage vegetation clearances at the Felker AAF, Joint Base Langley Eustis-Fort Eustis. The EA and FONSI/Finding of No Practicable Alternative evaluated three alternatives and the No Action Alternative. The purpose of the Proposed Action was to attain and maintain vegetation clearances within the Primary Surface, the Clear Zone, and the Approach-Departure Clearance Surface Area adjacent to the Clear Zone for the continued safety of airfield flight operations. This EA was posted for public comment, but the FONSI has not yet been signed.
- **EA for the Expansion of Training Areas and Ranges at Fort Eustis (Army, 2004)**. The U.S. Army assessed the potential environmental consequences of expanding all training areas and ranges at Fort Eustis; establishing a new training area; repairing/replacing degraded facilities; constructing new facilities; and supporting new types of training. The no action alternative was also evaluated. The proposed action included expansion of Felker AAF (Training Area 17B) from 256 acres to 340 acres). According to the EA, proposed flight training and non-tactical bivouac training would be the same as existing training at Felker AAF. No significant impacts were identified and a FONSI was signed in 2004. This EA remains in effect until the need for additional analysis of range and training area activity is deemed warranted.
- **U.S. Army Transportation Center Fort Eustis and Fort Story Installation Operational Noise Management Plan (Army, 2007)**. Fort Eustis manages compatibility between the airfield and neighboring communities via its Installation Operational Noise Management Plan (IONMP). According to the IONMP prepared by the U.S. Army Center for Health Promotion and Preventive Medicine, no incompatible land uses exist within the Felker AAF noise contours – neither inside nor outside the installation boundary. The 2007 IONMP is the current noise management plan for Fort Eustis.

The following additional documents evaluated the impacts from training and aircraft overflights of V-22 aircraft in the Mid-Atlantic region:

- EIS for Introduction of the V-22 to the Second Marine Aircraft Wing in Eastern North Carolina (Marine Corps 1999)
- EA for Proposed Military Operations Areas in Eastern North Carolina (Navy, 2003b)
- EA for Marine Corps Base Camp Lejeune/ MCAS New River Range Operations (Navy, 2009b)
- EA for MCAS Cherry Point Range Operations (Navy, 2009c)
- Navy Cherry Point Range Complex EIS/Overseas EIS (OEIS) (Navy, 2009d)
- Atlantic Fleet Training and Testing EIS/OEIS (Navy, 2013a)

The following additional documents evaluated the impacts from training and aircraft overflights of V-22 aircraft in the Southwest region:

- Southern California Range Complex EIS/OEIS (Navy, 2009e)

- EA for United States Marine Corps Rotary Wing and Tilt-Rotor Training Operations on Public Lands within Southern California (Marine Corps, 2013)
- Hawaii-Southern California Training and Testing EIS/OEIS (Navy, 2013b)

1.7 RELEVANT LAWS AND REGULATIONS

The Navy has prepared this EA based upon federal laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action, including, but not limited to, the following:

- NEPA (42 U.S.C. sections 4321-4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) parts 1500-1508)
- Navy regulations for implementing NEPA (32 CFR part 775), which provides Navy policy for implementing CEQ regulations and NEPA
- Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)
- Clean Water Act (CWA) (33 U.S.C. section 1251 et seq.)
- Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 et seq.)
- National Historic Preservation Act (NHPA) (54 U.S.C. section 306108 et seq.)
- Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.)
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. section 703-712)
- Bald and Golden Eagle Protection Act (16 U.S.C. section 668-668d)
- Executive Order (EO) 11988, Floodplain Management
- EO 12088, Federal Compliance with Pollution Control Standards
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 13834, Efficient Federal Operations

A description of the Proposed Action's consistency with these laws, policies and regulations, as well as the names of regulatory agencies responsible for their implementation, is presented in **Chapter 9** (**Table 9.1-1**).

1.8 AGENCY PARTICIPATION AND INTERGOVERNMENTAL COORDINATION

Regulations from the CEQ (40 CFR Section 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. Through the public involvement process, the Navy coordinates with relevant federal, state, and local agencies and notifies them and the public of the Proposed Action. Input from public agency responses are incorporated into the analysis of potential environmental impacts, as appropriate. Materials relating to interagency coordination and public involvement are included in **Appendix A**. The Navy consulted with the U.S. Fish and Wildlife Service (USFWS), Virginia Department of Historic Resources, Tribal Historic Preservation Officers, the California Coastal Commission, and Virginia Department of Environmental Quality. The Navy is the lead agency, and the Department of the Air Force is a cooperating agency in the EA. The Air Force participated in preparation

of the EA with regard to proposed transient flight activities that would occur at Felker AAF. Felker AAF is an airfield and training area assigned under Joint Base Langley-Eustis in Virginia, and is one of several east coast secondary training airfields identified to support future Navy V-22 training.

1.9 PUBLIC PARTICIPATION

According to CEQ regulations (40 CFR section 1506.6), agencies are directed to make diligent efforts to involve the public in preparing and implementing their NEPA procedures. The EA has been released for public comment for 30 days. Through the public involvement process, the Navy coordinates with the public and notifies the public of the Proposed Action. Input from the public is incorporated into the analysis of potential environmental impacts, as appropriate. Materials relating to public involvement are included in **Appendix A.**

1.9.1 PUBLIC NOTIFICATIONS

The Navy is committed to being an environmentally responsible neighbor and maintaining a transparent and collaborative relationship with the community. In March of 2017, the Commanding Officers and Community Plans and Liaison Officers of NBC and NS Norfolk informed city managers of the cities of Coronado and Imperial Beach, California, and Norfolk, Virginia about the Proposed Action and the Navy's plans to prepare the EA.

To announce the availability of the Draft EA for a 30-day public review, a Notice of Availability of the Draft EA and announcement of open house public meetings was published beginning January 4, 2018 in the following daily and weekly newspapers:

Table 1.9-1: Notice of Availability Newspaper Announcements

Newspaper	*Date Published*
San Diego Union-Tribune (daily)	January 4, 5, and 6
Coronado Eagle & Journal (weekly)	January 10
Imperial Beach Eagle & Times (weekly)	January 4
La Prensa (Spanish weekly)	January 5
The Virginian-Pilot	January 4, 5, 6
Daily Press	January 4, 5, 6

The published Notice of Availability solicited comments on the Draft EA and was intended to involve the local community in the NEPA process. Notification letters were mailed or emailed to 114 elected officials and federal, state, regional, and local agencies; and 26 postcards were mailed to local agencies and groups. The notices and distribution list are provided in **Appendix A**. The Navy also issued a press release that was circulated widely by the media (**Appendix A**). The public review period was scheduled for 30 days from January 4 to February 5, 2018. After a federal government shutdown forced postponement of the public information meeting in Coronado, the public review period was extended to February 26, 2018. A notice of the rescheduled meeting and comment period extension was published in the following newspapers:

Table 1.9-2: Rescheduled Public Meeting and Comment Period Newspaper Announcements

Newspaper	*Date Published*
San Diego Union-Tribune (daily)	January 26, 27, 28
Coronado Eagle & Journal (weekly)	January 31
Imperial Beach Eagle & Times (weekly)	February 1
La Prensa (Spanish weekly)	January 26

Copies of the Draft EA were made available at the following local libraries:

- San Diego Area Public Libraries:
    - Coronado Public Library: 640 Orange Avenue, Coronado, California
    - San Diego Central Library: 330 Park Boulevard, San Diego, California
    - Point Loma/Hervey Branch Library: 3701 Voltaire Street, San Diego, California
    - Imperial Beach Branch Library: 810 Imperial Beach Boulevard, Imperial Beach, California
- Hampton Roads Area Public Libraries:
    - Mary D. Pretlow Anchor Branch Library: 111 West Ocean View Avenue, Norfolk, Virginia
    - Groninger Library: 1313 Washington Boulevard, Fort Eustis, Virginia
    - Chesapeake Public Library: 298 Cedar Road, Chesapeake, Virginia

The Draft EA was also posted on the following website, and the public was invited to submit comments to the website:

- http://www.aftteis.com/navy-v-22

Based on the comments and analyses herein, the Navy determined that an EA is sufficient for the Proposed Action, and a FONSI will be prepared and signed. A Notice of Availability to announce to the public the release of the Final EA and issuance of the FONSI will be published in the following newspapers:

- California: *The San Diego Union Tribune*, *Coronado Eagle & Journal* (weekly), Imperial Beach Eagle & Times (weekly), and *La Prensa* (Spanish)
- Virginia: *The Virginian-Pilot, Daily Press* (weekly)

1.9.2 PUBLIC MEETINGS

During the Draft EA public review period, public open house information meetings were held at two locations near the project areas, as follows:

- Mary D. Pretlow Anchor Branch Library in Norfolk, Virginia (Thursday, January 18, 2018)
- Coronado Community Center in Coronado, California (Wednesday, February 7, 2018)

The meetings were announced in the newspapers with the Notice of Availability and included informational displays and fact sheets. Navy project representatives, (including Spanish language speakers in Coronado), were present to discuss the EA analysis and answer questions. Written comments were accepted at the meeting locations.

The public meeting in Coronado was originally scheduled for January 23, 2018, but the federal government shutdown forced postponement of the meeting to February 7. Notices of the rescheduled meeting and comment period extension were published in the newspapers noted above. The Navy also issued three press releases (January 22, 24, and February 1, 2018), and notified local media.

The Navy held media availability sessions with local media in the Norfolk, Virginia and Coronado, California areas on the day prior to the public information meetings. The purpose was to ensure all interested members of the public received information about the Navy's proposal and the date, time, and location of the public meetings.

A total of 7 people signed in at the meeting in Norfolk, and 24 people signed in at the meeting in Coronado.

1.9.3 PUBLIC COMMENTS AND THEMES

Comments received from the public and federal, state, and local agencies during the public review period were considered in finalizing this EA. The comments will also be considered in reaching the final decision about implementing the Proposed Action. The public was invited to submit comments by any of the following methods:

- written or verbal comments, while attending the public meeting
- electronically, via the project website http://www.aftteis.com/navy-v-22
- in writing, by mail to: Naval Facilities Engineering Command, Atlantic Division, Attn: Navy V-22 EA Project Manager (Code EV21JB), 6506 Hampton Boulevard, Norfolk, Virginia 23508.

The Navy carefully reviewed all comments received, which are summarized by issue or topic area in the following paragraphs. Issues of primary public concern are responded to below and were considered in the preparation of this Final EA.

Thirty-two comments from individuals, city officials, local organizations, and state agencies were received on the Draft EA through U.S. mail, project website, email, and at the two public information meetings. Of the 32 comments received, 17 expressed support for the Proposed Action (9 at NS Norfolk and 8 at NAS North Island). Several comments expressed concern about noise impacts and aircraft flight paths in the vicinity of the City of Coronado. Comments also included concerns about safety, air quality, the Air Installations Compatible Use Zones (AICUZ) Program at NAS North Island, land use compatibility, bird species, and traffic in the City of Coronado. These primary concerns are addressed in the following paragraphs. Other concerns are addressed through revisions or clarifications made in the applicable sections of this Final EA. Changes between the Draft EA and Final EA are summarized in **Section 1.9.4**.

Proposed Action and Alternatives

Comments Summary: About half of all comments expressed support for the Proposed Action, with most commenters supporting Alternative 2 over Alternative 1.

Response: The Secretary of the Navy is responsible for decisions related to alternatives for the transition from C-2A to Navy V-22. To support informed decision-making, Commander, U.S. Fleet Forces Command has prepared this EA and, based on public comment and the findings of the EA, will sign a FONSI for one or both alternatives. Comments received during the public review period, in addition to the EA findings and mission requirements, will be considered in reaching the final decision about implementing the alternatives.

Aircraft Operations

Comments Summary: The City of Coronado commented that there appears to be a significant operational increase between existing C-2A operations at NAS North Island and the proposed number of Navy V-22 operations under Alternative 1 or Alternative 2.

Response: Aircraft operations and their potential impacts at Navy airfields are analyzed in total rather than individual aircraft type. In any given year, air operations by aircraft types will fluctuate; therefore, the analysis considers the average total aircraft operations over a several year period. The Proposed Action analyzes an increase in total operations at NAS North Island of 14 percent for Alternative 1, and

7 percent for Alternative 2. The resulting total projected operations for either alternative are well within recent historical averages at NAS North Island (e.g. 138,000 in 2002; 95,000 in 2004; 102,000 in 2010) and would not represent a significant operational change (NBC, 2011; Appendix B [Noise Analysis]). The difference in the increase in annual operations between Alternative 1 and Alternative 2 depends on where the FRS will be located. At this time, the Navy has not identified a preferred alternative for the FRS.

Flight Paths

Comments Summary: Concern was expressed that according to flight track figures in the Draft EA, Appendix B Noise Analysis, the proposed Navy V-22 flight paths would shift and result in increased overflights of the City of Coronado and residential property.

Response: The flight paths would not change, and all operations would be performed in accordance with Federal Aviation Administration and Navy policy. The more northern flight tracks (approaches to Runway 29) are a small percentage of total approaches and do not strongly influence the noise contours. For full disclosure, the noise analysis depicts all the possible occasional approaches, even though they are planned for rare use during specific meteorological conditions to ensure flight safety. The preferred use of Runway 29 is to offset the flight path to the south, and that preferred use is reflected in the modeling of the majority of the operations in that manner. Whenever it is safe to do so, the NAS North Island Air Traffic Control staff endeavor to use the south-offset flight tracks.

Although flight tracks are represented as single lines on maps, they actually depict the predominant path of the aircraft over the ground. The actual path of an aircraft over the ground is affected by aircraft performance, pilot technique, other air traffic, and weather conditions.

Noise

Comments Summary: Several commenters, including the City of Coronado, expressed concern about an increase in noise and vibration, and the Navy's method for analyzing noise using Community Noise Equivalent Level (CNEL), Sound Exposure Level (SEL), and supplemental metrics, such as maximum sound level (Lmax), which are strongly influenced by the loudest jet aircraft.

Commenters believe Navy V-22 flights will be very noticeable from the ground, particularly under and near the flight paths, and that there will be increased noise disruptions, vibration, and noise-related incompatibilities in Coronado. Several commenters requested that aircraft avoid overflights of Coronado and that pilots follow designated flight paths.

Response: The aircraft noise of Navy V-22 is comparable to aircraft homebased and operating in and out of NAS North Island. Air Force and Marine Corps variants of the V-22 have been flying in and out of NAS North Island for several years. As a point of reference, during a 1,000 foot direct overflight the V-22 sound levels are within 2 decibels (dB) of the C-2A. A change of 3 dB is typically considered to be barely noticeable to the human ear. While the V-22 sounds different than the C-2A, the noise levels are very similar.

The noise study and EA noise analysis (**Sections 3.2** and **4.2**) use standard methodologies for assessing aircraft noise and found that any change in noise levels under the Proposed Action would be imperceptible. The accepted standard for recommending land use restrictions in California is based on a 24-hour CNEL metric. A CNEL value of less than 65 dB is the accepted standard for compatibility with residential areas and sensitive noise receptors, such as schools (refer to **Sections 4.2.2.3** and **4.2.3.3**).

The noise model accounts for the Navy V-22 in that it uses the type of aircraft; number of flights; flight tracks; height above the ground; power setting; environmental factors including temperature, humidity, terrain and different types of surface; and engine maintenance testing (see **Appendix B** Noise Analysis). The additional acreage and population under the noise contours would experience less than 1 dB A-weighted (dBA) change, which would be an imperceptible difference from the existing condition. While vibration may be a component of the noise from Navy V-22, the level of noise would not be high enough to cause structural damage (refer to additional information in **Section 3.2.3.4** [Vibration]). The loudest Sound Exposure Level from Navy V-22 operations would not exceed 110 dB at any of the analyzed points of interest. Therefore vibration effects from Navy V-22 operations would be expected to be minor.

The Navy strives to be a good steward of the environment as well as a good neighbor. NBC has and will continue to implement many noise reduction measures to minimize impacts from aircraft operations or training noise on its surrounding communities.

Safety

Comments Summary: Several commenters expressed concern about the safety of proposed Navy V-22 flights over homes and visitor areas. The concern is based on the perception that Navy helicopters fly low over these areas and do not observe flight tracks and that the Navy V-22 would do the same.

Response: The Navy values the safety of our pilots and of the surrounding communities. Our pilots are the best trained in the world. Their training includes extensive use of flight simulators and frequent practice in emergency procedures. As stated in **Section 4.3** (Public Health and Safety) of the EA, the Proposed Action would not change established Clear Zones, Accident Potential Zones, or other established airfield safety features and would have no impact to the AICUZ Program at NAS North Island. The Navy continually looks at ways to reduce its effects on the community, and any proposed changes must meet operational and safety standards.

Land Use Compatibility

Comments Summary: The City of Coronado expressed concerns about potential changes to AICUZ and commented that land use compatibility concerns should not be dismissed in the EA.

Response: The EA does not dismiss the issue of land use compatibility. As required by NEPA, the level of detail presented in the EA is consistent with the level of impact. **Section 1.5**, **Table 1.5-1** provides a brief discussion of why a detailed land use analysis was not necessary to assess the impacts of the Proposed Action. As noted above and stated in **Sections 4.2** (Noise) and **4.3** (Public Health and Safety) of this EA, the Proposed Action would not change land use compatibility recommendations, established Clear Zones, Accident Potential Zones, or other established airfield safety features, and would have no impact to AICUZ, Airport Land Use Planning, or related planning studies at NAS North Island. NBC values the extensive cooperation between the Navy and the City of Coronado on these planning efforts.

Air Quality

Comments Summary: The City of Coronado had several specific technical concerns regarding assumptions and factors used in the air quality analysis and requested measures to reduce greenhouse gas (GHG) emissions.

Response:

The Navy conducted a thorough air quality impact analysis. Construction air emissions would be well below the applicable annual significance thresholds. The net increase in operational emissions would

not exceed any significance threshold and would not cause or contribute to a violation of any National Ambient Air Quality Standards or California Ambient Air Quality Standards. The air quality impact analysis uses valid assumptions and in some cases, over-estimates emissions based on conservative assumptions. Any changes based on adjusted factors or assumptions suggested in the comments would be extremely minor and would not change the conclusions made.

It is the policy of the Navy to reduce GHG emissions from its operations as part of larger Navy-wide programs, such as its Energy Program. These Navy actions indirectly would limit GHG emissions from the project alternatives and therefore further mitigation of these emissions are not proposed as part of this Proposed Action.

Traffic

Comments Summary: The City of Coronado noted the increase in average daily traffic at NAS North Island by 340 under Alternative 1, and 160 under Alternative 2, and asked what measures the Navy will implement to ensure traffic and circulation impacts are minimized.

Response: The Navy previously studied potential mitigation measures for traffic related to NAS North Island; these are discussed in **Section 5.4.5** (Cumulative Impact Analysis – Transportation) of the EA. NBC has implemented several on-base mitigation actions. In 2018, the City of Coronado will implement one of the previously studied off-base mitigation actions by installing a new traffic signal at Alameda Boulevard/Fourth Street. NBC will continue to work with the City of Coronado and California Department of Transportation on viable solutions to mutual traffic concerns.

Biological Resources

Comments Summary: One comment requested that potential adverse effects of noise on burrowing owls and all other special status species at NAS North Island be minimized. A commenter in the NAS North Island area noted that Alternative 1 would increase potential effects to California least tern and western snowy plover and cause schedule delays and increased costs. Concerns were also expressed about marine species under flight paths and the effects of rotor wash on sensitive bird species.

Response: Burrowing owls are not federally listed as threatened, endangered, or candidate species in San Diego County, California under the Endangered Species Act and therefore do not merit Section 7 consultation with the USFWS. However, burrowing owls are a USFWS Bird of Conservation Concern protected under the Migratory Bird Treaty Act and accordingly are discussed under the Migratory Bird sections of the EA (refer to **Sections 3.6.2.2.3, 4.6.2.4, 4.6.3.4,** and **4.6.4.4)**.

The Navy conducted informal consultation with the USFWS under Section 7 of ESA for potential impacts to two federally listed species, California least tern and western snowy plover. The Proposed Action would not result in significant impacts to these species. Refer to **Section 4.6.2.5.1** (California least tern) for details about potential rotor wash near the bird nesting area. NAS North Island employs a full-time wildlife biologist who monitors the California least tern and western snowy plover nesting area located on the airfield. The Navy regularly consults with USFWS on this bird nesting area.

The small changes in noise over the water are 1 dBA CNEL or less, and would not be perceptible to biological resources or recreational users of the ocean and the bay. For a discussion of effects on marine resources, see **Sections 4.2.2.3** and **4.2.3.3** (Projected CNEL Noise Exposure, Alternative 1 and Alternative 2, respectively).

1.9.4 CHANGES FROM THE DRAFT EA TO FINAL EA

- **Executive Summary**
  - Changes noted in the following sections were also made in the Executive Summary, where applicable.
- **Chapter 1**
  - Public notifications and meetings have been updated in Sections 1.9.1 and 1.9.2
  - Public comments on the Draft EA and Navy responses have been added in Section 1.9.3
  - Changes between the Draft and Final EA have been added to Section 1.9.4
- **Chapter 2**
  - Data on recent historical aircraft operations at NAS North Island have been added to Sections 2.3.2.4 and 2.3.3.4
  - Clarifications on secondary airfields operations and evaluation of impacts have been added to Sections 2.3.2.4 and 2.3.3.4
- **Chapter 3**
  - A discussion of vibration effects has been added to Section 3.2.3
  - Noise model assumptions for the position of the Navy V-22 rotors have been added to Section 3.2.5
- **Chapter 4**
  - Additional clarification on proposed operations compared with recent historical aircraft operations at NAS North Island has been added in applicable sections of Chapter 4
  - Vibration impacts have been added to Sections 4.2.2 and 4.2.3
  - Sections 4.2.2.1, 4.6.2 and 4.6.3 have been updated to reflect consultation with the U.S. Fish and Wildlife Service
  - Regulatory conclusions on USFWS consultation have been provided in Section 4.6
  - The inclusion of an oil/water separator for the wash rack in Alternative 1 has been added in Section 4.8.2
  - Table 4.12.1 in Section 4.12 has been updated to include consultation conclusions and other Chapter 4 updates
  - Table 4.12.2 in Section 4.12 has been updated to include the final avoidance and minimization measures
- **Chapter 5**
  - Section 5.4.6 has been updated to reflect consultation with the U.S. Fish and Wildlife Service
- **Chapter 6**
  - Vibration effects have been added to Section 6.2.3
  - Noise model assumptions for the position of the Navy V-22 rotors have been added to Section 6.2.5
  - Section 6.7.1 Regulatory Setting for water resources has been updated to include a discussion of Coastal Zone Management Act enforceable policies administered by the Chesapeake Bay Act and Regulations in Virginia
  - Virginia Stormwater Management Program Municipal Separate Stormwater Sewer System general information has been in Section 6.7.2
- **Chapter 7**
  - Vibration impacts have been added to Sections 7.2.2 and 7.2.3.
  - Coastal Zone Management Act enforceable policies administered by the Chesapeake Bay Act and Regulations in Virginia have been included in Section 7.7 Water Resources

  - Sections 7.9.2 and 7.9.3 have been updated to reflect consultation with the Virginia Department of Historic Resources under Section 106 of the NHPA
  - Table 7.12.1 in Section 7.12 has been updated to include coastal consistency consultation conclusion
  - Table 7.12.2 in Section 7.12 has been updated to include the final avoidance and minimization measures
- **Chapter 8**
  - Section 8.4.6 has been updated to reflect consultation with the U.S. Fish and Wildlife Service
- **Chapter 9**
  - Table 9.1-1 has been updated with final regulatory conclusions
- **Appendix**

The following items have been added to the appendices:

  - **Appendix A:** Draft EA notifications
  - **Appendix C:**
    - Appendix C.1: Approved Record of Non-Applicability for Clean Air Act Conformity at NAS North Island
    - Appendix C.3: Addendum with air emissions estimates calculated for proposed Navy V-22 secondary airfield Felker AAF at Joint Base Langley-Eustis at the request of cooperating agency Department of the Air Force.
  - **Appendix D:** ESA Section 7 concurrence correspondence from U.S. Fish and Wildlife Service
  - **Appendix E:** NHPA, Section 106 concurrence correspondence from Virginia Department of Historic Resources, and responses from Indian tribes
  - **Appendix F:** Coastal Consistency Determination concurrence correspondence from the California Coastal Commission

1.10 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

The Proposed Action and alternatives include transition to Navy V-22 aircraft at the existing West Coast and East Coast logistics support centers, NAS North Island and NS Norfolk. Therefore, this EA is organized so that the reader may focus on the impacts of the alternatives at each installation. The Executive Summary provides a comparison of impacts of the alternatives at both installations. The following provides an overview of the organization of the chapters of this EA:

Executive Summary – Summary of the purpose of and need for the proposed action, description of the alternatives evaluated, potential environmental consequences including a summary matrix comparing the alternatives at NAS North Island and NS Norfolk, and public involvement.

Chapter 1 – Purpose of and Need for the Proposed Action: provides background information and a description of the proposal. Chapter 1 also discusses the scope of the environmental analysis, including resource areas that would be affected and unaffected by the Proposed Action, and public participation.

Chapter 2 – Description of the Proposed Action and Alternatives: includes a discussion of the range of alternatives considered and a description of the alternatives evaluated in detail in the EA.

West Coast Fleet Logistics Center – NAS North Island

Chapter 3 – Affected Environment

Chapter 4 – Environmental Consequences

Chapter 5 – Cumulative Impacts

East Coast Fleet Logistics Center – NS Norfolk

Chapter 6 – Affected Environment

Chapter 7 – Environmental Consequences

Chapter 8 – Cumulative Impacts

Chapter 9 – Other Considerations Required by NEPA: includes consistency with other federal, state, and local laws, plans, policies, and regulations including consistency with the CZMA.

Chapter 10 – References cited organized by chapter.

Chapter 11 – List of Preparers of the EA.

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2 PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Navy proposes to provide facilities and functions to support the replacement of C-2A aircraft with the Navy V-22 Osprey at existing West and East Coast logistics support centers Naval Air Station (NAS) North Island, California and Naval Station (NS) Norfolk, Virginia. Under the Proposed Action, the Navy plans to replace 27 legacy C-2A aircraft operated by existing logistics support squadrons with 38 Navy V-22 aircraft operated by fleet logistics support multi-mission squadrons; establish a Navy V-22 training squadron to train pilots and aircrews, and a maintenance school for maintenance personnel; construct, renovate, and maintain facilities to accommodate Navy V-22 squadron aircraft, aircraft maintenance, and personnel; and conduct Navy V-22 flight training operations.

Proposed Action

- Replace 27 legacy C-2A aircraft operated by existing fleet logistics support squadrons with 38 Navy V-22 aircraft;
- Establish a Navy V-22 training squadron for pilots and aircrews;
- Establish a maintenance school for maintenance personnel;
- Construct, renovate, and maintain facilities to accommodate Navy V-22 squadron aircraft, maintenance, and personnel;
- Make adjustments for personnel levels associated with the Navy V-22 training squadron and the maintenance school; and
- Conduct Navy V-22 flight training operations.

The increased number of aircraft under the Proposed Action is needed because the current inventory of C-2A aircraft is not sufficient to meet the mission requirements. Changes in personnel loading under the Proposed Action would be influenced by the location of the training squadron, maintenance school, and maintenance personnel.

The Proposed Action would be implemented over a 10-year period beginning in 2018 with facility renovations and some personnel actions at NAS North Island and NS Norfolk. Eventually, the Navy V-22 training squadron and maintenance school would be established, either on the West Coast or the East Coast, to fully support Navy training requirements. The transition is expected to be complete in the 2028 timeframe.

2.1.1 AIRCRAFT TRANSITION

2.1.1.1 Fleet Operational Squadron Transition

The Navy V-22 is being procured to replace older C-2A aircraft for the carrier on-board delivery mission. The transition from the C-2A to the Navy V-22 would begin in 2020, with the final retirement of the C-2A planned for 2026. Facilities and support must be in place and operational at the first main operating base by October 2020 to support the first detachment's unit level training, which would lead up to deployment. The Navy V-22 initial operating capability is scheduled for no later than September 2020 to achieve full operational capability in 2024 in order to support the retirement of the legacy C-2A.

Table 2.1-1 provides a comparison of the characteristics of the C-2A and the Navy V-22.

Table 2.1-1: Comparison of C-2A Aircraft and Navy V-22 Aircraft Characteristics

Feature	*C-2A Aircraft*	*Navy V-22 Aircraft*
Primary Function	On-board delivery to aircraft carriers	On-board delivery to aircraft carriers and other V-22-capable ships
Length	56 feet, 10 inches	57 feet, 10 inches
Height	17 feet, 2 inches	22 feet, 7 inches (vertical flight ready position); 33 feet, 5 inches (rotors in flight ready to maintenance)
Wing Span	80 feet, 7 inches	84 feet, 7 inches (rotors unfolded)
Engines	Two Allison T56-A-425 turbo-prop engines	Two pivoting Rolls-Royce/Allison AE1107C engines
Crew Members	Four	Four

Source: Commander Airborne Command Control and Logistics Wing Website: "C-2A(R) Stats"; Navy Fact File: C-2A logistics aircraft; Facilities Planning Criteria for the Navy V-22.

2.1.1.2 Fleet Replacement Squadron (Fleet Training Squadron) Transition

A Fleet Replacement Squadron (hereinafter referred to as a "fleet training squadron") is a unit of the Navy and Marine Corps that provides initial qualification and refresher training for naval aviators and enlisted naval aircrews on the specific front-line aircraft they have been assigned to fly. Fleet pilot and aircrew training would be accomplished through the Navy V-22 Training and Readiness and Air Combat Training Continuum programs. After completing the training regimen, graduates are assigned to fleet squadrons. Additionally, training squadrons are responsible for training aircraft mechanics, providing replacement aircraft for fleet squadron attrition, and standardizing maintenance and aircraft operations.

Navy V-22 Fleet Training Squadron Begins at Marine Corps Air Station New River. For the first few years of the aircraft transition, Navy V-22 pilots and enlisted aircrews would attend VMMT-204, the existing U.S. Marine Corps MV-22B training squadron at Marine Corps Air Station (MCAS) New River. Navy maintenance personnel would attend the MCAS New River maintenance school for Navy V-22 specific training.

The first fleet detachment to transition to the Navy V-22 would train at MCAS New River, and return to its main operating base sometime in 2020. Navy V-22 training would occur at MCAS New River until facilities or support are operational at NAS North Island and NS Norfolk. Training operations of the V-22 have previously been analyzed as part of MCAS New River base operations (refer to **Section 1.6,** Environmental Assessment (EA) for Marine Corps Base Camp Lejeune/MCAS New River Range Operations).

Navy V-22 Fleet Training Squadron Colocated with One Navy V-22 Operational Squadron. Under the Proposed Action, a Navy V-22 training squadron would be established at either NAS North Island or NS Norfolk.

2.1.2 Facilities and Infrastructure

The Proposed Action includes construction and/or renovation of facilities to accommodate Navy V-22 squadron aircraft and personnel. Home base installations need adequate space and capacity to accommodate the larger dimensions and associated support facilities, personnel, and functions of the Navy V-22. The Proposed Action would utilize existing facilities to the maximum extent feasible without impacting operations. The Proposed Action would renovate and/or construct facilities at both NAS North Island and NS Norfolk regardless of which alternative is implemented.

The primary infrastructure requirements for the Navy V-22 are an aircraft hangar, aircraft parking, wash racks, flight training device (FTD), utilities, and personnel parking. The locations of proposed Navy V-22 facilities and infrastructure under the Proposed Action are shown in **Figure 2.1-1** (NAS North Island) and **Figure 2.1-2** (NS Norfolk). Project locations depict those parts of NAS North Island and NS Norfolk proposed for hangar construction/renovation and designation of other associated primary infrastructure requirements. A description of each type of primary facility required to home base the Navy V-22 squadrons is provided below.

The specific infrastructure requirements proposed for each alternative is provided in **Section 2.3** (Alternatives Carried Forward for Analysis). Certain facility components necessary to accommodate the Navy V-22 differ for each alternative and would be tailored to meet necessary facility requirements for operational support, training, maintenance, supply, personnel support, and utilities. The facility renovation square footage, new construction acreage, new impervious surface acreage, and estimated approximate total construction costs associated with the Navy V-22 program vary at each installation by alternative and are described in more detail in **Section 2.3.2** (Alternative 1) and **Section 2.3.3** (Alternative 2).

2.1.2.1 Hangar

A hangar contains a high bay area used for aircraft maintenance in a controlled environment. The Navy V-22 requires a modified Type II hangar, which provides high bay space for aircraft, crew member and equipment space, and storage and administrative space. The hangar would also include an elevator, cranes, compressed air system, aqueous film-forming foam fire protection system, oil/water separator, and an emergency generator. Anti-Terrorism/Force Protection features and security would be provided in accordance with Department of Defense (DoD) standards.

Routine operations would require the use and appropriate storage of various materials, including petroleum, oil, and lubricant products; solvents; cleaning agents; paints; adhesives; and other products necessary to perform aircraft, ship, ground vehicle, and equipment maintenance; military training activities; facilities repair and maintenance; and administrative functions.

Type II hangars are designed to accommodate several aircraft types including Navy and Marine Corps versions of the C-130, V-22 and H-53. The squadron would require organizational hangar space to accommodate one third of squadron aircraft. For example, if four aircraft are accommodated in the hangar, the maintenance area in the hangar would need to be at least approximately 40,000 square feet in accordance with facilities requirements and aircraft specifications. The interior bridge crane clearance height requirement is approximately 40 feet. Additional hangar space is required to accommodate non-working areas supporting the crew, equipment and administration.

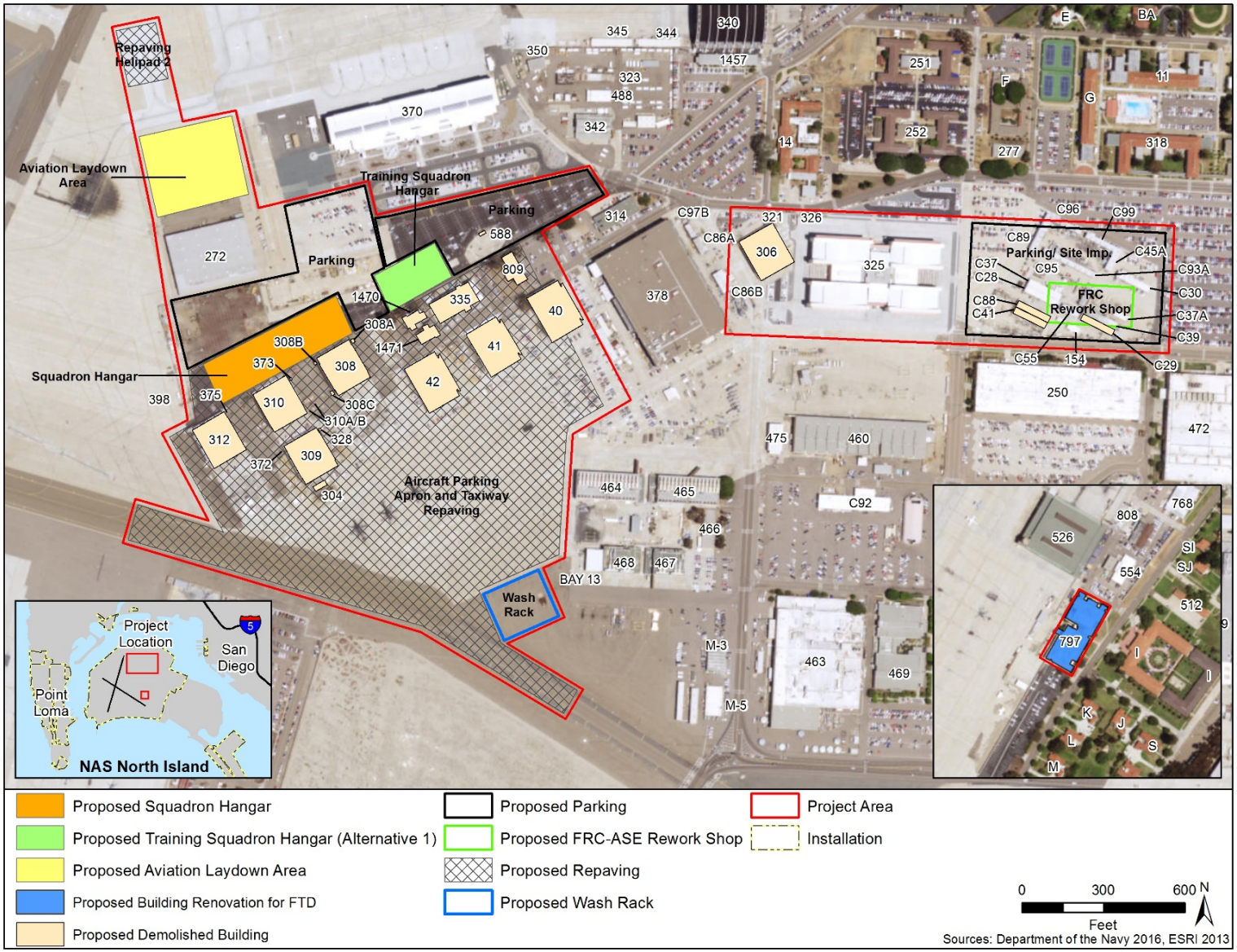


Figure 2.1-1: NAS North Island Navy V-22 Proposed Action Project Area

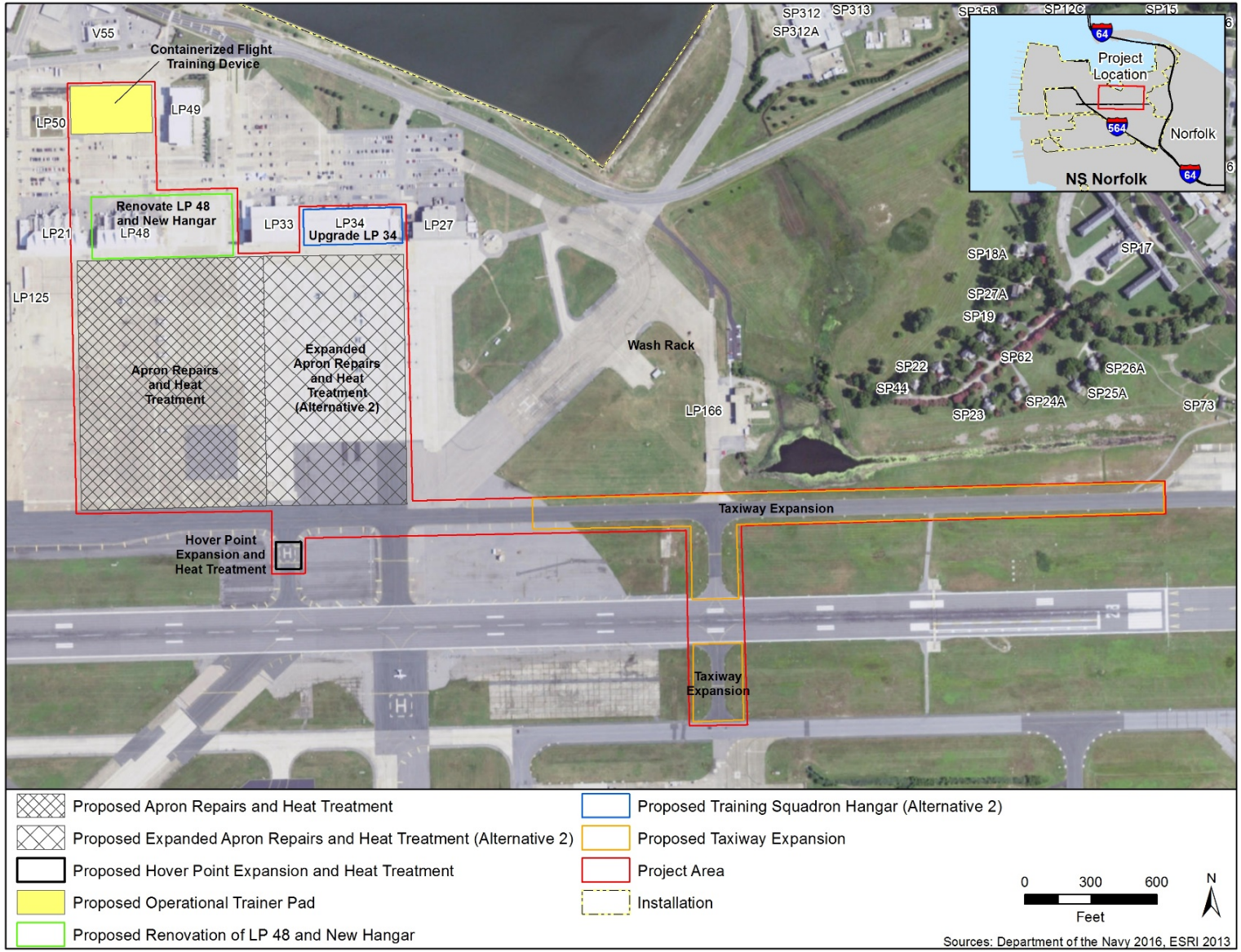


Figure 2.1-2: NS Norfolk Navy V-22 Proposed Action Project Area

2.1.2.2 Aircraft Parking Apron

Aircraft parking aprons consist of paved areas adjacent to maintenance hangars to provide parking spaces, tie-down points, line maintenance, loading, unloading, and aircraft servicing. The Navy V-22 aircraft requires 545 square feet of parking apron per aircraft. The total area requirements are based on the type and number of aircraft to be parked (i.e., sufficient space for approximately two-thirds of squadron aircraft). The operation of the Navy V-22 nacelles (i.e., housings holding the engines) in vertical configuration produces high heat exhaust directed downward close to the ground. Parking apron design would be constructed and maintained to withstand the expected high heat environment by including the installation of steel plating, use of heat resistant pavement, or application of a sodium silicate solution over existing concrete.

2.1.2.3 Aircraft Wash Rack

Aircraft wash racks and rinse facilities are used at air installations to clean the aircraft in conjunction with periodic maintenance. Wash racks are used for rinsing salt off aircraft after low-level flights over water and during periodic maintenance. Navy V-22 washes are recommended every two weeks. The aircraft requires a Type "A" wash rack that is 89.8 feet by 104.6 feet for a total paved area of 1,043.7 square yards). Accompanying the wash rack would be a drainage system, utilities control building to house detergent metering equipment, air compressors, detergent mixing tanks, water heaters, utility controls, cleaning equipment, and sanitary facilities for personnel.

2.1.2.4 Personnel Support Facilities

In addition to the facilities directly related to the logistics support mission, a variety of other facilities are needed to support Navy personnel and their families. These include but are not limited to military family housing, bachelor quarters, personnel support detachments (pay and records administration), gyms, commissaries, child development centers, and medical facilities. However, since these support facilities already exist at both NAS North Island and NS Norfolk and these installations are expected to accommodate any personnel changes, personnel support facilities are not a part of the Proposed Action.

2.1.2.5 Aircraft Maintenance

The Navy V-22 would be supported by three levels of maintenance: organizational, intermediate and depot-level maintenance, described below. The Proposed Action includes organizational-level maintenance and intermediate-level maintenance.

- **Organizational-level Maintenance.** Organizational-level maintenance is performed by the squadron maintenance department in the hangar high-bay and maintenance shop spaces as well as on the flightline. Planning criteria in the Naval Aviation Enterprise Global Shore Infrastructure Plan call for type II aircraft maintenance hangars for the Navy V-22; however, existing type I maintenance hangars may satisfy some maintenance requirements, reducing the amount of new construction required. Organization-level maintenance is typically performed at home base locations.
- **Intermediate-level Maintenance**. The Navy V-22 maintenance and logistics plan includes Level II repairs performed at an intermediate-level maintenance activity or Fleet Readiness Center (FRC). The need for expansion of existing Level II repair capability at Navy V-22 basing locations would be determined by the program office's logistics support analysis.
- **Depot-level Maintenance.** Depot-level maintenance support would come from a combination of the FRC and contractor logistics support. At this time, depot-level maintenance for component repair and Navy V-22 aircraft is expected to occur at the existing depot-level maintenance

facility at FRC East (MCAS Cherry Point). The location of depot-level maintenance has no bearing on basing location of the Navy V-22 training squadron and operational squadrons. The Navy would continue to use the existing depot-level maintenance facility at FRC East and is not proposing to create additional depot-level maintenance facilities for the Navy V-22. In the future, should it be determined that depot-level maintenance at one of the Navy V-22 logistics home bases is needed, such decision would be evaluated at that time pursuant to the National Environmental Policy Act (NEPA). To the extent that such plans become reasonably foreseeable, they would be discussed in the cumulative impacts analysis chapter of the Final EA.

2.1.2.6 Pilot Training Facilities

The mainstay of Navy V-22 pilot simulator training is the FTD or containerized FTD (CFTD) (**Figure 2.1-3**) which would be used for training in all mission areas of the Navy V-22. The FTD trains aircrews on basic aircraft familiarization and handling qualities. It also has capability to train in the following areas: systems/subsystems operation, communication, malfunctions, day and night flying, use of night-vision goggles, formation flying, aerial refueling, and landing on ships (Bell Boeing 2010).

Source: Navy.mil 2009

Figure 2.1-3: Inside the Containerized Flight Training Device

Each site where Navy fleet squadrons are located would be equipped with a minimum of one FTD or CFTD to support training. At the training squadron location, a second device would be required to support the training squadron syllabus. The CFTD consists of two shelters weighing over 25 tons. The FTD or CFTD require approximately 2,200 square feet of space.

Simulators minimize training costs by substituting for actual flight hours and enhance safety by allowing personnel to practice emergency procedures without putting the pilot and aircraft at risk. The simulators would have the capability to support up to 40 percent of the flying portion of the training syllabus.

2.1.2.7 Maintenance School

Under the Proposed Action, a Navy V-22 maintenance school would be colocated with the fleet training squadron and would be established at either NAS North Island or NS Norfolk.

The mainstay of Navy V-22 maintenance training is the Aircraft Maintenance Trainer (AMT), which would be used for training in all maintenance areas of the Navy V-22. Each site where Navy V-22 training squadron and/or fleet squadrons are located would be equipped with a minimum of one AMT device to support training evolutions. The minimum number of AMT devices at any site is one; however, the maintenance school will consume approximately 80 percent of the operating capacity of two devices. Additional devices may be required depending on the number of detachments at that site.

Maintenance training would also entail academic training in the form of traditional lecture training and computer-based training.

2.1.3 Personnel Requirements

Under the Proposed Action, the overall fleet logistics squadron organizational structure would largely remain the same. For example, there would continue to be one East Coast squadron and one West

Coast squadron. Each fleet squadron would consist of multiple Continental United States (CONUS) detachments and a shore-based home guard detachment. However, the Proposed Action does include some force structure changes, including changes to the number of primary aircraft authorized and pilots per detachment. Under the Proposed Action, each CONUS detachment would have three primary aircraft authorized (versus two primary aircraft authorized for the C-2A detachments) and 12 pilots (versus 6 for the C-2A detachments). NAS North Island would gain one additional CONUS detachment (DET 6) under the Proposed Action. **Table 2.1-2** provides a comparison of the personnel and aircraft loadings for the C-2A and Navy V-22 squadrons. More detailed personnel loadings per logistics base and per alternative are provided in **Section 2.3** (Alternatives Carried Forward for Analysis).

Table 2.1-2: Comparison of C-2A and Navy V-22 CONUS Aircraft and Personnel Composition

Element for Comparison	*C-2A Aircraft*	*Navy V-22 Aircraft*
Total Fleet Operational Squadrons	2	2
Total Fleet Primary Aircraft Authorized	22	33
Total Fleet Personnel	773	939
Total Fleet Training Squadrons (FRS)	1	1
Total Fleet Training Squadron Primary Aircraft Authorized	5	5
Total Fleet Training Squadron Personnel	151	173
Maintenance School Detachments	1	1
Maintenance School Personnel	7	7
Intermediate-level Maintenance Personnel	30	63

Notes:
The same aircrew personnel who operate the C-2A aircraft would be trained to operate the Navy V-22 aircraft. Fleet operational squadrons also include a forward deployed detachment stationed outside the United States, and those aircraft and personnel are not included in this table. The fleet operational squadrons are also supported by a wing staff and weapons school staff, but those personnel are not currently, or proposed to be, colocated with the other personnel.

Changes in personnel loading under the Proposed Action would also be influenced by the location of the fleet training squadron, maintenance school, and intermediate-level maintenance personnel. It is estimated that personnel associated with the Proposed Action would be accompanied by an average of about 1.2 family members. This planning factor is applied based on a United States (U.S.) DoD demographic survey and profile of the military community (DoD, 2014). Active duty members include both married and single members, and family members include spouses, children, and adult dependents. Personnel and family members would locate to each home base and the surrounding areas of San Diego, California and Norfolk, Virginia.

2.1.4 AIRCRAFT OPERATIONS

Pilot and aircrew training would be accomplished in the fleet training squadron for initial and refresher qualification, and in the fleet squadrons for proficiency and readiness through the Air Combat Training Continuum syllabi. Fleet pilot and aircrew training would be conducted in live and virtual environments requiring daily access to the following: prepared runways, helipads, deck landing qualification/vertical replenishment practice facilities, night vision goggle-capable landing zones, special use airspace (SUA), flight simulators, and academic training. The fleet training squadron would train pilots and maintainers. Upon successful completion of their training syllabi, they would depart the fleet training squadron for assignment to the fleet operational squadron.

2.1.4.1 Home Airfield Flight Operations

Proposed Navy V-22 home base airfield operations would be generally similar in nature to the current C-2A airfield operations, but the quantity of operations, types of operations, flight patterns would be slightly different. Actual operations can vary somewhat depending on specific training missions or need at any given time. An operation represents a single movement or individual flight in the home base airfield or airspace environment. For example, one aircraft departing and returning would represent two airfield flight operations. The West and East Coast Navy V-22 squadrons would execute the following types of airfield operations at NAS North Island and NS Norfolk: arrival (landing); departure (take-off); and closed patterns (i.e., touch-and-go and ground-controlled approach [GCA]). These types of operations closely resemble operations currently performed by C-2A fixed-wing aircraft at each airfield. Each of these operations is described below.

- **Departure.** This involves an aircraft taking off, and equates to one operation. Navy V-22 can take-off either vertically (like a helicopter) or after a short horizontal roll (like a conventional airplane).
- **Arrival.** This involves aircraft returning and landing, and equates to one operation. For the Navy V-22, the aircraft would transition from airplane mode of flight to the vertical take-off and landing mode in order to land. Such landings would occur on the runways or at helicopter pads at the airfield. The following defines the basic types of arrivals.
    - *Overhead Break Arrival.* An expeditious arrival using Visual Flight Rules (VFR). An aircraft typically approaches the runway 500 feet above the altitude of the landing pattern (this altitude can vary depending on local airfield course rules). Approximately halfway down the runway, the aircraft performs a 180-degree turn to enter the landing pattern. Once established in the landing pattern, the aircraft lowers landing gear, and performs a 180-degree descending turn to land on the runway. Landings can be vertical (like a helicopter), or rolling (like a conventional airplane).
    - *Straight-in/Full-stop Arrival.* When performing this operation, an aircraft lines up 6 to 10 nautical miles from the airfield on the runway centerline, descends gradually, lands, and then taxis off the runway. This operation can involve vertical landings or rolling landings, if the aircraft is in conversion mode. Note: straight-in approaches are avoided on Runway 29 on NAS North Island.
    - *Instrument Arrival.* In this operation, air traffic controllers direct the Navy V-22 to land using Instrument Flight Rules (IFR) only (i.e., non-visual means)[1]. During the approach, the aircraft transitions to conversion mode, lowers the landing gear, then continues to transition to vertical take-off and landing mode prior to executing a vertical landing. Rolling landings can be made in conversion mode.
- **Closed Patterns**. A closed pattern consists of two portions, a take-off/departure and an approach/landing, which equates to two operations. The following defines the basic types of closed patterns.
    - *Visual Touch-and-Go.* An aircraft lands and takes off on a runway without coming to a full stop. After landing, the pilot executes another take-off with minimal delay without

[1] The Federal Aviation Regulations define IFR as "rules and regulations established by the FAA to govern flight under conditions in which flight by outside visual reference is not safe."

taxiing clear of the runway. The touch-and-go is counted as two operations because the landing is counted as one operation and the take-off is counted as another.

- *Ground-controlled Approach.* In this training event, air traffic controllers guide aircraft to a landing to practice arrivals under adverse conditions. This event may involve a precision or non-precision approach. The GCA is counted as two operations because the landing is counted as one operation and the take-off is counted as another.

2.1.4.2 Secondary Training Airfield Operations

In addition to home base flight operations, flight training would be conducted at secondary training airfields under the Proposed Action. Training would occur within existing DoD airspace, national airspace, and at secondary training airfields where C-2A aircraft, MV-22B aircraft, and other rotary aircraft currently conduct flight training operations. The Proposed Action does not establish new airspace, training ranges, or airfields.

The Proposed Action secondary training airfields are outlying airfields located some distance from the Navy's primary home base for the aircraft. Secondary airfields would support repetitive Navy V-22 training operations, which would be distributed among various airfields without disrupting other operations at the home airfield or the secondary training airfields. In general, those secondary airfields located closest to the home airfield would be used more frequently than those farther away.

Proposed Navy V-22 usage of airspace and secondary training airfields is briefly described below. The types of training that would occur at most of the other DoD Installations has been previously analyzed in other NEPA documents, and those documents are listed in **Section 1.6** (Key Documents). **Section 2.3** (Alternatives Carried Forward for Analysis) further describes training proposed at secondary airfields under each alternative. The fleet logistics squadron would coordinate all training events with managers of the individual airfield(s) to ensure no scheduling conflicts would occur and that the planned training is consistent with the secondary airfield's procedures and NEPA planning.

Those secondary airfields anticipated to most regularly support Navy V-22 training requirements are listed in **Table 2.1-3**.

As shown in **Table 2.1-3,** the secondary training airfields would support a variety of training operation types. Flight training types include familiarization, confined area landing, vertical replenishment, deck landing qualification, and night vision goggle. These training operations are briefly described below:

- **Familiarization.** Develop proficiency in Navy V-22 aircraft control, normal procedures, normal checklists and actions to take during emergencies.
- **Confined Area Landing.** Develop proficiency in performing aircraft take-offs and landings in confined areas.
- **Vertical Replenishment.** Develop proficiency in the transfer of personnel and cargo.
- **Deck Landing Qualification.** Develop proficiency in flight operations on and off a carrier deck or ship platform. Training can involve practice in vertical landings in a designated location, communication procedures, light signaling, waveoff, and departure procedures.
- **Night Vision Goggle**. Develop proficiency while using night vision goggles under various light level conditions.

Table 2.1-3: West and East Coast Secondary Training Airfields and Proposed Typical Training Operation Types

West Coast		*East Coast*	
Airfield Name	***Typical Navy V-22 Training Operation Type***	***Airfield Name***	***Typical Navy V-22 Training Operation Type***
NAF El Centro, CA	FAM & DLQ	NALF Fentress, VA	DLQ & FAM
MCAS Miramar, CA	FAM & DLQ	Felker AAF, VA	VERTREP & CAL
MCAS Camp Pendleton, CA	VERTREP & DLQ	MCAS New River, NC	FAM & DLQ
NALF San Clemente, CA	FAM & NVG	Blackstone AAF, VA	CAL & NVG
MCOLF Camp Pendleton, CA	DLQ & FAM	MCOLF Oak Grove, NC	FAM & DLQ
MCAS Yuma, AZ	FAM & CAL	MCOLF Bogue, NC	FAM & DLQ

Notes:

Field Name: AAF=Army Airfield; AZ=Arizona; CA=California; MCAS=Marine Corps Air Station; MCOLF=Marine Corps Outlying Landing Field; NC=North Carolina; NAF=Naval Auxiliary Field; NALF=Navy Auxiliary Landing Field; VA=Virginia

Training Type: CAL=Confined Area Landing; DLQ=Deck Landing Qualification; FAM=Familiarization; NVG=Night Vision Goggle; VERTREP=Vertical Replenishment;

Other Airfields: In addition to the use of the above named secondary training airfields, proposed Navy V-22 training operations may also take place from time to time at regional civilian airfields and other DoD airfields consistent with past and current use of such airfields by C-2A, MV-22B, and other rotary aircraft. Examples of other DoD airfields in the West Coast region include: Helicopter Outlying Landing Field Camp Pendleton (California), Expeditionary Airfield at Marine Corps Air Ground Combat Center Twenty-nine Palms (California), Fort Hunter-Liggett (California), Remote Training Site Warner Springs (California), Outlying Auxiliary Airfield at Barry M. Goldwater Range-West (Arizona), and Hawthorne Army Ammunition Depot (Nevada). Examples of other DoD airfields in the East Coast region include: Muir AAF at Fort Indiantown Gap (Pennsylvania), Joint Base McGuire-Dix-Lakehurst (New Jersey), MCOLF Atlantic (North Carolina), MCOLF Camp Davis (North Carolina), Fort A.P. Hill (Virginia), Marine Corps Air Facility Quantico (Virginia), and/or Camp Dawson (West Virginia).

Figure 2.1-4 illustrates the location of the proposed West Coast secondary training airfields. NAS North Island is shown on the figure as well for context. **Figure 2.1-5** illustrates the location of the proposed East Coast secondary training airfields. NS Norfolk is shown on the figure as well for context. The proposed distribution of training operations at each of these airfields is described in **Section 2.3.2** (Alternative 1) and **Section 2.3.3** (Alternative 2). In addition to the above named secondary training airfields, proposed Navy V-22 training operations may also take place from time to time at regional civilian airfields and other DoD airfields consistent with past and current use of such airfields by MV-22B and C-2A aircraft. The potential additional airfields are listed in the notes of **Table 2.1-3** (Other Airfields).

Figure 2.1-4: West Coast Navy V-22 Secondary Training Airfields

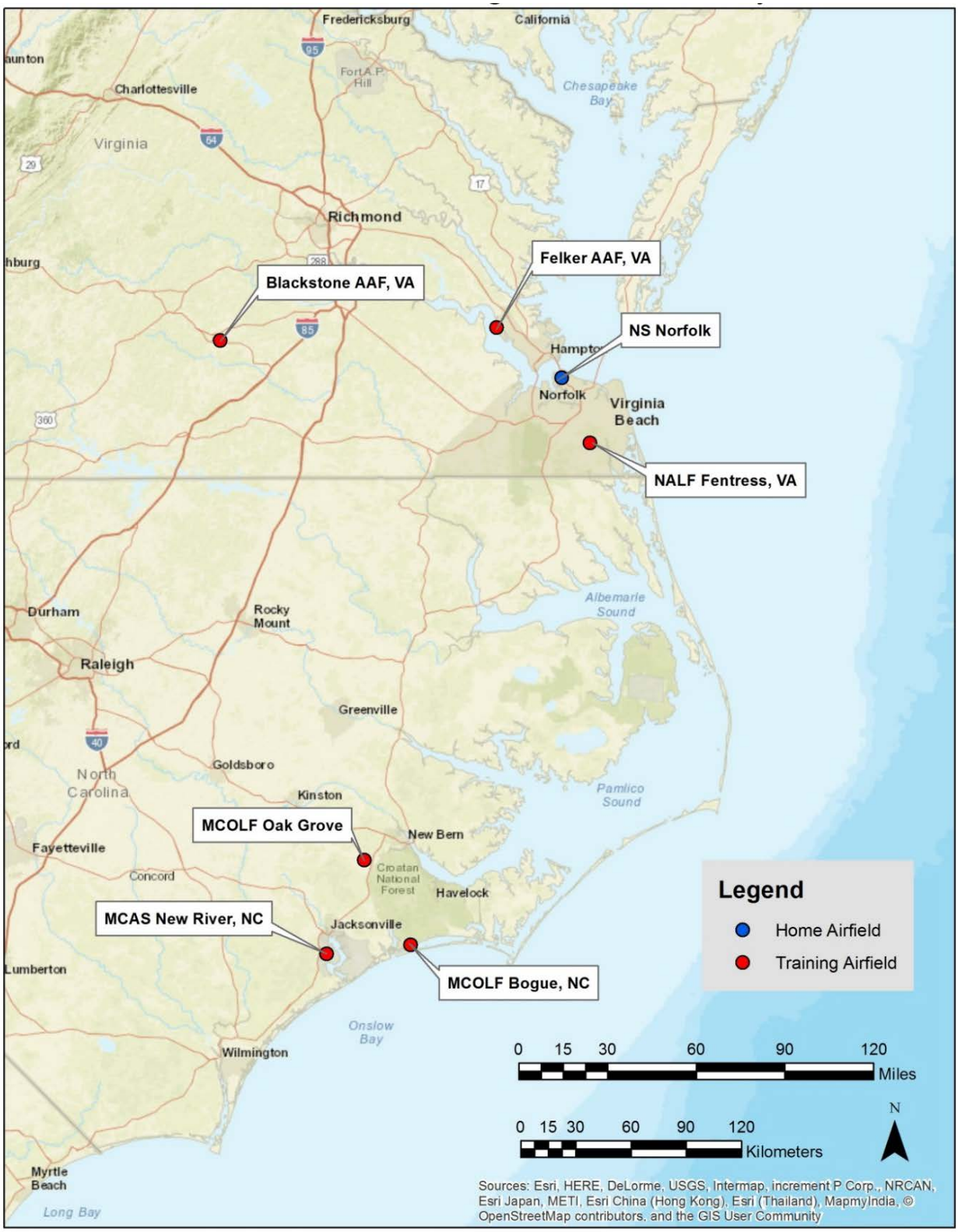


Figure 2.1-5: East Coast Navy V-22 Secondary Training Airfields

2.1.4.3 Special Use Airspace and Transit Flights

On the West Coast and on the East Coast, Navy V-22 flight training would occur within airspace currently used by other Navy aircraft and the U.S. Marine Corps MV-22B squadrons, including but not limited to SUA (restricted areas, warning areas, and military operations areas), and the National Airspace System for transits between home base airfields and secondary airfields.

The Navy V-22, like the C-2A it replaces, would have a requirement to travel to, from, and between ships at sea, and would be operating in warning areas offshore. In transit between bases and ships, the Navy V-22 would transit through this airspace regularly, as does every naval aircraft operating from sea. Any environmental impacts resulting from these operations by Navy V-22 are addressed in the Hawaii-Southern California Training and Testing Environmental Impact Statement (EIS)/ Overseas EIS (OEIS) for the NAS North Island-based aircraft, and the Atlantic Fleet Training and Testing EIS/OEIS for the NS Norfolk-based aircraft, and will not be further addressed in this EA.

The Navy V-22 would take over the logistics mission of the C-2A. This mission involves moving cargo, mail, and passengers to and from land bases and ships, and the training for this mission involves maintaining currency and proficiency for the crews. Transits of the Navy V-22 between various sites (bases, airfields, ships) would be very similar to the C-2A. Although the Navy V-22 is capable of landing similarly to a helicopter, once airborne, it rapidly assumes flight profiles similar to the C-2A, meaning that transit from place to place would be at altitude (like a fixed-wing aircraft) rather than near the ground like a helicopter. It is not anticipated that the Navy V-22 would generate any additional low-altitude transit activity when compared to the C-2A it replaces.

Transits would occur throughout the southwest and mid-Atlantic regions of the United States at altitudes exceeding 3,000 feet above ground level. At that altitude, noise impacts are negligible and emissions are above the U.S. Environmental Protection Agency's (USEPA's) presumed mixing height for air pollutants (USEPA, 1999a).

2.2 DEVELOPMENT OF THE RANGE OF ACTION ALTERNATIVES

In developing the proposed range of alternatives that meet the purpose of and need for the Proposed Action, the Navy carefully reviewed these important considerations:

- **Colocation with Fleet Logistic Centers.** Like the C-2A, the Navy V-22 would fill the time-critical logistics requirements, such as transporting personnel, mail, and priority cargo from the shore-based logistics centers located at NAS North Island and NS Norfolk to aircraft carriers. Colocating the fleet logistics squadrons with the fleet logistics centers that service aircraft carriers at NAS North Island and NS Norfolk enables rapid transfer of time critical items to the West and East Coast operating areas. Basing these squadrons at any other location would entail additional unnecessary flight operations and additional infrastructure. These aircraft would still need to fly to the fleet logistics centers to pick up or drop off the cargo.
- **Maximize the use of existing facilities and support.** The Navy V-22 would be a replacement for the C-2A operated by the fleet logistics squadrons at NAS North Island and NS Norfolk. Maintaining those squadrons at their current locations during and after the V-22 transition would maximize the existing Navy facilities, avoid unnecessary investment in shore infrastructure, and avoid creating excess capacity at those locations.
- **Colocation of Navy V-22 Training Squadron.** The Navy plans to establish a Navy V-22 training squadron, also known as the FRS, colocated with one of the two fleet logistics support multi-mission squadrons.

2.3 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

In accordance with Office of the Chief of Naval Operations (OPNAV) M-5090-1, the alternatives carried forward for analysis include the No Action Alternative and two action alternatives. Two action alternatives were identified based on the considerations for developing a range of alternatives that would meet the purpose and need for the Proposed Action. The action alternatives were derived through the collaborative efforts of U.S. Fleet Forces, Commander, Naval Air Forces (Commander, Naval Air Forces N8), Naval Facilities Engineering Command (NAVFAC), and installation staffs. The two action alternatives differ from each other primarily in terms of the location of the fleet training squadron and maintenance school. The No Action Alternative and two action alternatives are further described in **Section 2.3.1** (No Action Alternative), **Section 2.3.2** (Alternative 1), and **Section 2.3.3** (Alternative 2).

2.3.1 NO ACTION ALTERNATIVE

The Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1502.14[d]) require an EA to evaluate the No Action Alternative. The No Action Alternative provides a benchmark that typically enables decision makers to compare the magnitude of potential environmental effects of the Proposed Action and alternatives with baseline conditions.

Under the No Action Alternative, the Proposed Action would not occur; the Navy would not provide facilities and functions to support the replacement of C-2A aircraft with the Navy V-22 at existing West and East Coast logistics support centers that service aircraft carriers. The Navy would not renovate, expand, or construct new facilities or infrastructure. Consequently, there would be no facilities or functions to support the Navy V-22 aircraft. The carrier on-board mission would continue to be performed by VRC-40 at NS Norfolk and VRC-30 at NAS North Island using the C-2A aircraft. Personnel levels would remain the same, 390 C-2A personnel at NAS North Island and 581 C-2A personnel at NS Norfolk. Additionally, C-2A naval aviators and aircrews would continue to be trained to join the fleet operational squadrons at NS Norfolk by the existing fleet training squadron, VAW-120.

However, the existing C-2A aircraft have reached the end of their service life. Increasing maintenance requirements limit the use of the aging C-2A for the aircraft carrier on-board delivery mission, which would prevent the Navy from supporting its forward deployed forces effectively. The No Action Alternative would not meet the purpose and need for the Proposed Action; however, the conditions associated with the No Action Alternative serve as reference points for describing and quantifying the potential impacts associated with the action alternatives.

The analysis in this EA first compares the No Action Alternative to the baseline conditions, and then compares the Proposed Action to the No Action Alternative. Baseline conditions for facilities and infrastructure, the number of aircraft, the number of personnel, and resource areas are represented by the most recent available data as of the date of EA preparation in 2017. Baseline conditions for the number of aircraft operations are best represented by the average of the last full five years of actual operational data for NAS North Island and NS Norfolk from 2011 to 2015.

The expected end-state year is 2028 for both the No Action Alternative and Proposed Action because the proposed aircraft transition would be complete by 2028. For most resource areas, the baseline conditions and the No Action Alternative conditions would be the same. However, because of known programmed aircraft actions that are ongoing, the number of aircraft and corresponding aircraft operations in the existing baseline will change by 2028 regardless of the Proposed Action; therefore, the projected 2028 operations without the Proposed Action are analyzed under the No Action Alternative.

2.3.2 ALTERNATIVE 1: C-2A TO NAVY V-22 TRANSITION WITH WEST COAST FLEET TRAINING SQUADRON AND MAINTENANCE SCHOOL

Under Alternative 1, the Navy would provide facilities and functions to support the replacement of the existing C-2A aircraft with Navy V-22 aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established at NAS North Island.

2.3.2.1 Aircraft Transition Under Alternative 1

Under Alternative 1, the Navy would begin to transition the C-2A to the Navy V-22 in 2020 as the first aircraft arrived at NAS North Island. For the next several years, there would be a mix of colocated C-2A aircraft and Navy V-22 aircraft as the Navy V-22 aircraft move into the home bases and the C-2A aircraft are gradually replaced. The last C-2A would leave NAS North Island in 2024, while the last C-2A would leave NS Norfolk by 2028. The transition at both NAS North Island and NS Norfolk would be completed in the 2028 timeframe.

Table 2.3-1 provides an end-state comparison of existing C-2A aircraft and Navy V-22 aircraft count under Alternative 1 at each home base location. The aircraft count includes fleet squadron aircraft and training squadron aircraft. Under Alternative 1, total fleet logistics support squadron aircraft at NAS North Island would increase from 10 to 23 when compared to the No Action Alternative. This increase would include five Navy V-22 training squadron aircraft. Under Alternative 1, total fleet logistics squadron aircraft at NS Norfolk would decrease from 17 aircraft to 15 aircraft when compared to the No Action Alternative.

Table 2.3-1: Aircraft Transition Comparison (C-2A versus Navy V-22) under Alternative 1

	NAS North Island		***NS Norfolk***	
	No Action Alternative	***Alternative 1***	***No Action Alternative***	***Alternative 1***
	C-2A	***Navy V-22***	***C-2A***	***Navy V-22***
Fleet Logistics Squadrons	1	1	1	1
CONUS Fleet Squadron Detachments	4	5	5	4
Home Guard Detachments	1	1	1	1
Aircraft Per Detachment	2	3	2	3
Fleet Logistics Squadron and Home Guard Aircraft (Subtotal)	10	18	12	15
Fleet Training Squadron	0	1	1	0
Fleet Training Squadron Aircraft	0	5	5	0
TOTAL AIRCRAFT	**10**	**23**	**17**	**15**
Change from No Action Alternative	N/A	+13	N/A	-2

Note: N/A = not applicable

2.3.2.2 Facilities and Infrastructure under Alternative 1

Based on facility planning criteria for Navy and Marine Corps shore installations, Alternative 1 would include construction and/or renovation of facilities as described below. Construction would occur in currently developed and paved areas of NAS North Island and NS Norfolk, but there would be 2.4 acres of impervious surface added at NS Norfolk.

- **Hangar.** Under Alternative 1, a hangar facility would be constructed to accommodate up to six fleet squadron aircraft at NAS North Island and five fleet squadron aircraft at NS Norfolk. Two training squadron aircraft would also require hangar space at NAS North Island under Alternative 1. Should the Navy choose to implement Alternative 1, an additional 36,000 square

foot hangar required for the training squadron would be constructed at NAS North Island adjacent to and east of the fleet operational squadron hangar either as a stand-alone building or as an addition to the operational squadron hangar. Under Alternative 1, the hangar construction would encompass approximately 156,000 square feet at NAS North Island and 62,000 square feet at NS Norfolk. The height of the hangars would be approximately 60 feet. The proposed NAS North Island hangar and airfield location is shown in **Figure 2.1-1** and the proposed NS Norfolk hangar and airfield location is shown in **Figure 2.1-2**.

- **Aircraft Parking Apron.** Alternative 1 includes renovation/repair of parking aprons, taxiways, and helipads to accommodate the Navy V-22 requirements and parking configuration for 13 aircraft. Existing parking aprons at NAS North Island and NS Norfolk are adequate in size to accommodate the Navy V-22 aircraft. However, due in part to the high-heat exhaust directed downward close to the ground associated with the Navy V-22 aircraft and existing pavement condition, the parking aprons, taxiways, and aircraft hover points would require full-depth replacement at NAS North Island and coating with sodium silicate solution at NS Norfolk. Two training squadron aircraft would also require a parking apron for 3 aircraft at NAS North Island under Alternative 1. At NS Norfolk, 3,500 linear feet of taxiway would be expanded by 25 feet (3,500 square feet). The pavement area proposed for renovation of parking aprons, helipad, and taxiway at NAS North Island is approximately 35 acres and at NS Norfolk is approximately 24 acres. Striping for parking spots would be necessary to accommodate proper aircraft spacing, and tie downs would be needed to meet Navy V-22 requirements.
- **Aircraft Wash Rack.** Under Alternative 1, one Type A wash rack would be established at NAS North Island to meet Navy V-22 cleaning requirements in conjunction with periodic maintenance. The wash rack at NAS North Island would be located adjacent to the hangar site along with associated utilities, drainage system, and utilities control building. An existing wash rack would be used at NS Norfolk.
- **Pilot Training Facilities.** Under Alternative 1, pilot and aircrew academic training would occur similarly at NAS North Island and NS Norfolk. At least one additional FTD would be required at NAS North Island to support the training squadron. The FTD would be located in existing Building 797, approximately 4,000 feet southeast of the proposed hangar area (**Figure 1.2-2** and **Figure 2.1.1**). The building interior would be partially renovated for the FTD. There would be no construction outside the building; therefore, renovation of Building 797 would not result in environmental impacts and is not addressed further in the EA. At NS Norfolk, a 100,000 square foot pad and CFTD would be installed.
- **Maintenance Training.** One additional AMT would be required at NAS North Island, given the number of detachments located at the site, and would be located to the east of the hangar site. Aircraft maintenance would occur at the West and East Coast home bases on the flightline and in type II maintenance hangars (or existing type I maintenance hangars).

The proposed squadron hangar and other facilities at NAS North Island would require the demolition of the following 17 buildings (**Figure 2.1-1**):

- Building 312, Maintenance Hangar
- Building 42, Maintenance Shop
- Building 309, Rework Shop Building 329
- Storage Shed would be demolished
- Building 308B, Storage
- Building 308C, HAZ/FLAM Storage
- Building 308A, Electric Power Plant

- Building 373, HAZ/FLAM Storage
- Building 308, Rework Shop
- Building 310, Maintenance Hangar
- Building 328, Ready Magazine
- Building 304, Line Shack
- Building 331, Storage
- Building 306, Rework Shop
- Building C41, A/C tool & equip storage
- Building C29, Kitting + Storage
- Building C88, Metal Storage

Under Alternative 1, the proposed training squadron hangar and parking apron at NAS North Island would require the demolition of an additional 9 buildings, as follows (**Figure 2.1-1**):

- Building 40
- Building 41
- Building 335
- Building 454
- Building 588
- Building 809
- Building 1470
- Building 1471
- Gas station

The interiors of three existing NAS North Island buildings outside the project area, Buildings 861, 825, and F, would be partially renovated to accommodate relocated tenants from existing buildings within the project area and administrative functions for Navy V-22 wing staff. The renovations, which would total approximately 21,000 square feet, would include cosmetic repairs and facility system upgrades (e.g., mechanical, electrical, wet utilities). The façade of Building F is historic and is protected from alteration. No alterations of the exterior would occur. There would be no construction outside the buildings; therefore, the renovations would not result in environmental impacts or effects to historic properties. Details of the building renovations are not addressed further in the EA.

Table 2.3-2 summarizes the facilities proposed under Alternative 1.

Table 2.3-2: Facility Summary for Alternative 1

	NAS North Island	***NS Norfolk***
Navy V-22 Squadrons	1 Navy V-22 Fleet operational squadron and 1 Navy V-22 training squadron	1 Navy V-22 Fleet operational squadron
Facility Construction/Renovation (square feet)	156,000	62,000
Pavement Renovation/Expansion Area (acres)	35	24
New Impervious Surface (acres)	0	2.4
Construction Costs for Hangar and Site Work	$110.88 million	$32.38 million
FTD/CFTD Cost	$20.00 million	$10 million
TOTAL CONSTRUCTION COSTS	**$130.88 million**	**$42.38 million**

2.3.2.3 Personnel Requirements under Alternative 1

Under Alternative 1, C-2A personnel would transition to Navy V-22. There would be an increase in personnel at NAS North Island and a decrease in personnel at NS Norfolk.

Table 2.3-3 summarizes the change in personnel proposed under Alternative 1 at the end state. As with the aircraft transition, the change in personnel would occur over several years, and during the transition, there would be a blend of C-2A and Navy V-22 personnel at the home base.

Table 2.3-3: Change in Personnel at NAS North Island and NS Norfolk under Alternative 1

	NAS North Island		*NS Norfolk*	
	No Action Alternative	***Alternative 1***	***No Action Alternative***	***Alternative 1***
	C-2A	***Navy V-22***	***C-2A***	***Navy V-22***
TOTAL PERSONNEL	**390**	**731**	**581**	**455**
Change from No Action Alternative	N/A	+341	N/A	-126

Note: N/A = not applicable

Under Alternative 1, there would be an increase of 341 personnel at NAS North Island when compared to the No Action Alternative, whereas NS Norfolk would experience a reduction of 126 personnel. The reduction in personnel at NS Norfolk results from the movement of the fleet training squadron from NS Norfolk to NAS North Island. It is estimated that each of these new personnel is accompanied by an average of 1.2 family members. This planning factor is applied based on a DoD demographic survey and profile of the military community (DoD, 2014). Therefore, an estimated 750 people would relocate to the base, neighborhoods, and communities near NAS North Island, and an estimated 277 people would leave from the base, neighborhoods, and communities near NS Norfolk.

Included within the personnel count shown in **Table 2.3-3** are maintenance personnel associated with the Proposed Action. Intermediate-level maintenance would be conducted at NAS North Island and NS Norfolk. Under Alternative 1, intermediate-level maintenance at NAS North Island would be staffed by 35 enlisted personnel, while maintenance at NS Norfolk would be staffed by 28 enlisted personnel.

2.3.2.4 Aircraft Operations under Alternative 1

Navy V-22 training requirements and methods for fleet squadron, replacement, and maintenance personnel training are expected to generally resemble those of the legacy systems with few exceptions.

Alternative 1 operations would include deck landing qualification/vertical replenishment practice, night vision goggle practice, and special use airspace. **Table 2.3-4** contains a list of operations and expected annual quantities to be conducted at each home airfield. The Navy anticipates a total of approximately 16,000 annual airfield operations by Navy V-22 aircraft at NAS North Island under Alternative 1, which represents an increase of approximately 11,500 from No Action Alternative C-2A operations. Total aircraft operations at NAS North Island would increase from 79,800 to 91,300, a 14 percent increase. This level of operations at NAS North Island is consistent with recent historical operations, which were 138,000 in 2002; 95,000 in 2004; and 102,000 in 2010; and would not represent a significant operational change (NBC, 2011; Appendix B [Noise Analysis]). Additionally, the Navy anticipates a total of approximately 7,000 annual Navy V-22 airfield operations at NS Norfolk, which would be about the same as C-2A operations under the No Action Alternative. Additional details regarding flight operations are contained in **Appendix B**.

Table 2.3-4: Annual Home Airfield Operations for Current C-2A and Proposed Navy V-22 at NAS North Island and NS Norfolk under Alternative 1

	NAS North Island			*NS Norfolk*		
Type of Operation	***No Action Alternative C-2A Operations***	***Alternative 1 Navy V-22 Operations***	***Proposed Change***	***No Action Alternative C-2A Operations***	***Alternative 1 Navy V-22 Operations***	***Proposed Change***
Departures	800	2,500	+1,700	1,200	1,000	-200
VFR Arrivals	700	2,300	+1,600	900	600	-300
IFR Arrivals	100	300	+200	300	400	+100
Visual Closed Patterns (Touch-and-Go)	2,600	10,000	+7,400	4,100	4,300	+200
Instrument Patterns (GCA)	300	900	+600	500	700	+200
Total Annual Operations (C-2A and Navy V-22)	**4,500**	**16,000**	**+11,500**	**7,000**	**7,000**	**0**
Total Annual Operations (All Aircraft)	**79,800**	**91,300**	**+11,500**	**66,900**	**66,900**	**0**

Notes: IFR=Instrument Flight Rules; GCA=ground-controlled approach; VFR=Visual Flight Rules; operation=aircraft departure (take-off) or arrival (landing)
Numbers are rounded to the nearest 100.

In addition to training operations at the primary home airfields, Navy V-22 flight training would also require the use of secondary training airfields in the vicinity of NAS North Island and NS Norfolk. Several factors such as weather, wind, facility maintenance, and scheduling conflicts with other military aircraft influence the selection of the secondary training airfields on a given day. As a result, the Navy needs flexibility when scheduling and executing training operations. This flexibility may result in usage rates at each airfield that vary from year to year.

Under Alternative 1, approximately 12,500 annual operations would be distributed across six West Coast secondary airfields in the vicinity of NAS North Island, and approximately 4,600 annual operations would be distributed across six East Coast secondary airfields in the vicinity of NS Norfolk.

On each coast, the majority of operations would be distributed among three secondary airfields, and a smaller number could occur at three remaining secondary airfields. As shown in **Table 2.3-5**, on the West Coast, a maximum of 80 percent (up to approximately 10,000) of the operations could occur at either NAF El Centro, MCAS Miramar, or MCAS Camp Pendleton, and a maximum of 20 percent (up to approximately 2,500) could occur at either NALF San Clemente, MCOLF Camp Pendleton, or MCAS Yuma. On the East Coast under Alternative 1, a maximum of 80 percent (up to approximately 3,700) of the operations could occur at either NALF Fentress, Felker AAF, or MCAS New River, and 20 percent (up to approximately 900) could occur at either Blackstone AAF, MCOLF Bogue, or MCOLF Oak Grove. MCOLF Oak Grove is an MCI East facility that is heavily utilized by six MV-22 operational Marine Corps squadrons and one MV-22 FRS based out of New River as primary outlying land field, and priority use goes to those squadrons.

While the Navy anticipates that total Navy V-22 flight operations would be distributed among the six West Coast and six East Coast airfields to meet training requirements, Alternative 1 assumes there is some potential, although unlikely, for the maximum number of Navy V-22 secondary airfield operations to occur in any year at one location, up to the stated maximum (i.e., up to 80 percent at one of the three secondary airfields and up to 20 percent at one of the remaining secondary airfields). For example, up to approximately 10,000 airfield operations may occur in any given year at any of the following: NAF El Centro, MCAS Miramar, or MCAS Camp Pendleton, and up to approximately 2,500 operations could occur at either NOLF San Clemente, MCOLF Camp Pendleton, or MCAS Yuma.

Proposed Navy V-22 use of airspace and secondary training airfields, even in the unlikely scenario that the maximum annual operations would be conducted at any one of the airfields, would represent a small percentage of existing operations in airspace and at the airfields. Existing airfield operations, including those of fixed-wing jet and rotary-wing aircraft, at the secondary airfields where most of the Navy V-22 training operations are proposed, have been previously analyzed in other NEPA documents listed in **Section 1.6** (Key Documents). The percentage increases provided in **Table 2.3-5** represent the percent of total existing operations for all aircraft occurring at the airfields.

Table 2.3-5: Secondary Training Airfield Proposed Operations under Alternative 1

Training Airfield	*Maximum Total Estimated Annual Navy V-22 Secondary Airfield Operations*[1]	*Maximum Increase in Overall Annual Airfield Operations (All Aircraft)*[2]	*Percent Distribution (Day/Evening/Night – CA) (Day/Night – AZ, VA, NC)*
NAS North Island Vicinity			
NAF El Centro, CA MCAS Miramar, CA MCAS Camp Pendleton, CA	Up to 10,000 (80%) at any one of the three airfields	7 – 15 percent	75/15/10
NALF San Clemente, CA MCOLF Camp Pendleton, CA[3], MCAS Yuma, AZ	Up to 2,500 (20%) at any one of the three airfields	2 – 9 percent	75/15/10 90/10 (MCAS Yuma, AZ)
Total West Coast Secondary Airfield Operations	12,500	--	--
NS Norfolk Vicinity			
NALF Fentress, VA Felker AAF, VA MCAS New River, NC	Up to 3,700 (80%) at any one of the three airfields	3 – 4 percent	90/10
Blackstone AAF, VA MCOLF Oak Grove, NC MCOLF Bogue, NC	Up to 900 (20%) at any one of the three airfields	3 – 5 percent	90/10
Total East Coast Secondary Airfield Operations	4,600	--	--

Notes:
AAF=Army Airfield; AZ=Arizona; CA=California; MCAS=Marine Corps Air Station; MCOLF=Marine Corps Outlying Field; NAF=Naval Auxiliary Field; NALF=Naval Auxiliary Landing Field; NC=North Carolina; VA=Virginia
Day/Evening/Night operating hours observed in California = day (7:00 a.m.-6:59 p.m.), evening (7:00 p.m.-9:59 p.m.), night (10:00 p.m. to 6:59 a.m.); Day/Night operating hours observed in Virginia = day (7:00 a.m.-9:59 p.m.), night (10:00 p.m.-6:59 a.m.)

[1] Total of approximately 12,500 annual operations distributed across six airfields in the vicinity of NAS North Island, and a total approximately of 4,600 distributed across six airfields in the vicinity of NS Norfolk.

[2]Percent of total existing operations of all aircraft occurring at the airfield. Total existing annual operations at the 3 east coast and 3 west coast secondary airfields where 80% of operations would occur range from 66,000 at NAF El Centro to 146,000 at MCAS Miramar, and most of these airfields support over 100,000 operations each year.

[3] Existing operations data not available for MCOLF Camp Pendleton; percentage of overall Camp Pendleton operations would be less than 1 percent.

Total existing annual operations previously analyzed at the three east and three west coast secondary airfields listed in **Table 2.3-5** where 80 percent of operations would occur range from 66,000 at NAF El Centro to 146,000 at MCAS Miramar. Most of these six secondary airfields typically support over 100,000 operations each year. It is anticipated that the airfields listed in **Table 2.3-5** would accommodate most of the required Navy V-22 training operations. However, some Navy V-22 operations may occur at other airfields not listed where such airfields already accommodate periodic V-22 or C-2A flight operations (refer to **Table 2.1-3** notes on other airfields).

Navy V-22 operations at the secondary training airfields, under Alternative 1, would be conducted in a manner consistent with existing airfield operations and would be expected to have negligible environmental impacts to the airspace and airfield environments. Alternative 1 operations at the secondary airfields would not cause a perceptible change in the primary noise metric, Community Noise Equivalent Level (CNEL) in California or Day-Night Average Sound Level (DNL), at those airfields. The changes in airfield operations indicated in **Table 2.3-5** range from 2 to 15 percent of the total airfield operations. For similar-type operations, this might be expected to account for approximately 0.1 to 0.6 decibel (dB) change in CNEL/DNL. Since some of these airfields often host louder operations from jet aircraft, the change in the CNEL/DNL metric would be even less. Changes to CNEL/DNL of less than 1 dB would not be perceptible. Proposed operations would not result in additional noise or vibration that would affect structures at the airfields, including historic properties.

No changes to airspace procedures would be required to accommodate the Navy V-22 aircraft performance or airfield sorties[2]. Navy V-22 operations would be similar to other existing aircraft operations in airspace and at the airfields. Operations would fall within the same general types as those that currently occur and no changes to established airfield safety features would be required. Air emissions from Alternative 1 operations would not appreciably increase air emissions from existing operations at the secondary airfields that were analyzed in previous NEPA documents, or operations would be minor and emissions would be negligible. For example, air emissions estimates calculated for Felker AAF at Joint Base Langley-Eustis using the highest number of operations for NS Norfolk (Alternative 2) show Navy V-22 emissions at this secondary airfield would be well below *de minimis* thresholds (see calculations included in Appendix C.3). Aircraft operations would be conducted in a manner consistent with existing airfield operations and in accordance with the installations' bird/animal aircraft strike hazard programs and Integrated Natural Resources Management Plans, which are implemented to minimize impacts to biological resources.

In summary, proposed annual operations at secondary airfields would be similar to existing operations and would represent a small percentage of the operations that have already been analyzed under NEPA. The Navy V-22 operations would be expected to have negligible environmental impacts to the airspace

[2] In military aviation, a sortie is a mission of an individual aircraft, starting when the aircraft takes off and ending on its return. For example, one mission involving six aircraft would tally six sorties.

and airfield environments. Therefore, environmental and operational impacts associated with Navy V-22 use of secondary training airfields would not be significant and were not evaluated further in this EA.

2.3.3 ALTERNATIVE 2: C-2A TO NAVY V-22 TRANSITION WITH EAST COAST FLEET TRAINING SQUADRON AND MAINTENANCE SCHOOL

Under Alternative 2, the Navy would provide facilities and functions to support replacement of the existing C-2A aircraft with Navy V-22 aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established on the East Coast at NS Norfolk under Alternative 2.

2.3.3.1 Aircraft Transition under Alternative 2

Under Alternative 2, the Navy would begin to transition the C-2A to the Navy V-22 in 2020, as described in Alternative 1, except that the last C-2A would leave NAS North Island in 2024, while the last C-2A would leave NS Norfolk by 2026. The transition at both NAS North Island and NS Norfolk would be completed by 2028.

Table 2.3-6 provides an end-state comparison of existing C-2A aircraft and Navy V-22 aircraft under Alternative 2 at each home base location. The aircraft count includes fleet squadron aircraft and training squadron aircraft. Under Alternative 2, total fleet logistics squadron aircraft at NAS North Island would increase from 10 to 18 when compared to the No Action Alternative. Under Alternative 2, total fleet logistics squadron aircraft at NS Norfolk would increase from 17 aircraft to 20 aircraft when compared to the No Action Alternative. This increase includes five Navy V-22 training squadron aircraft.

Table 2.3-6: Aircraft Transition Comparison (C-2A versus Navy V-22) under Alternative 2

	NAS North Island		***NS Norfolk***	
	No Action Alternative	***Alternative 2***	***No Action Alternative***	***Alternative 2***
	C-2A	***Navy V-22***	***C-2A***	***Navy V-22***
Fleet Squadrons	1	1	1	1
CONUS Fleet Detachments	4	5	5	4
Home Guard	1	1	1	1
Aircraft Per Detachment	2	3	2	3
Fleet Squadron and Home Guard Aircraft (Subtotal)	10	18	12	15
Fleet Training Squadron	0	0	1	1
Training Squadron Aircraft	0	0	5	5
TOTAL AIRCRAFT	**10**	**18**	**17**	**20**
Change from No Action Alternative	N/A	+8	N/A	+3

Note: N/A = not applicable

2.3.3.2 Facilities and Infrastructure under Alternative 2

Based on facility planning criteria for Navy and Marine Corps shore installations, Alternative 2 would require construction and/or renovation of a hangar facility to accommodate up to six fleet squadron aircraft at NAS North Island and five fleet squadron aircraft at NS Norfolk. Two fleet training squadron aircraft would also require hangar space at NS Norfolk under Alternative 2. There would be no training squadron hangar at NAS North Island under Alternative 2. Construction would occur in currently developed and paved areas of NAS North Island and NS Norfolk, but there would be 2.4 acres of impervious surface added at NS Norfolk.

- **Hangar.** Under Alternative 2, a hangar facility would be constructed to accommodate up to six fleet squadron aircraft at NAS North Island and five fleet squadron aircraft at NS Norfolk. Two training squadron aircraft would also require hangar space at NS Norfolk under Alternative 2. Should the Navy choose to implement Alternative 2, an existing hangar (LP-34) at NS Norfolk, located adjacent to the proposed fleet squadron hangar space, would be renovated to provide the additional hangar space for the fleet training squadron aircraft. Under Alternative 2, hangar construction/renovation would encompass 102,200 square feet at NAS North Island and 96,100 square feet at NS Norfolk. The height of the hangars would be approximately 60 feet. The proposed NAS North Island hangar and airfield location is shown in **Figure 2.1-1**, and the proposed NS Norfolk hangar and airfield location is shown in **Figure 2.1-2**.
- **Aircraft Parking Apron.** Alternative 2 requires renovation/repair of parking aprons to accommodate the Navy V-22 requirements and parking configuration for 13 aircraft. Existing parking aprons at NAS North Island and NS Norfolk are adequate in size to accommodate the expected number of Navy V-22 aircraft; however, due to the high-heat exhaust directed downward close to the ground associated with the Navy V-22 aircraft, the parking aprons, taxiways, helipads, and aircraft hover points would require full-depth replacement at NAS North Island and coating with sodium silicate solution at NS Norfolk. At NS Norfolk, 3,500 linear feet of taxiway would be expanded by 25 feet (3,500 square feet). The pavement area proposed for renovation at NAS North Island is approximately 24 acres and at NS Norfolk is approximately 36 acres. Striping for parking spots would be necessary to accommodate proper aircraft spacing, and tie downs would be needed to meet Navy V-22 requirements.
- **Aircraft Wash Rack.** Under Alternative 2, one Type A wash rack would be established at NAS North Island to meet Navy V-22 cleaning requirements in conjunction with periodic maintenance. The wash rack at NAS North Island would be located adjacent to the hangar site along with associated utilities, drainage system, and utilities control building. An existing wash rack would be used at NS Norfolk.
- **Pilot Training Facilities.** Under Alternative 2, pilot and aircrew academic training would occur similarly at NAS North Island and NS Norfolk. At NAS North Island, the FTD would be located in existing Building 797, approximately 4,000 feet southeast of the proposed hangar area (**Figure 1.2-2** and **Figure 2.1-1**). The building interior would be partially renovated for the FTD. There would be no construction outside the building; therefore, renovation of Building 797 would not result in environmental impacts and is not addressed further in the EA. At least one additional CFTD would be required at NS Norfolk to support the training squadron. A 100,000 square foot pad and CFTD would be installed at NS Norfolk.
- **Maintenance Training.** One additional AMT would be required at NAS North Island given the number of detachments located at the site, and would be located to the east of the hangar site. One additional AMT would be required at NS Norfolk with the maintenance school siting there under Alternative 2. Aircraft maintenance would occur at the West and East Coast home bases on the flightline and in type II maintenance hangars (or existing type I maintenance hangars).

The proposed squadron hangar at NAS North Island would require demolition of the same 17 buildings listed under Alternative 1 and as shown on **Figure 2.1-1**.

The interiors of three existing NAS North Island buildings outside the project area, Buildings 861, 825, and F, would be partially renovated to accommodate relocated tenants from existing buildings within the project area and administrative functions for Navy V-22 wing staff. The renovations, which would total approximately 21,000 square feet, would include cosmetic repairs and facility system upgrades (e.g., mechanical, electrical, wet utilities). The façade of Building F is historic and is protected from

alteration. No alterations of the exterior would occur. There would be no construction outside the buildings; therefore, the renovations would not result in environmental impacts or effects to historic properties. Details of the building renovations are not addressed further in the EA.

Table 2.3-7 summarizes the facilities proposed under Alternative 2.

Table 2.3-7: Facility Summary under Alternative 2

	NAS North Island	***NS Norfolk***
Navy V-22 Squadrons	1 Navy V-22 Fleet squadron	1 Navy V-22 Fleet squadron and 1 Navy V-22 training squadron
Facility Construction/Renovation (square feet)	102,200	96,100
Pavement Renovation/Expansion Area (acres)	24	36
New Impervious Surface (acres)	0	2.4
Construction Costs for Hangar and Site Work	$95.55 million	$48.77 million
FTD/CFTD Cost	$10.00 million	$20 million
TOTAL CONSTRUCTION COSTS	**$105.55 million**	**$68.77 million**

2.3.3.3 Personnel Requirements under Alternative 2

Under Alternative 2, C-2A personnel would transition to Navy V-22, and there would be an increase in personnel at NAS North Island and NS Norfolk. **Table 2.3-8** summarizes the change in personnel proposed under Alternative 2 at the end state. As with the aircraft transition, the change in personnel would occur over several years and during the transition there would be a blend of C-2A and Navy V-22 personnel at the home base.

Table 2.3-8: Change in Personnel at NAS North Island and NS Norfolk under Alternative 2

	NAS North Island		***NS Norfolk***	
	No Action Alternative	***Alternative 2***	***No Action Alternative***	***Alternative 2***
	C-2A	***Navy V-22***	***C-2A***	***Navy V-22***
TOTAL PERSONNEL	**390**	**551**	**581**	**635**
Change from No Action Alternative	N/A	+161	N/A	+54

Note: N/A = not applicable

Under Alternative 2, there would be an increase of 161 personnel at NAS North Island when compared to the No Action Alternative, and NS Norfolk would experience an increase of 54 personnel. It is assumed that each of these new personnel is accompanied by an average of 1.2 family members (DoD, 2014). Therefore, up to 354 people would relocate to the base, neighborhoods, and communities near NAS North Island and 119 people would relocate to the base, neighborhoods, and communities near NS Norfolk.

Included within the personnel count shown in **Table 2.3-9**, are maintenance personnel associated with the Proposed Action. Intermediate-level maintenance would be conducted at NAS North Island and NS Norfolk. Under Alternative 2, intermediate-level maintenance at NAS North Island would be staffed by 35 enlisted personnel; while maintenance at NS Norfolk would be staffed by 28 enlisted personnel.

2.3.3.4 Aircraft Operations under Alternative 2

Under Alternative 2, Navy V-22 training requirements and methods for fleet squadron, replacement, and maintenance personnel are expected to generally resemble those of the legacy systems with few exceptions. Alternative 2 operations would include deck landing qualification/vertical replenishment practice, and night vision goggle-practice.

Table 2.3-9 provides the number of estimated annual operations at each home airfield. The Navy anticipates a total of approximately 10,300 annual airfield operations by Navy V-22 aircraft at NAS North Island under Alternative 2, which represents an increase of 5,800 operations from No Action Alternative C-2A operations. Total aircraft operations at NAS North Island would increase from 79,800 to 85,600, a 7 percent increase. This level of operations at NAS North Island is consistent with recent historical operations, which were 138,000 in 2002; 95,000 in 2004; and 102,000 in 2010; and would not represent a significant operational change (NBC, 2011; Appendix B [Noise Analysis]). Additionally, the Navy anticipates a total of approximately 12,700 annual airfield operations at NS Norfolk, which represents an increase of 5,700 operations from No Action Alternative C-2A operations. Additional details on flight operations are contained in **Appendix B**.

Table 2.3-9: Annual Home Airfield Operations for Current C-2A and Proposed Navy V-22 at NAS North Island and NS Norfolk under Alternative 2

	NAS North Island			*NS Norfolk*		
Type of Operation	***No Action Alternative C-2A Operations***	***Alternative 2 Navy V-22 Operations***	***Proposed Change***	***No Action Alternative C-2A Operations***	***Alternative 2 Navy V-22 Operations***	***Proposed Change***
Departures	800	1,700	+900	1,200	1,800	+600
VFR Arrivals	700	1,700	+1,000	900	1,000	+100
IFR Arrivals	100	100	0	300	800	+500
Visual Closed Patterns (Touch-and-Go)	2,600	6,200	+3,600	4,100	8,100	+4,000
Instrument Patterns (GCA)	300	600	+300	500	900	+400
Total Annual Operations (C-2A and Navy V-22)	**4,500**	**10,300**	**+5,800**	**7,000**	**12,700**	**+5,700**
Total Annual Operations (All Aircraft)	**79,800**	**85,600**	**+5,800**	**66,900**	**72,600**	**+5,700**

Notes:
IFR=Instrument Flight Rules; GCA=ground-controlled approach; VFR=Visual Flight Rules
Numbers are rounded to the nearest 100 if number is greater than 100

Navy V-22 flight training at secondary training airfields under Alternative 2 would be the same as described for Alternative 1, except that approximately 7,500 annual operations would be distributed across six West Coast airfields in the vicinity of NAS North Island, and approximately 9,600 annual operations would be distributed across six East Coast airfields in the vicinity of NS Norfolk.

As shown in **Table 2.3-10**, on the West Coast, a maximum of 80 percent (up to approximately 6,000) of the operations could occur at either NAF El Centro, MCAS Miramar, or MCAS Camp Pendleton; and a maximum of 20 percent (up to approximately 1,500) could occur at NALF San Clemente, MCOLF Camp Pendleton, or MCAS Yuma. On the East Coast under Alternative 2, a maximum of 80 percent (up to approximately 7,700) of the operations could occur at NALF Fentress, Felker AAF, or MCAS New River; and 20 percent (up to approximately 1,900) could occur at Blackstone AAF, MCOLF Bogue, or MCOLF Oak Grove.

As described under Alternative 1, while the Navy anticipates that total Navy V-22 flight operations would be distributed among the six West Coast and East Coast airfields to meet training requirements, Alternative 2 also assumes there is some potential for the maximum number of Navy V-22 secondary airfield operations to occur in any year at one location, up to the stated maximum of 80 percent at one of three secondary airfields and 20 percent at one of the remaining secondary airfields. For example, up to approximately 6,000 airfield operations may occur in any given year at any of the following: NAF El Centro, MCAS Miramar, or MCAS Camp Pendleton; and up to approximately 1,500 operations could occur at either NOLF San Clemente, MCOLF Camp Pendleton, or MCAS Yuma.

Proposed Navy V-22 use of airspace and secondary training airfields, even in the unlikely scenario that the maximum annual operations would be conducted at any one of the airfields, would represent a small percentage of existing operations in airspace and at the airfields. The percentage increases provided in **Table 2.3-10** represent the percent of total existing operations for all aircraft occurring at the airfields.

It is anticipated that the six airfields listed in **Table 2.3-10** would accommodate most of the required Navy V-22 training operations. However, some Navy V-22 operations may occur at other airfields not listed where such airfields already accommodate periodic V-22 or C-2A flight operations (refer to **Table 2.1-3** notes on other airfields).

Proposed annual operations at the airspace and airfield environments under Alternative 2 would be similar to existing operations and would represent a small percentage of the operations at these secondary airfields that have already been analyzed in other NEPA documents listed in **Section 1.6** (Key Documents). Total existing annual operations previously analyzed at the three east coast and three west coast secondary airfields listed in **Table 2.3-5** where 80 percent of operations would occur range from 66,000 at NAF El Centro to 146,000 at MCAS Miramar. Most of these six secondary airfields typically support over 100,000 operations each year. The changes in airfield operations indicated in **Table 2.3-10** range from 1 to 11 percent of the total existing airfield operations.

Proposed Alternative 2 environmental effects at the secondary airfields would be expected to be negligible, as described under Alternative 1, and would not be significant.

Table 2.3-10: Secondary Training Airfield Proposed Operations under Alternative 2

Training Airfield	*Maximum Total Estimated Annual Navy V-22 Secondary Airfield Operations[1]*	*Maximum Increase in Overall Annual Airfield Operations (All Aircraft)[2]*	*Percent Distribution (Day/Evening/Night – CA) (Day/Night – AZ, VA, NC)*
NAS North Island Vicinity			
NAF El Centro, CA MCAS Miramar, CA MCAS Camp Pendleton, CA	Up to 6,000 (80%) distributed across any of the three airfields	4 – 9 percent	75/15/10
NALF San Clemente, CA MCOLF Camp Pendleton, CA[3], MCAS Yuma, AZ	Up to 1,500 (20%) distributed across any of the three airfields	1 – 5 percent	75/15/10 90/10 (MCAS Yuma, AZ)
Total West Coast Secondary Airfield Operations	7,500	--	--
NS Norfolk Vicinity			
NALF Fentress, VA Felker AAF, VA MCAS New River, NC	Up to 7,700 (80%) distributed across any of the three airfields	6 – 8 percent	90/10
Blackstone AAF, VA MCOLF Oak Grove, NC MCOLF Bogue, NC	Up to 1,900 (20%) distributed across any of the three airfields	6 – 11 percent	90/10
Total East Coast Secondary Airfield Operations	9,600	--	--

Notes:
AAF=Army Airfield; AZ=Arizona; CA=California; MCAS=Marine Corps Air Station; MCOLF=Marine Corps Outlying Field; NAF=Naval Auxiliary Field; NALF=Naval Auxiliary Landing Field; NC=North Carolina; VA=Virginia
Day/Evening/Night operating hours observed in California = day (7:00 a.m.-6:59 p.m.), evening (7:00 p.m.-9:59 p.m.), night (10:00 p.m. to 6:59 a.m.)
Day/Night operating hours observed in Virginia = day (7:00 a.m.-9:59 p.m.), night (10:00 p.m.-6:59 a.m.)
[1] Total of approximately 7,500 annual operations distributed across six airfields in the vicinity of NAS North Island, and a total approximately of 9,600 distributed across six airfields in the vicinity of NS Norfolk.
[2]Percent of total existing operations of all aircraft occurring at the airfield. Total existing annual operations at the 3 east coast and 3 west coast secondary airfields where 80% of operations would occur range from 66,000 at NAF El Centro to 146,000 at MCAS Miramar, and most of these airfields support over 100,000 operations each year.
[3] Existing operations data not available for MCOLF Camp Pendleton; percentage of overall Camp Pendleton operations would be less than 1 percent.

2.4 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR DETAILED ANALYSIS

The following alternatives were considered, but not carried forward for detailed analysis in this EA as they did not meet the purpose and need for the project and satisfy the considerations presented in **Section 2.2** (Development of Range of Action Alternatives).

2.4.1 NEW FLEET LOGISTICS SUPPORT SQUADRON HOME BASES

New home basing alternatives were excluded from further consideration. Placing fleet logistics support aircraft in locations where there is no fleet logistic center essentially defeats the purpose of the mission since the mission of the fleet support aircraft is to move supplies that originate from the fleet logistics centers. Placing the aircraft at other locations would necessitate the creation of additional fleet logistic centers, but this would be logistically challenging since the fleet logistic centers must be located with the fleet they service. For this reason, the existing fleet logistic centers are located at NAS North Island and NS Norfolk, the main Navy fleet bases. In addition, such an alternative would require unnecessary investment in shore infrastructure to duplicate what already exists.

VRC-30 is currently located at NAS North Island and VRC-40 is currently located at NS Norfolk and would continue to be based there. Colocating the logistics support squadrons with fleet logistics support centers at NAS North Island and NS Norfolk enhances maintenance and support infrastructure; offers operational synergy (i.e., efficiency and collaboration) through proximity to support facilities, command staff, and other personnel; improves the ability to deploy forces quickly and efficiently; and enables the rapid transfer of time critical items to and from the carrier strike group at sea in the primary fleet operating areas (Virginia Capes Operating Area and Southern California Operating Area). Relocating the logistics support squadrons, including a training squadron component, to any other base or air station would increase operational risks associated with the ability to meet training requirements and deployment schedules, would reduce operational synergies within the logistics support community, and would significantly increase the life-cycle costs of the Proposed Action. If the logistics support squadrons were located elsewhere, they would still have to fly to NAS North Island and NS Norfolk to obtain cargo from the fleet logistics centers and support the principle tenant commands and ships homeported there. Therefore, an alternate location would not meet the purpose and need of the Proposed Action. In addition, such an alternative would increase environmental impacts as it would require the creation of new support facilities and logistic centers that already exist at NAS North Island and NS Norfolk and would increase the transit time of aircraft, which increases fuel usage and the emission of greenhouse gases.

2.4.2 SINGLE SITING OF NAVY V-22 SQUADRONS

The Navy continuously evaluates home basing plans for all squadrons to ensure that strategic planning keeps pace with global events. While single siting some smaller type/model/series communities at one location may provide logistic and training efficiencies, such as the EA-18G community, doing so with the Navy V-22 squadrons should be avoided due to the persistence in carrier on-board delivery requirements on each coast and the inefficiency of frequent transcontinental flights. Carrier on-board delivery demands are increasing on the West Coast of the United States as the DoD presses forward with the rebalance to the Asia-Pacific region. However, across the Atlantic Ocean, the DoD remains steadfast in its commitment to its North Atlantic Treaty Organization allies. The North Atlantic Treaty Organization "provides vital collective security guarantees and is strategically important for deterring conflict." The DoD continues to support its North Atlantic Treaty Organization partners to increase their interoperability with U.S. forces and provide for their own defense. Atlantic forces also routinely deploy into the U.S. 5th Fleet area of operation in the Arabian Gulf, Red Sea, Gulf of Oman, and parts of the Indian Ocean.

Carrier on-board delivery requirements persist on each coast in support of rapid response to international events in Atlantic, Mediterranean, Persian Gulf, and Pacific theaters. Single siting of Navy

V-22 squadrons would diminish rapid response capabilities in a particular theater and would not meet the purpose and need of the Proposed Action.

2.4.3 Establishment of a Training Squadron and Maintenance School at Both West and East Coast Locations

Over the past 20 years, naval aviation has achieved efficiencies in manpower, training, and logistics through consolidation of assets by type/model/series. Consolidating the training squadron and maintenance school leverages existing facilities, organizations, and manpower thereby improving the efficiency of operations and optimizing costs. Home basing the training squadron and maintenance school at more than one installation would require duplication of manpower, training, and logistics resources, consequently increasing annual, recurring costs (i.e., manpower and supply) and one-time investments (i.e., construction and procurement of equipment and pilot training simulators). In the interest of reducing the Navy's total ownership costs, and compliance with policy directives to reduce installation footprint, and to strive for zero manpower growth, the Navy eliminated consideration of multiple-site/split-site alternatives for the training squadron and maintenance school.

2.4.4 Establishment of a Training Squadron and Maintenance School at Neither West nor East Coast Location

As noted earlier, initially Navy V-22 pilots and enlisted aircrews will attend the existing U.S. Marine Corps MV-22B FRS (training squadron) (i.e., VMMT-204) and Navy maintenance personnel will attend the Center for Naval Aviation Technical Training (maintenance school) at MCAS New River, NC for V-22 specific initial training. The Navy considered as an alternative to the Proposed Action to permanently retain initial Navy V-22 pilot, aircrews, and maintenance training at MCAS New River and, therefore, not establish a Navy-unique training squadron and maintenance school at either the West Coast or East Coast logistics support centers (NAS North Island and NS Norfolk, respectively). Although this alternative was considered (and recent MCAS New River NEPA documentation has accounted for additional aircraft capacity to support such a scenario), this alternative is not reasonable and was not carried forward for detailed analysis.

MCAS New River is not a reasonable alternative because it is not a fleet logistics center. Initially, the Navy will leverage available capacity at the Marine Corps MV-22B FRS. However, as the Navy V-22 community grows, it will exceed that available capacity warranting establishment of a stand-alone Navy V-22 training squadron. The Navy believes that the most reasonable and efficient scenario is to develop a Navy-unique training squadron and maintenance school at an existing fleet logistics support center. The Navy's CMV-22B variant has unique characteristics not found on the Marine Corps MV-22B and the Navy on-board delivery mission and other supporting training is different from the established Marine Corps MV-22B training. A Navy-unique training squadron and maintenance school would best train pilots, aircrews and maintenance personnel in these unique airframe and training aspects. Moreover and similar to the statements made in **Section 2.4.3** (Establishment of a Training Squadron and Maintenance School at Both West and East Coast Locations), consolidating the Navy V-22 training squadron and maintenance school with Navy V-22 fleet squadrons (as opposed to retaining them at MCAS New River) leverages existing facilities, organizations, and manpower thereby improving the efficiency of operations and optimizing costs.

3 WEST COAST FLEET LOGISTICS CENTER AFFECTED ENVIRONMENT

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives.

All potentially relevant environmental resource areas were initially considered for analysis in this Environmental Assessment (EA). In compliance with the National Environmental Protection Act (NEPA), Council on Environmental Quality (CEQ), and 32 Code of Federal Regulations (CFR) part 775 guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. This section includes airfields and airspace, noise, safety, air quality, transportation, biological resources, water resources, infrastructure, cultural resources, hazardous materials and waste, and socioeconomics.

The potential impacts to the following resource areas are considered to be negligible or non-existent (refer to **Section 1.5** [Scope of Environmental Analysis]), so they were not analyzed in detail in this EA: land use compatibility, community/emergency services, parks, recreation, geological resources, and visual resources.

3.1 AIRFIELDS AND AIRSPACE

This discussion of airspace includes current uses and controls of the airspace. The Federal Aviation Administration (FAA) manages all airspace within the United States and its territories. Airspace, which is defined in vertical and horizontal dimensions and by time, is considered a finite resource that must be managed for the benefit of all aviation sectors, including commercial, general, and military aviation (FAA, 2017a).

This section describes the existing airfield operations at Naval Air Station (NAS) North Island and airspace in which the Navy V-22 would operate in the vicinity of their home base location.

3.1.1 REGULATORY SETTING

Specific aviation and airspace management procedures and policies to be used by the Navy are provided by Office of the Chief of Naval Operations Instruction (OPNAVINST) 3710.7V, *Naval Aviation Training and Operating Procedure Standardization General Flight and Operating Instructions* and OPNAVINST 3770.2L, *Airspace Procedures and Planning Manual*. The Navy also follows all FAA procedures and policies found in FAA Order JO 7110.65W, *Air Traffic Control*, and FAA Order JO 7110.10Y, *Flight Services*.

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the United States and its territories. Navigable airspace is considered to be airspace above the minimum altitudes of flight, typically 500 feet or greater, prescribed by regulations under United States Code (U.S.C.) Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the take-off and landing of aircraft (49 U.S.C. § 40102).

Congress has charged the FAA with responsibility for developing plans and policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of the airspace (49 U.S.C. § 40103[b]; FAA Order JO 7400.2L [FAA, 2017b]). The FAA considers multiple and sometimes competing demands for airspace in relation to commercial, general, and military aviation. Specific rules and regulations concerning airspace

designation and management are listed in FAA Order JO 7400.2L (FAA, 2017b). Special Use Airspace (SUA) is airspace of defined dimensions wherein activities must be confined because of their nature or wherein limitations may be imposed upon aircraft operations that are not a part of those activities (FAA, 2017a). The types of SUA areas are prohibited areas, restricted areas, military operations areas (MOAs), warning areas, alert areas, controlled firing areas, and National Security Areas.

SUA relevant to the Proposed Action are defined below.

- **Restricted Area.** Airspace designated to support ground or flight activities that could be hazardous to non-participating aircraft. Entry into restricted areas without approval from the using or controlling agency is prohibited.
- **Military Operations Area.** A MOA is established to separate certain non-hazardous military activities from Instrument Flight Rules (IFR)[3] aircraft traffic and to identify for Visual Flight Rules (VFR) aircraft traffic where military activities are conducted. MOAs exist at altitudes up to, but not including, 18,000 feet mean sea level (MSL). Air Traffic Control Assigned Airspace is an extension of the MOA above 18,000 feet. Civilian VFR traffic is allowed in MOAs, in which case both civilian and military aircraft use "see-and-avoid" procedures. Generally, civilian pilots avoid flying through MOAs because of the likelihood of encountering a fast-moving military jet.
- **Warning Area.** A warning area is airspace of defined dimensions, extending from three nautical miles outward from the coast of the United States, that contains activity that may be hazardous to non-participating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both. (FAA, 2016)

3.1.2 AFFECTED ENVIRONMENT

The affected environment is the airfield at NAS North Island and airspace in which the Navy V-22 would operate. NAS North Island is located in Coronado, a peninsula about two miles southwest of downtown San Diego, California. The airfield at NAS North Island is called Halsey Field. The airfield consists of parking apron space and aircraft hangars, along with a variety of weapons storage facilities, fuel storage areas, and general maintenance/storage warehouses. The airfield elevation is 25 feet MSL and there are taxiways throughout the airfield of varying widths.

Halsey Field consists of two primary runways, Runway 18/36 and Runway 29/11 that intersect at nearly right angles. Runway 18/36 is 8,001 feet long by 200 feet wide; Runway 29/11 is 7,501 feet long by 200 feet wide. Runways are numbered according to their magnetic heading for aircraft on approach or departure. For example, on Runway 18/36, the numbers 18 and 36 signify this runway is most closely aligned with compass headings of 180 and 360 degrees, respectively.

A wide range of aircraft types use NAS North Island and include homebased C-2A, C-12, C-26, C-40, and H-60. The basic flight operations at Halsey Field are departures, straight in/full-stop arrivals, overhead arrivals, touch-and-go operations, low approaches, and ground-controlled approaches. While the airfield could operate 24 hours a day, 7 days a week if necessary, the airfield is normally open for flight operations from 6:30 a.m. Monday through 10:00 p.m. Friday, and 8:00 a.m. to 10:00 p.m. Saturday and Sunday. Current annual C-2A operations at the airfield total approximately 4,500.

[3] The Federal Aviation Regulations define IFR as "rules and regulations established by the FAA to govern flight under conditions in which flight by outside visual reference is not safe."

Under the FAA National Airspace System, the airspace above NAS North Island is designated Class D airspace (**Figure 3.1-1** and **Figure 3.1-2**). The Class D airspace around NAS North Island is that portion of a 4.3-nautical mile circle south of San Diego Class B airspace, centered on Halsey Field and extends up to but does not include 2,800 feet MSL.

Air Traffic Control services to all aircraft operating within the Class D airspace are provided by the NAS North Island Tower, which is responsible for the safe, orderly, and expeditious flow of both civil and military air traffic.

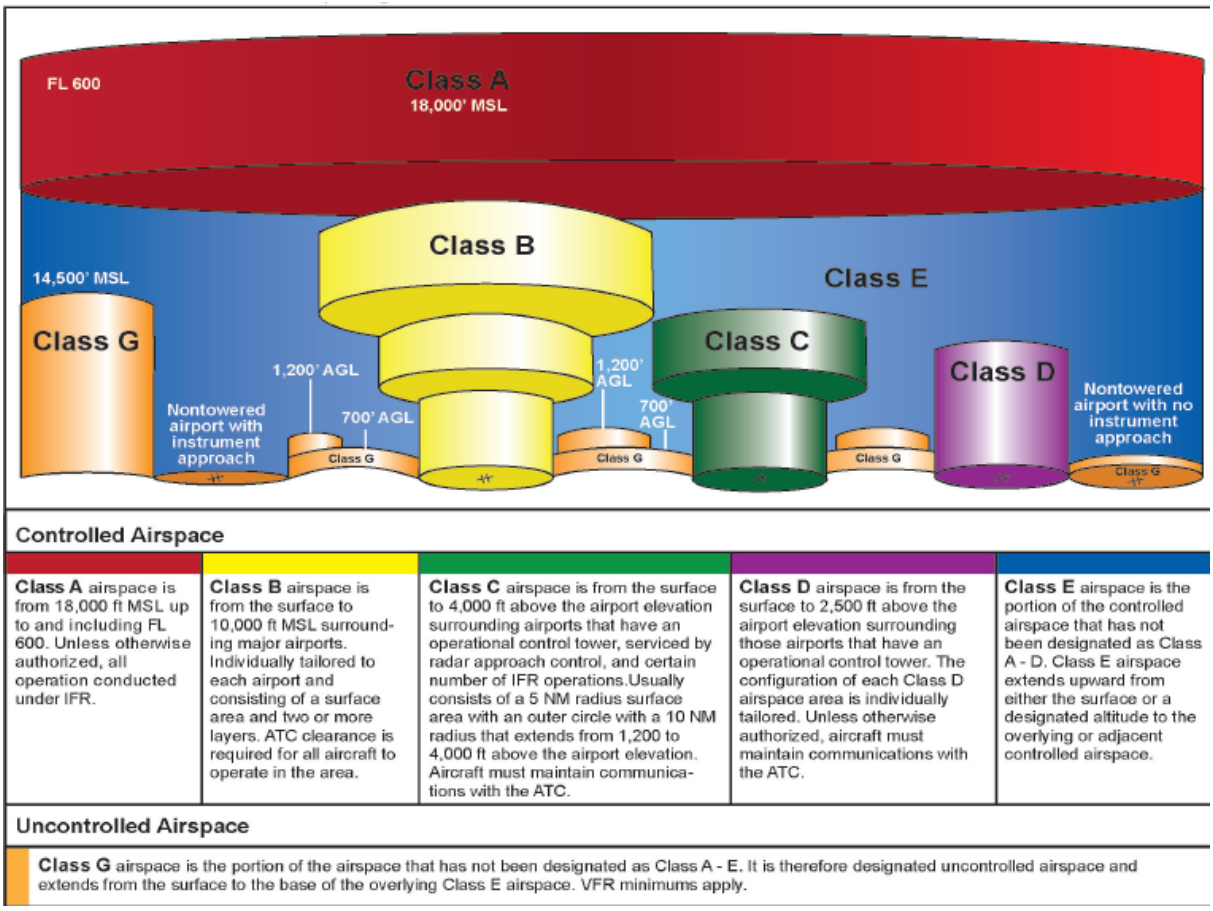


Figure 3.1-1: Schematic Diagram of Airspace Classes

Figure 3.1-2: Aeronautical Chart NAS North Island, Halsey Field

3.2 NOISE

This discussion of noise includes the types or sources of noise and the associated sensitive receptors in the human environment. Noise in relation to biological resources and wildlife species is discussed in **Section 3.6** (Biological Resources).

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

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

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance (see **Appendix B**). The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. While aircraft are not the only sources of noise in an urban or suburban environment, they are readily identified by their noise output and are given special attention in this EA.

3.2.1 BASIC SOUND AND A-WEIGHTED SOUND LEVEL

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The dB is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or hertz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" to the measurement unit in order to identify that the measurement has been made with this filtering process A-weighted sound levels (dBA). In this document, the dB unit refers to dBA. **Table 3.2-1** provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

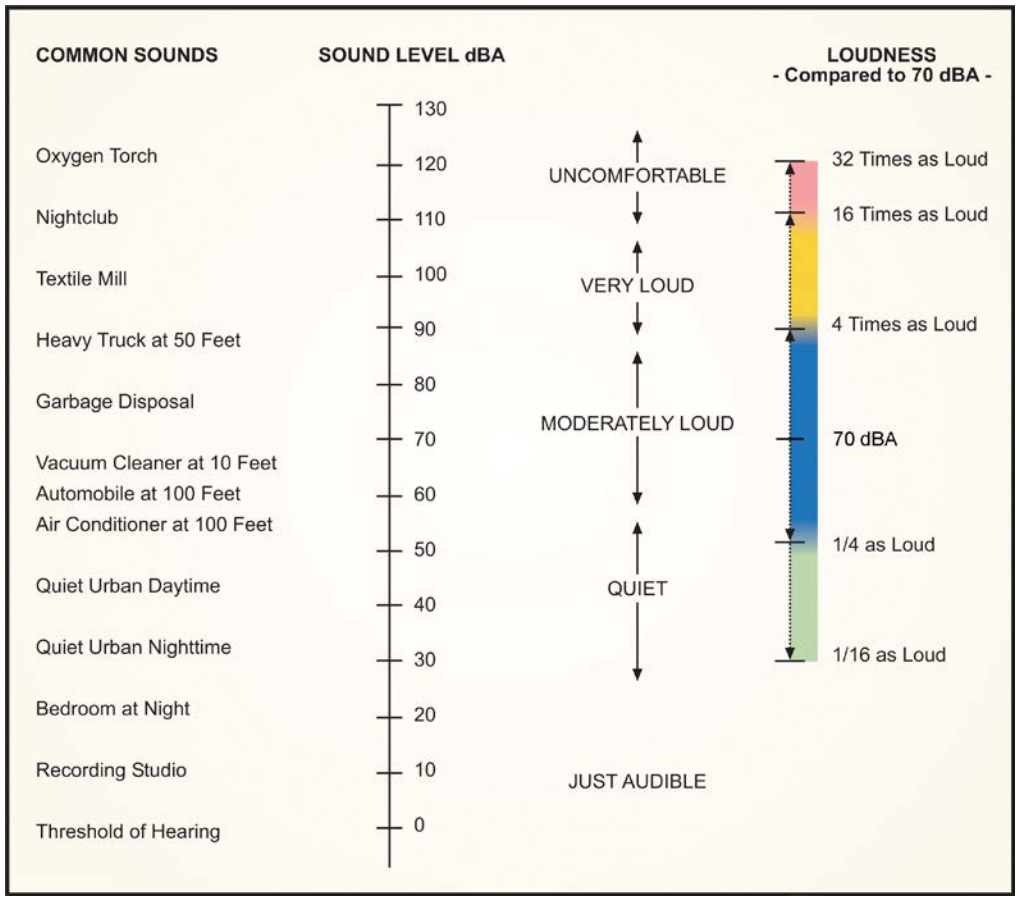
Table 3.2-1: Subjective Responses to Changes in A-Weighted Decibels

Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Figure 3.2-1 provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for

some period of time. Other sources (e.g., automobile, heavy truck) are the maximum sound produced during an event like a vehicle pass-by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

Noise levels from aircraft operations that exceed background noise levels at an airfield typically occur beneath main approach and departure corridors, in local air traffic patterns around the airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft in flight gain altitude, their noise contributions drop to lower levels, often becoming indistinguishable from the background noise.



Sources: Derived from Harris (1979) and Federal Interagency Committee on Aviation Noise (1997).

Figure 3.2-1: A-Weighted Sound Levels from Typical Sources

3.2.2 NOISE METRICS

A metric is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. The noise metrics used in this EA are described in summary format below and in a more detailed manner in **Appendix B**. While the Day-Night Average Sound Level (DNL) and Community Noise Equivalent Level (CNEL) noise metrics are the most commonly used tools for analyzing noise generated at an airfield, the Department of Defense (DoD) has been developing additional metrics (and analysis techniques). These supplemental metrics and analysis tools provide more detailed noise exposure information for the decision process and improve the discussion regarding noise exposure. The DoD Noise Working Group

product, *Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics* (DoD Noise Working Group, 2009) was used to determine the appropriate metrics and analysis tools for this EA.

3.2.2.1 Day-Night Average Sound Level

The DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10-dB adjustment assigned to noise events occurring between 10 p.m. and 7 a.m. (acoustic night). DNL values are average quantities, mathematically representing the continuous sound level that would be present if all of the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy received and is therefore a cumulative measure, but it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour day. DNL is the standard noise metric used by the U.S. Department of Housing and Urban Development, FAA, U.S. Environmental Protection Agency (USEPA), and DoD. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments; there is a consistent relationship between DNL and the level of annoyance. Most people are exposed to sound levels of 50 to 55 DNL or higher on a daily basis.

Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Urban Noise, 1980). Therefore, the 65 dB DNL noise contour is used to help determine compatibility of military aircraft operations with local land use, particularly for land use associated with airfields.

3.2.2.2 Community Noise Equivalent Level

CNEL is a noise metric adopted as a standard by the state of California. The CNEL metric is similar to the DNL metric and is also an energy-averaged sound level measurement. DNL and CNEL provide average noise levels taking into consideration and applying penalties for annoyance from intrusive events that occur during evening and nighttime hours. Both DNL and CNEL are measures of cumulative noise exposure over a 24-hour period, with adjustments to reflect the added intrusiveness of noise during certain times of the day. However, while DNL considers one adjustment period, CNEL reflects two adjustment periods. DNL includes a single adjustment period for night, in which each aircraft noise event at night (defined as 10 p.m. to 7 a.m.) is counted 10 times. CNEL adds a second adjustment period where each aircraft noise event in the evening (defined as 7 p.m. to 10 p.m.) is counted three times. The nighttime adjustment is equivalent to increasing the noise levels during that time interval by 10 dB. Similarly, the evening adjustment increases the noise levels by approximately 5 dB.

3.2.2.3 Sound Exposure Level

The Sound Exposure Level (SEL) metric is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of total sound energy of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL captures the total sound energy from the beginning of the acoustic event to the point when the receiver no longer hears the sound. It then condenses that energy into a 1-second period of time and the metric represents the total sound exposure received. The SEL has proven to be a good metric to compare the relative exposure of transient sounds, such as aircraft overflights, and is the recommended metric for

sleep disturbance analysis (DoD Noise Working Group, 2009). In this EA, SEL is used in aircraft comparison and sleep disturbance analyses.

3.2.2.4 Maximum Sound Level

The highest A-weighted sound level measured during a single event where the sound level changes value with time (e.g., an aircraft overflight) is called the maximum A-weighted sound level (L_{max}). During an aircraft overflight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. L_{max} defines the maximum sound level occurring for a fraction of a second. For aircraft noise, the "fraction of a second" over which the maximum level is defined is generally 1/8 second (American National Standards Institute, 2005). For sound from aircraft overflights, the SEL is usually greater than the L_{max} because an individual overflight takes seconds and the L_{max} occurs instantaneously. In this EA, L_{max} is used in the analysis of aircraft comparison and speech interference.

3.2.3 NOISE EFFECTS

An extensive amount of research has been conducted regarding noise effects including annoyance, speech interference, sleep disturbance, noise-induced hearing impairment, nonauditory health effects, performance effects, noise effects on children, effects on domestic animals and wildlife, property values, structures, terrain, and archaeological sites. These effects are summarized below. Environmental health and safety risks to children are also addressed in **Section 3.3** (Public Health and Safety).

3.2.3.1 Annoyance

As previously noted, the primary effect of aircraft noise on exposed communities is long-term annoyance, defined by USEPA as any negative subjective reaction on the part of an individual or group. The scientific community has adopted the use of long-term annoyance as a primary indicator of community response and there is a consistent relationship between DNL/CNEL and the level of community annoyance (Federal Interagency Committee on Noise, 1992).

DoD policy directive requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to DNL/CNEL greater than or equal to 80 dB (DoD, 2009). Because the Proposed Action would not expose population to DNL/CNEL greater than or equal to 80 dB (refer to **Section 4.2** Noise), potential hearing loss is not analyzed in this EA.

3.2.3.2 Sleep Disturbance

The disturbance of sleep is a major concern for communities exposed to nighttime aircraft noise. In this EA, sleep disturbance uses the SEL noise metric and calculates the probability of awakening from single aircraft overflights. These are based upon the particular type of aircraft, flight profile, power setting, speed, and altitude relative to the receptor. The results are then presented as a percent probability of people awakening (USEPA, 1974).

3.2.3.3 Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 dBA as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss. Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document in 1998, which reaffirmed the 85 dB recommended exposure limit (National Institute for Occupational Health and Safety, 1998).

3.2.3.4 Vibration

Noise-induced structural vibration may cause annoyance to occupants because of induced secondary vibrations, or "rattle", of objects within the building. In general, rattling occurs at peak unweighted sound levels that last for several seconds at levels above 110 dB, which is well above that considered normally compatible with residential land use. Thus, assessments of noise exposure levels for compatible land use will also be protective of noise-induced rattle. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (Wyle, 2014).

3.2.4 NONAUDITORY HEALTH EFFECTS

Studies have been conducted to examine the nonauditory health effects of aircraft noise exposure, focusing primarily on stress response, blood pressure, birth weight, mortality rates, and cardiovascular health. Exposure to noise levels higher than those normally produced by aircraft in the community can elevate blood pressure and also stress hormone levels. However, the response to such loud noise is typically short in duration: after the noise goes away, the physiological effects reverse and levels return to normal. In the case of repeated exposure to aircraft noise, the connection is not as clear. The results of most cited studies are inconclusive, and it cannot be conclusively stated that a causal link exists between aircraft noise exposure and the various type of nonauditory health effects that were studied (DoD Noise Working Group, 2009).

3.2.4.1 Noise Effects on Children

A review of the scientific literature indicated that there has not been a tremendous amount of research in the area of aircraft noise effects on children. The research reviewed does suggest that environments with sustained high background noise can have variable effects, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of schoolchildren. Physiological effects in children exposed to aircraft noise and the potential for health effects have been the focus of limited investigation (DoD Noise Working Group, 2009).

3.2.5 NOISE MODELING

Computer modeling provides a tool to assess potential noise impacts. DNL/CNEL noise contours are generated by a computer model that draws from a library of actual aircraft noise measurements. Noise contours produced by the model allow a comparison of existing conditions and proposed changes or alternative actions, even when the aircraft studied are not currently operating from the installation. For these reasons, on-site noise monitoring is seldom used at military air installations, especially when the aircraft mix and operational tempo are not uniform. The Proposed Action would occur in California and Virginia; therefore, both CNEL and DNL standards are used for noise calculations in this EA.

The noise environment for this EA was modeled using NOISEMAP. NOISEMAP analyzes all the operational data (types of aircraft, number of operations, flight tracks, altitude, speed of aircraft, engine power settings, and engine maintenance run-ups), environmental data (average humidity and temperature), and surface hardness and terrain. The noise model assumes a mix of aircraft operating in both airplane mode (rotors horizontal) and conversion mode (rotors vertical), as discussed in **Section 2.1.4** (Aircraft Operations). For the noise analysis at NAS North Island, the results of the modeling are

CNEL noise contours, or lines connecting points of equal value, usually in 5-dB increments (for example [e.g.], 65 dB CNEL and 70 dB CNEL). The modeled CNEL contours are depicted on noise contour maps, which provide a visual depiction of the overall geographic area covered by the different levels of noise. The CNEL noise contour ranges used in this analysis include the following:

- 65 to less than 70 dB CNEL
- 70 to less than 75 dB CNEL
- Greater than or equal to 75 dB CNEL

A newer model, called the Advanced Acoustic Model, has not yet been approved for use by the DoD. Per Chief of Naval Operations Instruction (OPNAVINST) 11010.36C, *Air Installations Compatible Use Zones (AICUZ) Program,* NOISEMAP is to be used for developing noise contours and is the best noise modeling science available today for fixed-wing aircraft until the Advanced Acoustic Model is approved.

3.2.6 REGULATORY SETTING

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

The joint instruction, OPNAVINST 11010.36C and Marine Corps Order 11010.16, provides guidance administering the AICUZ Program which recommends land uses that are compatible with aircraft noise levels.

3.2.7 AFFECTED ENVIRONMENT

The affected environment is the area surrounding NAS North Island that experiences noise exposure of 65 dB or greater and any sensitive receptors in proximity to proposed construction. Many components may generate noise and warrant analysis as contributors to the total noise impact. The predominant noise sources consist of aircraft operations, both at and around the airfields, as well as in the airspace and on ranges. Other components such as construction, aircraft ground support equipment for maintenance purposes, and vehicle traffic produce noise, but such noise generally represents a transitory and negligible contribution to the average noise level environment. The federal government supports conditions free from noise that threaten human health and welfare and the environment. Response to noise varies, depending on the type and characteristics of the noise, distance between the noise source and whoever hears it (the receptor), receptor sensitivity, and time of day. A noise sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors may also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species. The nearest sensitive receptors are approximately 1 to 2 miles from the project site in the City of Coronado, adjacent to NAS North Island, and Point Loma, across San Diego Bay. Potentially noise-sensitive wildlife species are discussed in **Section 3.6 (**Biological Resources).

The principal on-site sources of noise at NAS North Island are typical of Navy installations and include aircraft operations, truck and automobile traffic, and operations involving ship-loading cranes, diesel-

powered equipment, and compressors. The San Diego International Airport is located 2.7 miles north of the NAS North Island airfield. Noise from military and civilian aircraft is audible in neighborhoods surrounding the base. A variety of other on-base activities and traffic are also audible.

Previous studies conducted at noise receptor areas surrounding NAS North Island have shown that noise levels in these areas were dominated by vehicle traffic along nearby roads rather than any noise generated on the base. The measured existing peak noise levels at the residences along main traffic routes range from 66 dBA to 78 dBA. These peak noise levels are considered typical for areas ranging from a busy daytime urban area to a typical commercial area (Navy, 2011a). In addition, measurements conducted during a previous project reported nighttime maximum ambient noise levels at the property boundary with the City of Coronado of 61.5, 60.2, and 59.9 dBA. Similar studies conducted near NAS North Island have also reported outdoor CNEL levels of 55 to 70 dBA at different locations within the City of Coronado (Navy, 2011a).

3.2.7.1 Air Installations Compatible Use Zones Program

NAS North Island has an active AICUZ Program that informs the public and local government about its aircraft noise environment and recommends specific actions for the local jurisdictions with planning and zoning authority that can enhance the health, safety, and welfare of those living near NAS North Island. The current version of the AICUZ for NAS North Island was published in the 2011 AICUZ Study Update for NAS North Island and Naval Outlying Landing Field Imperial Beach (Naval Base Coronado [NBC], 2011). The AICUZ area covers NAS North Island, a portion of the City of Coronado, and two small areas along the waterfront of Point Loma.

Three noise zones are identified in the AICUZ Study Update (NBC, 2011) as follows:

- Noise Zone 1: areas exposed to noise levels less than 65 CNEL
- Noise Zone 2: areas exposed to noise levels of 65 to 75 CNEL
- Noise Zone 3: areas exposed to noise levels greater than 75 CNEL

OPNAVINST 11010.36C provides compatible land use recommendations for land uses within the noise contours and Accident Potential Zones (APZs) (NBC, 2011). APZs are discussed in **Section 3.3** (Public Health and Safety). In general, the greatest potential for incompatible land use in the noise contours is residential development and other noise sensitive land uses, such as churches and schools. The Navy recommends such land uses be prohibited within Noise Zone 3 and discouraged within Noise Zone 2.

3.2.7.2 Noise Abatement Procedures

Noise abatement procedures for assigned and transient aircrews have been voluntarily developed by the Navy for NAS North Island and Naval Outlying Landing Field Imperial Beach. The installation has collaborated with the surrounding communities, especially the City of Coronado, in developing airfield operations procedures to reduce noise associated with aircraft while executing the mission and maintaining flight safety.

Noise abatement procedures are published in NBC Instruction 3710.7V, Air Operations Manual for NAS North Island and Naval Outlying Landing Field Imperial Beach, January 7, 2013, as well as in DoD Flight Information Publication Area Planning, North and South America (DoD 2017). This wide dissemination assists pilots of aircraft not normally assigned to the NAS North Island in understanding and complying with procedures.

During noise abatement hours (10:00 p.m. to 7:00 a.m. Monday through Friday and 6:00 pm Friday through 7:00 a.m. Monday), fixed-wing aircraft normally land on Runway 36 and depart on Runway 18, normally making full stop landings.

Aircraft will not normally fly over the following areas below 2,500 feet altitude: City of Coronado, Point Loma, Coronado Cays (6.5 nautical miles southeast of NAS North Island on Silver Strand), Coronado Shores Condominiums, and Hotel Del Coronado on Runway 29 final approach.

Engine run-up operations[4] are also normally limited for noise abatement purposes. General instructions require run-ups to be accomplished during periods of highest daily activity to use ambient noise to mask the operation and to minimize the number and duration of operations (NBC, 2011).

3.2.8 AIRCRAFT NOISE

For this EA, baseline conditions for aircraft operations take into account the last six full years (2010 through 2015) of air traffic control reports for NAS North Island. The baseline aircraft operations numbers were derived from taking the average of the operations over this six-year period. This allows a more accurate picture of current, ongoing operations at NAS North Island. Operations vary from year to year due to global events. Some individual years are higher than the average, and some are lower than the average. **Table 3.2-2** shows the summary breakdown of baseline conditions for total aircraft operations, general type of operations, as well as the day/evening/night breakdown of operations at NAS North Island. For a more in-depth breakdown of aircraft operations at NAS North Island, see **Appendix B**.

Table 3.2-2: Aircraft Operations under Baseline Conditions[1] at NAS North Island

Operation Type[2]	*Acoustic Day (7:00 a.m. – 7:00 p.m.)*	*Acoustic Evening (7:00 p.m. – 10:00 p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrivals	22,700	7,300	1,300	31,300
Departures	22,700	7,300	1,300	31,300
Patterns	11,900	900	100	13,000
Total	**57,300**	**15,500**	**2,700**	**75,600**

Notes:

[1] Baseline operations numbers are based on an average of six years of operations. As such, some individual years are higher than the average, and some are lower than the average.

[2] An operation is one take-off or one landing; numbers are rounded to the nearest 100.

Under baseline conditions, there are approximately 75,600 annual operations on average at NAS North Island. The majority of the operations occur during the day, with 57,300 total operations (approximately 76 percent), followed by 15,500 evening operations (approximately 20 percent), and 2,700 night operations (approximately 4 percent).

3.2.8.1 Noise Exposure

NAS North Island baseline noise exposure, expressed in CNEL noise contours, was calculated using NoiseMap 7.2 and plotted in 5-dB increments from 65 dB CNEL to 85 dB CNEL; the noise contours are shown on **Figure 3.2-2**. Most of the noise area exposed to 65 CNEL and greater occurs on-base at NAS North Island, or over the water of the Pacific Ocean and San Diego Bay. The 65 dB CNEL contour does

[4] Engine tests during maintenance or prior to flight.

extend southeast, along the coast over the southern portion of Coronado. The 65 dB CNEL contour also extends across the San Diego Bay to the north and west over parts of Shelter Island and Point Loma.

Table 3.2-3 presents total noise exposure in terms of estimated acreage and population under baseline conditions. Population estimates were calculated using census block group data from the 2015 U.S. Census Bureau (USCB) American Community Survey five-year estimates. Geographic Information Systems software was used to determine the area of each census block that was affected by the noise contours shown in **Figure 3.2-2**, and then used to estimate population affected within each block. Noise exposure is calculated by multiplying the total population by the ratio of areas affected by noise. This methodology assumes an evenly distributed population throughout the census block.

Table 3.2-3: Acreage and Estimated Population Impacts under Baseline Conditions

CNEL (dBA)	*Total Acres[1]*	*Off-Base Acres[2]*	*Estimated Population[2,3]*
85 or greater	246	0	0
80 or greater	553	0	0
75 or greater	1,045	59	396
70 or greater	1,566	126	821
65 or greater	2,053	320	2,215

Source: USCB, 2017

Notes:

[1] Acreages exclusive of water bodies.

[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 CNEL or greater" means all acreage and population exposed to CNEL at or greater than 65 dBA and includes the acres/population in the rows above.

[3] Population is based on assumed even distribution of 2015 census block population data.

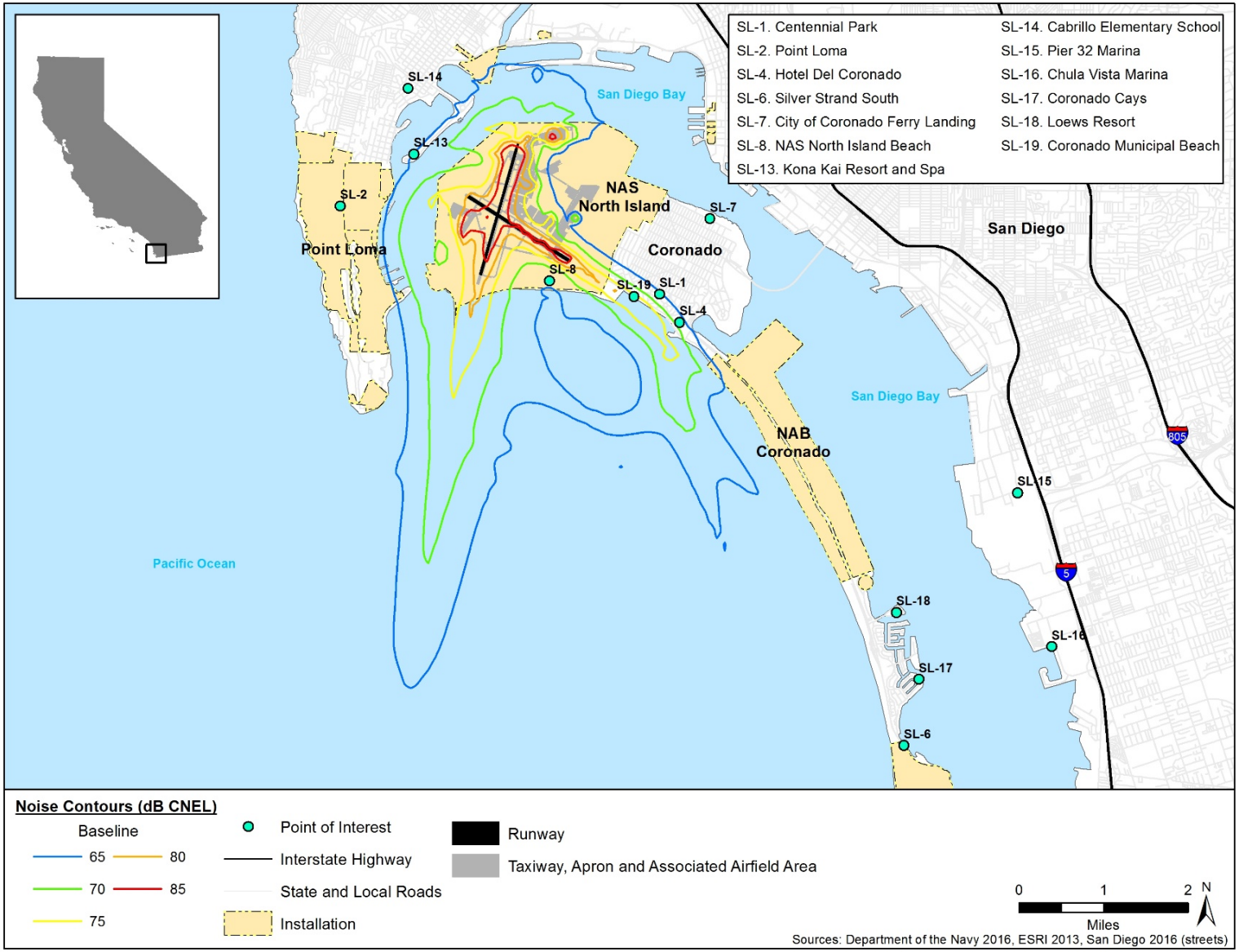


Figure 3.2-2: Baseline Condition CNEL Contours and Point of Interest Locations at NAS North Island

As shown, under baseline conditions, there are no off-base areas impacted by noise of 80 dB CNEL or greater. Only 59 off-base acres are exposed to noise levels greater than 75 dB CNEL, with a corresponding population estimate of 396 people. Under baseline conditions, it is estimated that 320 off-base acres of land and 2,215 people are exposed to levels above 65 dB CNEL.

In addition to the noise exposure analysis described above, several areas were selected as specific points of interest (POIs) around NAS North Island for supplemental noise analysis. Thirteen POIs are depicted in **Figure 3.2-2** and listed in **Table 3.2-4** along with the associated CNEL. These sensitive receptor locations were provided by NAS North Island and have been used in the past for other noise analyses with regard to aircraft operations.

Table 3.2-4: Baseline Conditions CNEL Values at Point of Interest Locations

POI Identification	*POI Name*	*CNEL (dB)*
SL-1	Centennial Park	66
SL-2	Point Loma	56
SL-4	Hotel Del Coronado	67
SL-6	Silver Strand South	58
SL-7	City of Coronado Ferry Landing	52
SL-8	NAS North Island Beach	66
SL-13	Kona Kai Resort and Spa	65
SL-14	Cabrillo Elementary School	56
SL-15	Pier 32 Marina	46
SL-16	Chula Vista Marina	57
SL-17	Coronado Cays	53
SL-18	Loews Resort	53
SL-19	Coronado Municipal Beach	77

Note: CNEL is a representation of average annual noise energy on a daily basis. A measurement or calculation of any single individual day could be higher or lower than the CNEL value.
CNEL=Community Noise Equivalent Level; dB=decibels

Supplemental noise analysis was also performed at three representative locations shown in **Figure 3.2-3** (P1, P2, and P3) on the NAS North Island California least tern management area (also referred to as the MAT site, see **Section 3.6.2** Biological Resources): the center of the area, the northwest edge closest to the proposed hangar and taxiway, and the southwest edge, which has the highest baseline CNEL. According to the noise model, baseline CNEL is 65 dB at P1, 65 dB at P2, and 69 dB at P3. The noisiest events are all produced by aircraft that would not change under the Proposed Action because they are not caused by either the C-2A or the V-22. The following section discusses the loudest aircraft noise events and the number of times these events occur.

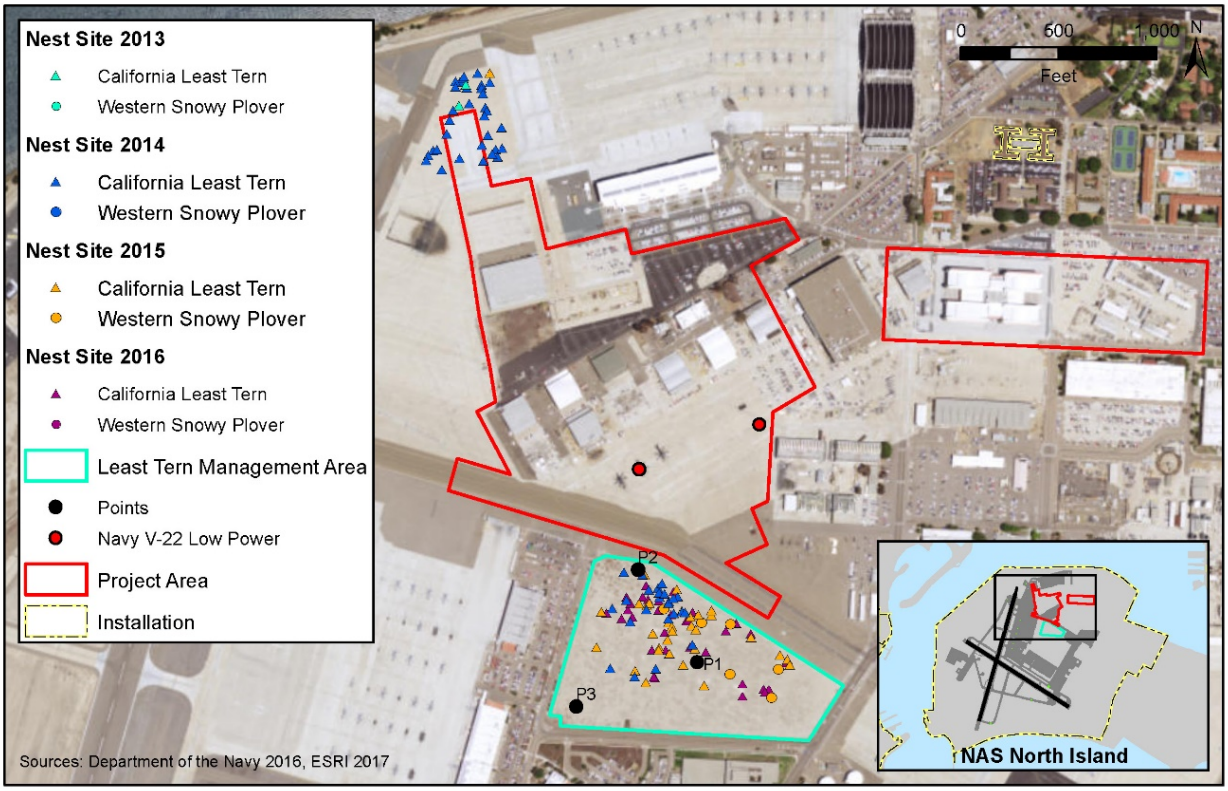


Figure 3.2-3: CNEL Point Analysis Locations on NAS North Island California Least Tern Management Area

3.2.8.2 Maximum Sound Level and Sound Exposure Level

While a cumulative metric such as CNEL is excellent for showing the overall noise environment, it can also be of interest to know how loud the loudest events are at a particular location. To help answer these questions about the loudest events, calculations were made for each of the POIs to find the loudest events at each of them under baseline conditions. **Table 3.2-5** shows, for each POI, the aircraft and profile for the three events producing the highest SEL, and lists the SEL and the L_{max} for each. It also lists the number of daytime and nighttime events per day for each, and the total events per week. It allows for a demonstration that some "loud" events may occur in an area of a lower CNEL. For instance, at SL-4 (Hotel Del Coronado), the point has a CNEL value of 67 dB, and has about five weekly events of F-18 flight operations which have an L_{max} of 108 dB. This shows that even while the overall noise (represented by CNEL) is considered lower, there are some events which would be more noticeable.

Comparison of **Table 3.2-5** with **Figure 3.2-2**, which shows the locations of the POIs, reveals that the loudest events tend to occur closest to the airfield and nearest the flight tracks that align with the runways at NAS North Island.

Table 3.2-5: SEL and L_{max} Values for Baseline Conditions at NAS North Island

POI	*POI Name*	*Baseline CNEL (dBA)*	*Aircraft*	*Profile ID*	*Daily Events*			*Total per Week*	*SEL (dBA)*	*L_{max} (dBA)*
					Day	*Evening*	*Night*			
SL-1	Centennial Park	66	F-18E/F	F18E-5	0.615	0.005	0.003	4.4	110.6	104.5
			F-18E/F	EA18G-5	0.047	0.025	0	0.5	110.6	104.5
			F-18E/F	F18E-8	0.04	0	0	0.3	110.6	104.7
SL-2	Point Loma	56	F-18E/F	F18E-2	0.029	0.002	0	0.2	103.3	93.8
			F-18E/F	EA18G-2	0.027	0.001	0	0.2	103.3	93.8
			F-18A/C	F18C-2	0.005	0	0	0.0	103.2	92.6
SL-4	Hotel Del Coronado	67	F-18E/F	F18E-8	0.04	0	0	0.3	113.2	108.6
			F-18E/F	F18E-5	0.615	0.005	0.003	4.4	112.9	108.2
			F-18E/F	EA18G-5	0.047	0.025	0	0.5	112.9	108.2
SL-6	Silver Strand South	58	C-5A	C5A-8	0.033	0.004	0	0.3	109.7	100.0
			LEARJET-25	LJ25-8	0.387	0	0	2.7	104.4	96.2
			F-18E/F	F18E-9	0.085	0.022	0.01	0.8	104.0	95.1
SL-7	City of Coronado Ferry Landing	52	F-18E/F	F18E-4	0.013	0	0	0.1	110.9	104.3
			F-18A/C	F18C-4	0.002	0	0	0.0	104.3	98.0
			F-35A	F35C-4	0.002	0	0	0.0	104.2	73.4
SL-8	NAS North Island Beach	66	F-18E/F	F18E-2	0.029	0.002	0	0.2	115.6	110.1
			F-18E/F	EA18G-2	0.027	0.001	0	0.2	115.6	110.1
			F-18A/C	F18C-2	0.005	0	0	0.0	115.2	108.5
SL-13	Kona Kai Resort and Spa	65	F-35A	F35C-2	0.005	0	0	0.0	113.5	103.4
			F-18E/F	F18E-2	0.029	0.002	0	0.2	109.1	102.8
			F-18E/F	EA18G-2	0.027	0.001	0	0.2	109.1	102.8
SL-14	Cabrillo Elementary School	56	F-18E/F	F18E-2	0.029	0.002	0	0.2	100.2	91.1
			F-18E/F	EA18G-2	0.027	0.001	0	0.2	100.2	91.1
			F-18A/C	F18C-2	0.005	0	0	0.0	99.7	89.8
SL-15	Pier 32 Marina	46	C-5A	C5A-8	0.033	0.004	0	0.3	94.3	80.7
			F-35A	F35C-9	0.014	0.004	0.001	0.1	89.1	79.7
			F-18E/F	F18E-9	0.085	0.022	0.01	0.8	88.1	75.1
SL-16	Chula Vista Marina	57	C-5A	C5A-8	0.033	0.004	0	0.3	111.5	102.2
			LEARJET-25	LJ25	0.387	0	0	2.7	105.9	98.1
			F-18E/F	F18E-9	0.085	0.022	0.01	0.8	105.7	97.1
SL-17	Coronado Cays	53	C-5A	C5A-8	0.033	0.004	0	0.3	105.0	93.4
			LEARJET-25	LJ25-8	0.387	0	0	2.7	100.3	90.2
			F-18E/F	F18E-9	0.085	0.022	0.01	0.8	99.9	88.9
SL-18	Loews Resort	53	C-5A	C5A-8	0.033	0.004	0	0.3	101.7	85.5
			F-18E/F	F18E-6C	0.145	0.01	0.002	1.1	100.5	94.9
			F-18E/F	EA18G-6C	0.223	0.004	0	1.6	100.5	94.9
			F-18E/F	F18E-6D	0.145	0.01	0.002	1.1	100.5	94.9
			F-18E/F	EA18G-6D	0.223	0.004	0	1.6	100.5	94.9

Table 3.2-5: SEL and L_{max} Values for Baseline Conditions at NAS North Island (cont.)

POI	*POI Name*	*Baseline CNEL (dBA)*	*Aircraft*	*Profile ID*	*Daily Events*			*Total per Week*	*SEL (dBA)*	*L_{max} (dBA)*
					Day	*Evening*	*Night*			
SL-19	Coronado Municipal Beach	77	F-18E/F	F18E-6C	0.145	0.01	0.002	1.1	121.2	117.5
			F-18E/F	EA18G-6C	0.223	0.004	0	1.6	121.2	117.5
			F-18E/F	F18E-6D	0.145	0.01	0.002	1.1	121.2	117.5
			F-18E/F	EA18G-6D	0.223	0.004	0	1.6	121.2	117.5
			F-18E/F	F18E-6A	0.145	0.01	0.002	1.1	121.2	117.5
			F-18E/F	EA18G-6A	0.223	0.004	0	1.6	121.2	117.5
			F-18E/F	F18E-6B	0.145	0.01	0.002	1.1	121.2	117.5
			F-18E/F	EA18G-6B	0.223	0.004	0	1.6	121.2	117.5

***Notes**:*
L_{max} is the loudest sound level experienced for a fraction of a second. This table includes the number of each of these events that would occur in an average day and average week. On a given single day or week, there could be more or fewer of these events, depending on operational tempo, weather, and other factors.
CNEL=Community Noise Equivalent Level; dBA=A-weighted sound level; ID=Identification; L_{max}=Maximum A-weighted sound level; NAS=Naval Air Station; POI=point of interest; SEL=sound exposure level

3.2.8.3 Sleep Disturbance

Sleep disturbance can result from aircraft overflight. The significance of this potential impact can be assessed by determining the probabilities of awakening. To determine the probabilities of awakening, the SELs of the representative aircraft over representative locations are calculated and then used in the equations provided in the ANSI/ASA standard. Indoor probability of awakening uses 15 dB and 25 dB noise attenuation (reduction) from the outdoor noise levels for windows open and closed, respectively. Indoor awakening is used to distinguish average night sleeping from awakenings during the day or outdoor activities (i.e., naps in a hammock or tent camping).

Table 3.2-6 lists the probabilities of awakening because of aircraft overflight at least once in a night between the hours of 10:00 p.m. and 7:00 a.m. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 3 to 4 percent at SL-19, Coronado Municipal Beach, with windows open. Of the 13 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed.

Table 3.2-6: Probability of Awakening at Point of Interest Locations Near NAS North Island

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
SL-1 – Centennial Park	0.08	<1%	<1%
SL-2 – Point Loma	0.05	<1%	<1%
SL-4 – Hotel Del Coronado	0.08	<1%	<1%
SL-6 – Silver Strand South	0.15	<1%	<1%
SL-7 – City of Coronado Ferry Landing	0.02	<1%	<1%
SL-8 – NAS North Island Beach	0.25	<1%	1-2%
SL-13 – Kona Kai Resort and Spa	0.16	<1%	<1%
SL-14 – Cabrillo Elementary School	0.05	<1%	<1%
SL-15 – Pier 32 Marina	0.00	<1%	<1%
SL-16 – Chula Vista Marina	0.08	<1%	<1%
SL-17 – Coronado Cays	0.02	<1%	<1%
SL-18 – Loews Resort	0.04	<1%	<1%
SL-19 – Coronado Municipal Beach	0.89	2-3%	3-4%

Notes:
[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.
[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.
[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.
NAS=Naval Air Station; POI=point of interest

3.3 PUBLIC HEALTH AND SAFETY

Public health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. The primary goal is to identify and prevent potential accidents or impacts on the general public.

A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses public safety during construction, demolition, and renovation activities; and during subsequent operations of those facilities. Various stressors in the environment can adversely affect human health and safety. Identification and control or elimination of these stressors can reduce risks to health and safety to acceptable levels or eliminate risk entirely.

This discussion of public health and safety addresses flight safety, Bird/Animal Aircraft Strike Hazard (BASH), APZs, and environmental health and safety risks to children. The installation-specific program that addresses flight safety concerns is called the AICUZ Program, which recommends land uses that are compatible with noise levels, accident potential, and obstruction clearance criteria for military airfield operations.

3.3.1 REGULATORY SETTING

Aircraft safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with Federal Aviation Regulations Part 91, *General Operating and Flight Rules*, which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. In addition, naval aviators must also adhere to the flight rules, Air Traffic Control, and safety procedures provided in Navy guidance. Specific Navy requirements are outlined in OPNAVINST 3710.7 (series), the Naval Air

Training and Operating Procedures Standardization manual, which provides standard language, communication methods, nomenclature, and flight and operating procedures. This manual also provides processes and procedures that improve combat readiness (through asset-preservation) and achieve a substantial reduction in aircraft mishaps, thereby safeguarding people and resources. Additionally, NAVAIR 00-80T-114, the Naval Air Training and Operating Procedures Standardization Air Traffic Control Manual, provides Navy requirements for air traffic control services to aircraft utilizing military-controlled airspace.

Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to "make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

3.3.2 AFFECTED ENVIRONMENT

The affected environment includes NAS North Island airspace and areas within Clear Zones and APZs for NAS North Island. The following discussions provide a description of the existing conditions for each of the categories under public health and safety resources at NAS North Island.

3.3.2.1 Flight Safety

Navy requirements outlined in OPNAVINST 3500.39C, *Operational Risk Management*, provide a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. The FAA is responsible for ensuring safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. In order to fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. The primary safety concern with regard to military training flights is the potential for aircraft mishaps to occur, which could be caused by mid-air collisions with other aircraft or objects, weather difficulties, mechanical failures, pilot error, or BASH events.

Aircraft mishaps are classified in OPNAVINST 3750.6S as Class A, B, C, or D, with Class A mishaps being the most severe, with total property damage of $2 million or more (threshold was $1 million prior to 2010), total aircraft loss, or a fatality and/or permanent total disability. Combat losses are excluded from these mishap statistics. Class B mishaps are those with total property damage of $500,000 or more, but less than $2 million, or results in permanent partial disability or three or more personnel are hospitalized for in-patient care. Class C mishaps are those with total property damage of $50,000 or more, but less than $500,000, or a non-fatal injury that results in at least one day away from work. Class D is the least severe with total property damage $20,000 or more, but less than $50,000, or a recordable injury or illness occurs. Worldwide, only a small number of mishaps occur in hundreds of thousands of military aircraft operations each year.

NAS North Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The initial response element usually consists of the Fire Chief, who would normally be the first on-scene Commander, fire-fighting and crash-rescue personnel, medical personnel, security police, and crash-recovery personnel. The second phase is the mishap investigation,

which is comprised of an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed.

The Navy places an extremely high priority on safety during training and real-world operations, as well as valuing the safety of its pilots and the surrounding communities. Navy pilots are well-trained, and to complement flight training, all pilots use state-of-the-art simulators extensively. Simulator training includes all facets of flight operations and comprehensive emergency procedures, which minimizes risk associated with mishaps due to pilot error. Additionally, highly trained maintenance crews perform routine inspections on each aircraft in accordance with Navy and Marine Corps regulations, and maintenance activities are monitored by senior technicians to ensure the aircraft are equipped to withstand the rigors of operational and training events safely.

3.3.2.2 Bird/Animal Aircraft Strike Hazard

Potential BASH is another safety concern for aircraft operations. Between 2004 and 2014 the average of strikes at NAS North Island was seven per year (U.S. Department of Agriculture [USDA], 2014). Aircraft strikes of birds or other animals (e.g., bats and deer) are a safety concern because of the potential for damage to aircraft or injury to pilots or local populations if an aircraft crash should occur in a populated area. Aircraft may encounter birds at altitudes of 30,000 feet MSL or higher. However, most reported bird strikes occur at an elevation of less than 1,000 feet. Birds, in particular, are drawn to the open, grassy areas and warm pavement of an airfield. Although most bird and animal strikes do not result in crashes, they may cause structural and mechanical damage to aircraft. Due to the speed of the aircraft, collisions with birds or other animals can happen with considerable force.

BASH plans are developed for military airfields to reduce the potential for collisions between aircraft and birds or other animals. BASH plans account for seasonal migration patterns where risks to aircraft can increase. NAS North Island has an active BASH program. Additionally, to help prevent bird hazards and potential bird strikes at NAS North Island, the Navy entered into a Cooperative Agreement in 1997 with USDA Wildlife Services to effectively manage all wildlife, primarily birds that present a strike hazard to the aircraft operating on the airfield at NAS North Island (NBC, 2014). The primary intent is to reduce, discourage, and/or eliminate the number of birds that nest, roost and/or loaf in areas around the airfields and/or present a strike hazard to aircraft.

3.3.2.3 Accident Potential Zones and Clear Zones

Airfield safety clearances and APZs are established at military airfields under the AICUZ Program. The main goals of the AICUZ Program are to protect the health, safety, and welfare of people living or working near military airfields while preserving the defense flying mission. It achieves these goals by promoting land use compatible with aircraft operations.

Clear Zones and APZs are areas in the vicinity of airfield runways where an aircraft mishap is most likely to occur (if one were to occur). While the likelihood of a mishap is remote, the Navy recommends that the intensity and density of land uses within APZs be minimal or low density to ensure the maximum protection of public health and property. The components of a standard AICUZ study are defined as follows (adapted from OPNAVINST 11010.36C, *Air Installations Compatible Use Zones (AICUZ) Program*):

- **Clear Zone –** extends 3,000 feet immediately beyond the runway and has the highest potential for accidents. A Clear Zone is required for all active runways and should remain undeveloped.

- **APZ-I –** extends 5,000 feet beyond the Clear Zone, with a width of 3,000 feet. An APZ-I area is provided for flight tracks that experience 5,000 or more annual operations (departures or approaches).
- **APZ-II –** extends 7,000 feet beyond APZ-I with a width of 3,000 feet.

Clear Zones and APZs at NAS North Island are shown in **Figure 3.3-1**.

3.3.2.4 Environmental Health and Safety Risks to Children

Health and safety risks to children that have potential to result from the proposed alternatives in this EA may be related to APZs and noise. There are eight schools within one mile of the NAS North Island APZs, Clear Zones, and the proposed facilities site. There are no schools or congregations of children (i.e., schools or playgrounds) within the APZs and Clear Zones. The closest school with children is approximately 200 feet away from the APZ. The estimated population within the 65 dB DNL or greater noise zone is 2,215 (refer to **Section 3.2** [Noise]); of those, an estimated 15 percent (refer to **Section 3.11** [Socioeconomics]), or approximately 330, are children.

3.4 AIR QUALITY

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

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

3.4.1 REGULATORY SETTING

3.4.1.1 Criteria Pollutants and National Ambient Air Quality Standards

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

Under the Clean Air Act (CAA), the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for these pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

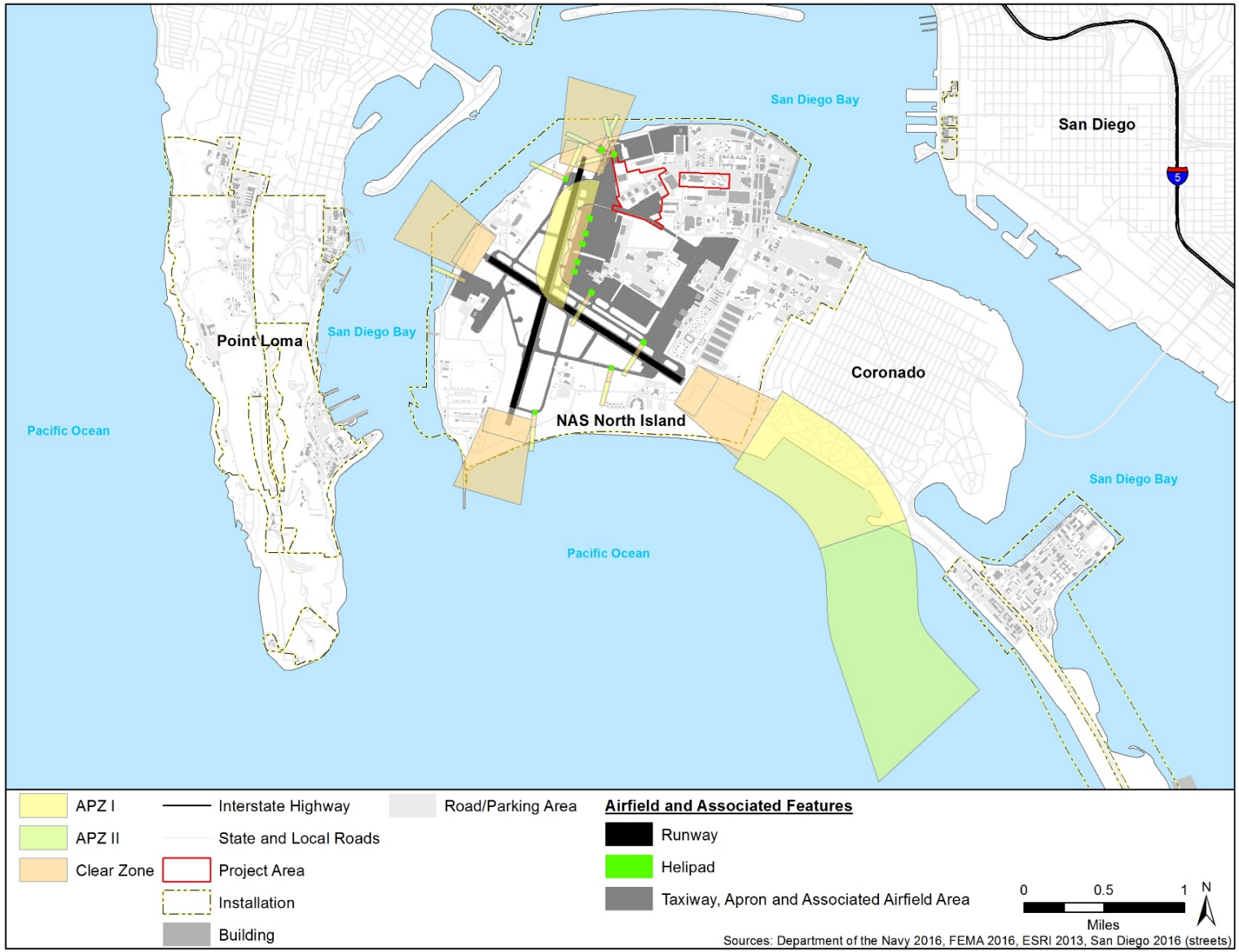


Figure 3.3-1: Clear Zones and Accident Potential Zones at NAS North Island

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. These plans, known as State Implementation Plans (SIPs), are developed by state and local air quality management agencies and submitted to USEPA for approval. In California, the California Air Resources Board (ARB) is responsible for enforcing air pollution regulations. The California ARB also establishes state standards, called the California Ambient Air Quality Standards (CAAQS). In San Diego County, the California ARB has delegated the responsibility for enforcing air pollution regulations to the San Diego County Air Pollution Control District (APCD).

3.4.1.2 Hazardous Air Pollutants

In addition to the NAAQS for criteria pollutants, there are national standards for hazardous air pollutants (HAPs), which are regulated under Section 112(b) of the 1990 CAA Amendments. HAPs are compounds known or suspected to cause cancer or other serious health and environmental effects. Unlike criteria pollutants, there are no NAAQS for HAPs. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR part 61). USEPA also promulgated a Mobile Source Air Toxics Rule to regulate sources of HAPs from mobile sources. The California ARB regulates HAPs and refers to them as toxic air contaminants. The USEPA controls HAPs by regulating constituents of concern in fuels, promulgating cleaner engine emission standards, and limiting excessive engine operations.

3.4.1.3 General Conformity

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

A conformity applicability analysis is the first step of a conformity evaluation and assesses if a federal action must be supported by a conformity determination. This is typically done by quantifying applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which can occur at a later time or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* emissions thresholds, then the conformity evaluation process is completed. *De minimis* threshold emissions are presented in **Table 3.4-1**.

Table 3.4-1: General Conformity *de minimis* Levels

Pollutant	*Area Type*	*Tons Per Year*
Ozone (VOC or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO_2, and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ Direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors)	All nonattainment and maintenance	100
Pb	All nonattainment and maintenance	25

Source: USEPA, 2017a

3.4.1.4 Air Permitting

The CAA established the New Source Review (NSR) and Title V permitting programs for stationary air pollution sources. A permit is required when a stationary source has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specified thresholds. NSR is a preconstruction permitting program, and includes major and minor source permitting. Major NSR includes the Prevention of Significant Deterioration (PSD) permitting program for construction projects at major stationary sources located in NAAQS attainment areas. Minor NSR applies to construction projects that do not necessitate major source permitting. The NSR process ensures that proposed emissions would conform to the SIP. Additional permitting requirements may apply to increases in stationary source greenhouse gas (GHG) emissions for sources that already trigger NSR for criteria pollutant emissions. The Title V program is an operating permit program applicable to all major air pollution sources and a limited number of minor sources. The Title V permitting program ensures that all air quality requirements applicable to an air pollution source are included under a single operating permit.

3.4.2 AFFECTED ENVIRONMENT

3.4.2.1 Air Quality

NAS North Island is located in the San Diego Air Basin (SDAB), which includes all of San Diego County. The affected environment is the SDAB. The USEPA classifies the SDAB as in moderate nonattainment for the 8-hour 2008 ozone standard. The SDAB is also a maintenance area for CO. The USEPA classifies the SDAB as unclassified/attainment for all other criteria pollutants (USEPA, 2016). Since the SDAB is in

nonattainment for ozone and maintenance for CO, the Proposed Action would require a General Conformity evaluation. The applicable conformity *de minimis* thresholds for the SDAB are 100 tons per year of VOCs, CO, and NO_x, as shown in **Table 3.4-2**.

The California ARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS have been exceeded more than once in three years. The California ARB currently designates the SDAB as in nonattainment for ozone, PM_{10}, $PM_{2.5}$, and in attainment for all other CAAQS. The SDAB is considered a severe ozone nonattainment area by the California ARB.

Table 3.4-2: General Conformity *de minimis* Levels for the SDAB

Pollutant (Precursor)	*De minimis Level (Tons/Year)*
Ozone (Nitrogen Oxides)	100
Ozone (VOC)	100
Carbon Monoxide	100

Source: USEPA, 2017a
Notes: SDAB=San Diego Air Basin; VOC=volatile organic compound

In the SDAB, the California ARB has delegated responsibility for enforcing air pollution regulations to the San Diego County APCD. The APCD monitors air pollution, prepares and implements its portion of the SIP, and promulgates rules and regulations (APCD, 2017). The SIP for the APCD includes strategies and tactics used to attain and maintain acceptable air quality in its jurisdiction, including establishing annual air emissions budgets for the area. In the SDAB, this list of strategies is contained in the Regional Air Quality Strategy. The APCD rules and regulations include procedures and requirements to control the emissions of pollutants and prevent significant impacts. These regulations require permits for any equipment that emits or controls air contaminants before construction, installation, or operation (e.g., Authority to Construct or Permit to Operate). The following APCD rules would apply to the Proposed Action:

- **Rule 50 – Visible Emissions.** A person will not discharge into the atmosphere from any single source of emissions whatsoever any air contaminant for a period or periods aggregating more than three minutes in any period of 60 consecutive minutes which is darker in shade than that designated as Number 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or of such opacity as to obscure an observer's view to a degree greater than does smoke of a shade designated as Number 1 on the Ringelmann Chart.
- **Rule 51 – Nuisance.** A person will not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property.
- **Rule 55 – Fugitive Dust Control.** No person will engage in construction or demolition activity subject to this rule in a manner that discharges visible dust emissions into the atmosphere beyond the property line for a period or periods aggregating more than three minutes in any 60 minute period.

The APCD does not have quantitative emissions limits for proposed construction or long-term operational emissions that may result from increased vehicle or mobile source usages. However, proposed construction equipment would need to comply with the California ARB In-Use Off-Road Diesel

Vehicle Rule, which requires owners of off-road mobile equipment powered by diesel engines 25 horsepower or larger to meet fleet average or Best Available Control Technology requirements for NO_x and particulate matter emissions by March 1 of each year. In addition, California ARB ATCMs also could apply to proposed sources of construction and operational equipment.

The most recent emissions inventory for San Diego County is shown in **Table 3.4-3**. VOC and NO_x emissions are used to represent ozone generation because they are precursors of ozone.

Table 3.4-3: San Diego County Annual Air Emissions Inventory (Year 2014)

Source Category	*Air Pollutant Emissions (tons per year)*						
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e (mt)*
Mobile Sources	96,887	203,229	31,323	893	25,958	8,346	16,941,174
Stationary/Area Sources	21,427	27,182	2,554	373	5,783	3,561	N/A
SDAB Total	**118,314**	**230,410**	**33,877**	**1,266**	**31,742**	**11,907**	**16,941,174**

Source: USEPA, 2017b
Notes: mt=metric tons; N/A=not available
GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for San Diego County are incomplete.

Sources of air pollutants at NAS North Island include mobile emissions from aircraft, vessels, aircraft ground support equipment, and private and government vehicles. Stationary source emissions occur from external combustion equipment such as boilers, internal combustion engines, paint stripping and surface-coating operations, solvent use, fuel dispensing and storage, and other miscellaneous operations. Stationary sources that require APCD air permits are regulated under a site-wide Title V permit (Permit to Operate No. 960380) for aircraft maintenance and corrosion control and by individual permits to operate. In addition, stationary sources associated with depot-level maintenance and repair of aircraft and components at the Fleet Readiness Center Southwest are regulated under Title V permit 960383.

The Proposed Action would mainly include mobile source operations that would not require APCD air permits. Any other potential operations, such as the use of paints and solvents for routine V-22 maintenance activities or the operation of a diesel-powered electrical emergency generator within the proposed squadron hangar and training squadron hangars, would undergo Navy review to ensure compliance with applicable APCD rules and permitting regulations.

Table 3.4-4 presents estimates of emissions associated with the most recent year of activity for the existing C-2A detachment at NAS North Island. Year 2016 was chosen to define existing or baseline emissions for the C-2A detachment, as it included the most recent calendar year of operational activities. Emissions from existing C-2A aircraft activity were based on data developed for the project noise analyses and special studies on aircraft operations (Navy Aircraft Environmental Support Office [AESO], 2015a and 2015b). Emissions for the use of aerospace ground equipment by C-2A aircraft are based on usages developed for generic aircraft groups by the U.S. Air Force (Air Force Civil Engineer Center, 2016). Emissions from privately owned vehicles (POVs) are based on vehicle trip generation rates developed by the project traffic analysis. **Appendix C** includes data and assumptions used to calculate emissions from existing C-2A activities at NAS North Island.

The analysis of aircraft operations on air quality is limited to operations that occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer where the

release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

Table 3.4-4: C-2A Detachment Baseline Annual Air Emissions – NAS North Island

Year	*Air Pollutant Emissions (tons per year)*						
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e (mt)*
C-2A Flight Operations	0.48	2.56	9.73	1.25	0.85	0.85	2,827
C-2A On-Wing Engine Testing	0.25	1.37	3.73	0.54	0.39	0.39	1,223
Ground Support Equipment	0.14	0.55	1.27	0.00	0.12	0.11	287
POVs – On- and Off-Base	0.04	1.31	0.15	0.003	0.002	0.002	375
Total Emissions	**0.91**	**5.79**	**14.88**	**1.80**	**1.36**	**1.36**	**4,712**

Note: mt=metric tons

3.4.2.2 Greenhouse Gases and Climate Change

The direct environmental effect of GHG emissions is an increase in global temperatures, which indirectly causes numerous environmental and social effects. Therefore, the analysis domain for proposed GHG impacts would be global. These cumulative global impacts would be manifested as impacts on resources and ecosystems in California.

Climate change refers to any significant change in the measures of climate lasting for an extended period of time (USEPA, 2016). These gases act like a blanket around the earth, trapping energy in the atmosphere and causing it to warm (USEPA, 2016). According to the USEPA, the global average temperature has increased by more than 1.5 degrees Fahrenheit since the late 1800s. Natural causes alone cannot explain all of these changes. Human activities are contributing to climate change, primarily by releasing tons of GHGs, such as carbon dioxide into the atmosphere every year. Most of the warming of the past half century has been caused by human activities that result in the emissions of GHGs, including burning fossil fuels for heat and energy, clearing forests, fertilizing crops, storing waste in landfills, raising livestock, and producing some kinds of industrial products. These GHG emissions include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride and sulfur hexafluoride (USEPA, 2016).

Each GHG is assigned a global warming potential, which refers to the ability of a gas or aerosol to trap heat in the atmosphere (USEPA, 2016). The global warming potential rating system is standardized to carbon dioxide, which has a value of one. The equivalent carbon dioxide rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. An increase in GHGs, especially those with larger global warming potentials, causes more heat to be retained.

The buildup of GHGs in the atmosphere and the warming of the planet affect many aspects of the environment. Not all of the effects of greenhouse gases are related to climate. For example, elevated concentrations of carbon dioxide can lead to ocean acidification and stimulate terrestrial plant growth, and methane emissions can contribute to higher ozone levels.

The United States and the world are warming, global sea level is rising, and some types of extreme weather events are becoming more frequent and more severe (U.S. Global Change Research Program, 2016). Recent observed changes due to global warming include rising temperatures, shrinking glaciers and sea ice, sea level rise, a lengthened growing season, and shifts in plant and animal ranges (U.S. Global Change Research Program, 2014). Predictions of future environmental impacts due to global

warming include continuing sea level rise; changing weather patterns, including increases in the severity of storms and droughts; changes to local and regional ecosystems, including the potential loss of species; and a substantial reduction in winter snowpack. These elements of climate change may impact the way the Navy executes its missions by increasing demand to provide humanitarian assistance and relief related to natural disasters, reducing the availability of infrastructure at coastal installations due to rising sea levels and increased flooding, and limiting training activities due to severe weather and available supporting infrastructure. The Navy's role in the defense of our country requires planning for a wide range of contingencies. Included in these contingencies is the future trend of climate change.

The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and reduce emissions of greenhouse gases. The Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy has adopted energy, environmental, and climate change goals including increasing alternative energy use Navy-wide to 50 percent by 2020; reducing non-tactical petroleum use; ensuring environmentally sound acquisition practices; and ensuring environmentally compliant operations for ships, submarines, aircraft, and facilities operated by the Navy.

While the implication of climate change may influence factors such as water availability and agriculture and food security, the factors applicable to the Proposed Action in the study area include extreme weather and sea level rise. These climate factors are described below and further discussed, as appropriate, in the water resources, infrastructure, and biological resources sections.

Extreme Weather. Continued climate change in California could result in an increase in extreme climate conditions, which pose the most serious human health and ecological risk. In California, these effects would include exacerbation of air quality problems; a reduction in municipal water supply from the Sierra snowpack; an increase in sea level and coastal erosion that would displace coastal operations and infrastructure; an increase in wild fires; damage to marine and terrestrial ecosystems; and an increase in the incidence of infectious diseases, asthma, and other human health problems (California Energy Commission, 2012). The state of California has developed strategies to adapt to these future climatic effects (California Natural Resources Agency, 2014) and the city of San Diego proposes a similar approach through their City of San Diego Climate Action Plan (City of San Diego, 2015a). The Navy is aware of these efforts and where applicable, is involved with these or similar activities to address climate change (Navy, 2013c).

Sea Level Rise. Climate change is being addressed on a regional level, including conducting sea level rise modeling and establishing local programs, such as the proposed City of San Diego Climate Mitigation and Adaption Plan (City of San Diego, 2015a). This plan will provide policy direction and identify actions that the city and community can take to reduce the threat of climate change such as sea level rise. The DoD also conducts research on sea level rise and develops measures for installations to adapt to this threat (DoD Strategic Environmental Research and Development Program, 2014 and 2016).

3.5 TRANSPORTATION

This discussion of transportation includes vehicular traffic and alternative transportation. Vehicular traffic refers to the movement of vehicles on roadway networks and street systems, and alternative transportation refers to ridesharing and mass transit. Air transportation is discussed under Airfields and Airspace.

3.5.1 REGULATORY SETTING

The California Department of Transportation manages state and federal highways, highway bridges, inter-city rail, public-use airports, and mass transportation (California Department of Transportation, 2015). The San Diego Association of Governments (SANDAG) is a "public agency that serves as the forum for regional decision-making." SANDAG's mission includes planning, engineering, and building public transportation (SANDAG, 2017).

Roadway operating conditions and the adequacy of existing roadway systems to accommodate vehicle use are often described in terms of average daily traffic (ADT) volume and level of service (LOS). LOS is a measure for traffic analysis used in the *Highway Capacity Manual* published by Transportation Research Board to identify the level of flow and service of highways and roads. LOS is based on a quantitative calculation of traffic delay time and is assigned to roadways based on traffic flow, density, speed, and other characteristics. LOS is represented by the letters A through F. An LOS of A is considered the least restricted flow of traffic. An LOS of B has a reasonable free flow with only minor maneuverability restrictions in traffic flow, and C has a stable flow where the ability to maneuver through lanes is restricted and lane changes require more driver awareness. An LOS of D has unstable flow, and the freedom to maneuver in the traffic stream is limited; E has an unstable flow, and is operating at its capacity. An LOS of F is considered the most restricted flow and typical of roads with traffic jams.

3.5.2 AFFECTED ENVIRONMENT

The affected environment is the transportation network serving NAS North Island in the City of Coronado. NAS North Island is located on the northwestern border of the City of Coronado on San Diego Bay and is a few miles from downtown San Diego. Vehicular traffic traveling to and from NAS North Island and other noncontiguous military facilities, including NAB Coronado and Silver Strand Training Complex, is a major contributor to traffic volume within the City of Coronado.

3.5.2.1 Vehicular Traffic

3.5.2.1.1 Traffic Circulation

Military gates that control traffic access onto and off of NAS North Island are all located off Alameda Boulevard. The Main Gate for entering traffic (Admiral B Stockdale Gate) is on Stockdale Boulevard at Third Avenue and for exiting traffic is on McCain Boulevard at Fourth Street. Secondary gates are on Quay Road at First Street and on Sherman Boulevard at Ocean Boulevard (**Figure 3.5-1**).

Travel to NAS North Island from San Diego is via State Route (SR)-75, a five-lane freeway (principal arterial), which carries traffic over the San Diego-Coronado Bridge into the City of Coronado. SR-75 is known as Third Street in Coronado, where it turns southwest onto Orange Avenue, and continues toward the City of Imperial Beach, located south of Coronado, on what is known as Silver Strand Boulevard. Third Street is classified as a principal arterial that is also identified as SR-282 between Orange Avenue and Alameda Boulevard where it intersects with Stockdale Boulevard, which provides entrance-only access to NAS North Island through the Main Gate. According to the City of Coronado 2015 Traffic Report, 99,600 ADT travel to/from Coronado and 77,500 ADT use the San Diego-Coronado Bridge (City of Coronado, 2015).

Traffic exiting NAS North Island bound for San Diego uses the exit-only gate on McCain Boulevard to Fourth Street and travels Fourth Street (SR-282) to SR-75 and the San Diego-Coronado Bridge. Most traffic (over 50 percent) uses the Main Gates. NAS North Island may be also be accessed from the City of Imperial Beach via Silver Strand Boulevard (SR-75) and the Ocean Boulevard Gate at Sherman Boulevard.

Principal arterials, minor arterials, collectors, and local roads are shown in **Figure 3.5-1** (City of Coronado, 2016).

3.5.2.1.2 Traffic Conditions

A detailed assessment of vehicular traffic conditions within the City of Coronado was conducted by the Navy in 2008 for the *Supplemental Environmental Impact Statement (SEIS) for Developing Homeport Facilities for Three Nimitz-Class Aircraft Carriers in Support of the U.S. Pacific Fleet* (Navy 2008). A primary focus of the 2008 SEIS was on vehicular traffic and traffic-related issues. The document also evaluated the effectiveness of traffic improvement measures to mitigate the effects of cumulative traffic growth at NAS North Island and in the City of Coronado. The 2008 SEIS analyzed the effects of baseline (2007) and future (2015 and 2030) traffic traveling through Coronado to NAS North Island, NAB Coronado, and other points within the City of Coronado. The traffic analysis included projected traffic volumes for planned projects at NAS North Island and in the City of Coronado, and also assumed future growth related to projects at NAS North Island, such as the Proposed Action, that had not yet been identified. The traffic analysis included in this EA is based on, and incorporates by reference (pursuant to 40 CFR 1502.21), the traffic analysis presented in the 2008 SEIS (Navy, 2008a).

NAS North Island Gate Traffic

Daily traffic volume generated by NAS North Island is measured by counts at the NAS North Island gates. ADT is the average number of vehicles that use a roadway segment within a 24-hour period.

The following provides past, recent, and projected future ADT for traffic entering and exiting NAS North Island based on traffic projections from the 2008 traffic study (Navy, 2008a) and other periodic vehicle counts (as noted) at the NAS North Island gates:

- 1983 – 51,600 ADT (2008 SEIS)
- 1989 – 61,978 ADT (2008 SEIS)
- 1999 – 45,136 ADT (2008 SEIS)
- 2002 – 47,696 ADT (included three aircraft carriers in port; 2008 SEIS)
- 2007 – 40,016 ADT (included one aircraft carrier; 2008 SEIS)
- 2013 – 45,000 ADT (estimate for McCain/Fourth Street and Ocean Boulevard gates; SANDAG, 2013)
- 2015 – 48,570 ADT (all gate counts with two aircraft carriers; Commander, Navy Installations Command (Commander, Navy Installations Command, 2015)
- 2015-2030 – 45,222 ADT (one aircraft carrier); 50,015 ADT (two aircraft carriers); 54,808 ADT (three aircraft carriers) (calculated ADTs in 2008 SEIS)

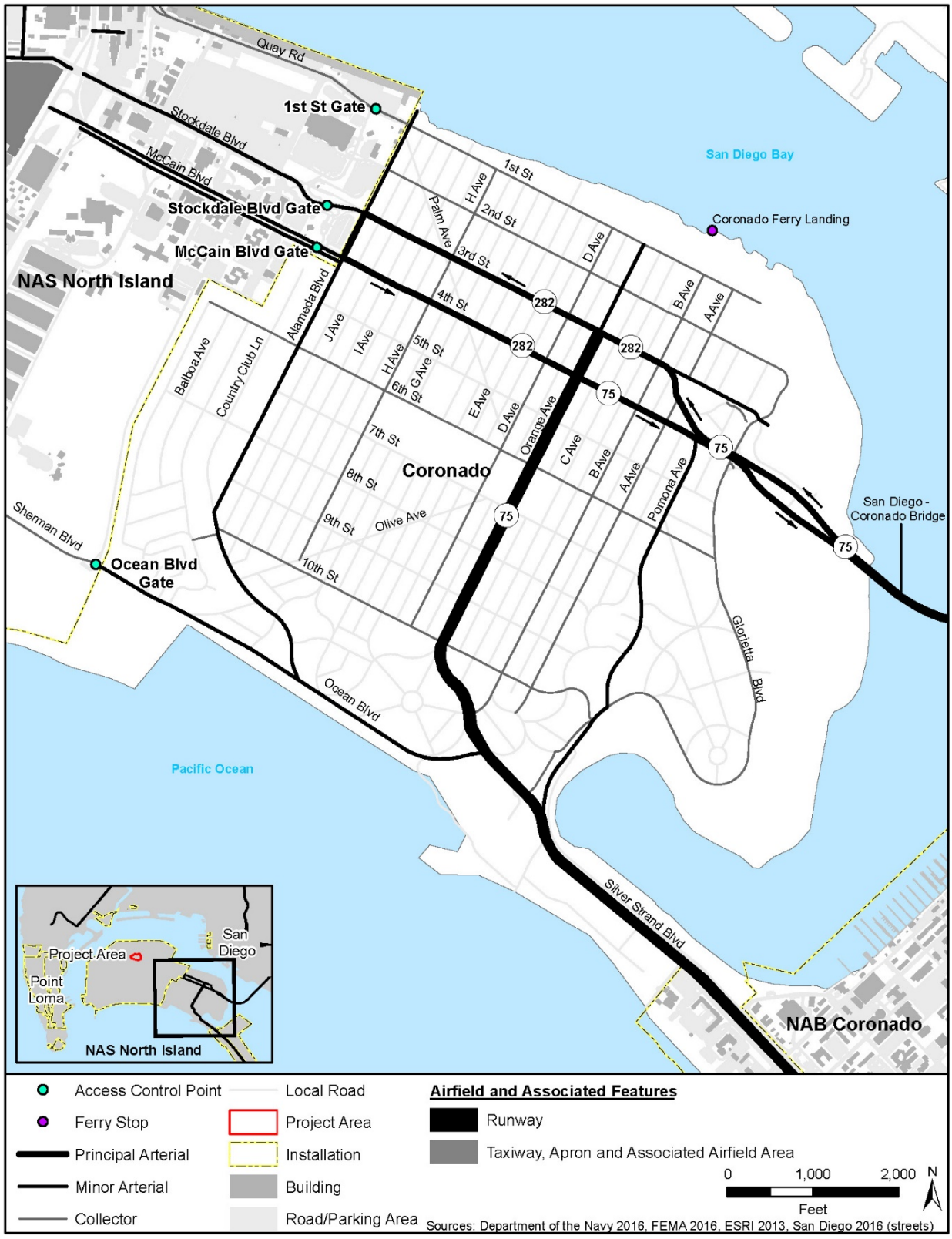
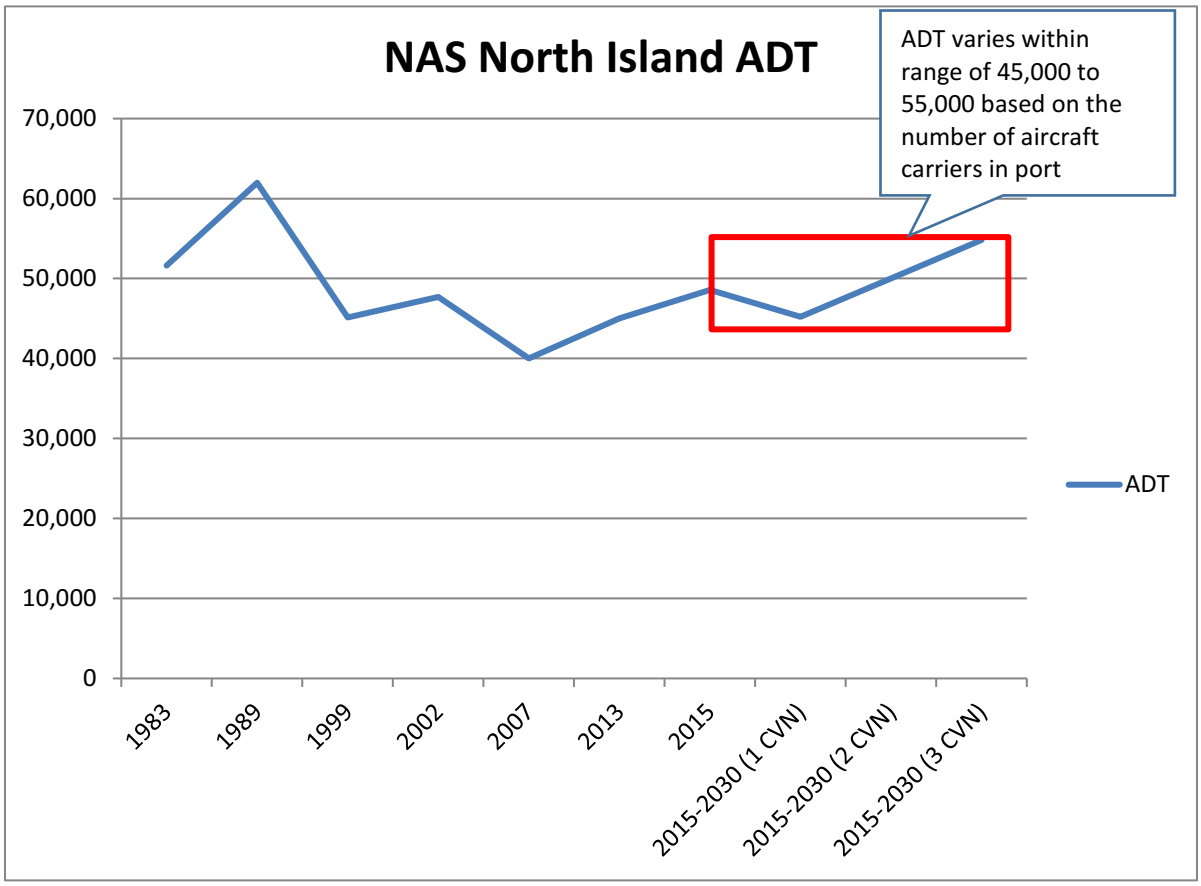


Figure 3.5-1: Coronado Roadway Network

Figure 3.5-2 illustrates the change in ADT over the past several decades and projections for the next 15 years based on fluctuations in aircraft carrier port calls. ADT has fallen since a peak in 1989 and, as depicted in **Figure 3.5-2**, was projected by the 2008 SEIS to fluctuate within a range of 45,000 to 55,000 depending on whether one, two, or three aircraft carriers are in port simultaneously.



Source: 1983 through 2007 (2008 SEIS reported past gate counts and 2007 traffic study counts); 2013 (SANDAG estimate); 2015 (Commander, Navy Installations Command NBC 2015 gate counts); 2015-2030 one, two, and three aircraft carriers (2008 SEIS traffic study model calculations).

Figure 3.5-2: Past, Present, and Projected NAS North Island Average Daily Traffic

SANDAG estimates for 2013 show an increase in ADT since 2007 that is consistent with the 2008 SEIS projected 2015 ADT with one aircraft carrier in port (Navy 2008). Actual recent gate counts conducted at NAS North Island in 2015 with two aircraft carriers in port (Commander, Navy Installations Command, 2015) also indicate that ADT is consistent with the 2008 projections, though the 2015 traffic counts are slightly lower than projected. Fluctuations in traffic at NAS North Island may be attributable to aircraft carriers in port, deployments, and other variations in NAS North Island tenant activities.

Roadway Traffic

The existing conditions for this EA assumes that 2015 traffic conditions projected in the 2008 SEIS represent existing conditions on the Coronado street network. The 2008 SEIS estimated traffic conditions expected to be in place by 2015 with one, two, or three homeported aircraft carriers and staggered working hours when three aircraft carriers are in port. Staggering NAS North Island personnel work hours spreads out personnel arrivals/exits to reduce peak traffic. This scenario included the evaluation of 2007 baseline traffic volumes and the cumulative effects of forecasted growth in

background traffic, plus projected traffic associated with approved or pending projects anticipated to be constructed by 2015.

Forecasted traffic volumes for 2015 were based on the 2030 SANDAG regional travel forecast model and further adjusted through traffic growth interpolation to reflect the anticipated incremental growth between 2007 baseline conditions and year 2015 (Navy 2008).

Future traffic growth analyzed for NAS North Island in 2008 included: future planned projects for an additional helicopter squadron with operational maintenance hangar, expansion of the Navy Lodge, and estimated additional traffic that might occur in future years as a result of other not yet identified projects at NAS North Island, such as the Proposed Action. The cumulative projects totaled an estimated 4,000 ADT and represented the maximum ADT scenario. The current status of the cumulative projects is evaluated in **Chapter 5** (Cumulative Impacts at West Coast Fleet Logistics Center).

The 2008 SEIS analyzed 25 intersections that would be affected by NAS North Island and Coronado peak hour traffic in 2015. Peak hours are those hours of the day during which the bulk of commuter trips occur and traffic impacts are likely to be the greatest. Peak hour counts were collected between 6:00 a.m. to 8:00 a.m. and 2:30 a.m. to 4:30 p.m. NAS North Island morning and afternoon peak hours are 6:15 to 7:15 a.m. and 2:30 to 3:30 p.m. Intersection LOS calculated for 2015 with the scenario of three aircraft carriers in port (maximum ADT) with staggered work hours, as presented in the 2008 SEIS, is shown in **Table 3.5-1**.

Table 3.5-1: 2008 Traffic Study Peak Hour Intersection Level of Service Summary for 2015

Intersection	*Traffic Control*	*Peak Hour*	*Three Aircraft Carriers (Staggered Work Hours)*	
			Delay[(1)]	*LOS*
1. Alameda Boulevard/First Street	All-way stop	a.m.	235.1	F
		p.m.	98.0	F
2. Alameda Boulevard/ Third Street	Two-way stop	a.m.	37.8	D
		p.m.	10.2	B
3. Alameda Boulevard/ Fourth Street	All-way stop	a.m.	6.5	A
		p.m.	83.5	F
4. Alameda Boulevard/ Ocean Boulevard	One-way stop	a.m.	35.1	E
		p.m.	201.6	F
5. D Avenue/First Street	Two-way stop	a.m.	26.4	D
		p.m.	147.7	F
6. D Avenue/Third Street	Two-way stop	a.m.	ECL	F
		p.m.	61.6	F
7. D Avenue/Fourth Street	Two-way stop	a.m.	47.4	E
		p.m.	ECL	F
8. D Avenue/Sixth Street	All-way stop	a.m.	8.2	A
		p.m.	10.5	B
9. Orange Avenue/First Street	Signalized	a.m.	10.7	B
		p.m.	138.6	F
10. Orange Avenue/Third Street	Signalized	a.m.	124.5	F
		p.m.	43.4	D
11. Orange Avenue/Fourth Street	Signalized	a.m.	18.2	B
		p.m.	168.3	F
12. Orange Avenue/Fifth Street	Two-way stop	a.m.	96.4	F
		p.m.	ECL	F

Table 3.5-1: 2008 Traffic Study Peak Hour Intersection Level of Service Summary for 2015 (cont.)

Intersection	*Traffic Control*	*Peak Hour*	*Three Aircraft Carriers (Staggered Work Hours)*	
			Delay[(1)]	*LOS*
13. Orange Avenue/Sixth Street	Signalized	a.m. p.m.	14.6 19.1	B B
14. Orange Avenue/Tenth Street	Signalized	a.m. p.m.	18.3 26.4	B C
15. Pomona Avenue/Third Street	One-way stop	a.m. p.m.	102.7 26.0	F D
16. Orange Avenue/R.H. Dana Place	Signalized	a.m. p.m.	133.5 43.6	F D
17. Pomona Avenue/Fourth Street	One-way stop	a.m. p.m.	24.0 650.0	C F
18. Pomona Avenue/ Glorietta Boulevard	Two-way stop	a.m. p.m.	10.7 18.1	B C
19. Pomona Avenue/ Silver Strand Boulevard	Signalized	a.m. p.m.	40.0 41.8	D D
20. Glorietta Boulevard/ Fourth Street	One-way stop	a.m. p.m.	126.4 26.7	F D
21. Silver Strand Boulevard/ Tarawa Road	Signalized	a.m. p.m.	291.4 96.5	F F
22. Silver Strand Boulevard/ Tulagi Road	Signalized	a.m. p.m.	3.8 12.3	A B
23. Cesar E Chavez Parkway/ Logan Avenue	Signalized	a.m. p.m.	18.6 128.1	B F
24. National Avenue/ SR-75 Off-Ramp	One-way stop	a.m. p.m.	10.0 11.4	A B

Source: Navy, 2008a
Notes: [1] Delay measured in seconds per vehicle. ECL=Exceeds Calculable Limit, reported when delay exceeds 180 seconds. LOS E or F are indicated in red.

Under maximum ADT conditions (including forecast background and projected growth) with three aircraft carriers in port and assuming staggered work hours, 16 intersections were projected to operate at deficient LOS (LOS E or F) in either the a.m. peak hour or p.m. peak hour, 9 of which are unsignalized. Several intersections in Coronado that are not primarily affected by traffic to/from NAS North Island also experience LOS E or F during the peak hours.

In addition to work hour staggering, the Navy currently implements other measures to reduce the effects of NAS North Island traffic. The Navy has used its personnel to conduct manual traffic control as a temporary measure to manage exiting NAS North Island traffic by controlling or "stacking" vehicle movements at the intersection of Fourth and Alameda Boulevard. This measure effectively mimics a traffic signal.

The Navy continues to study solutions to improve traffic operations on and off-base. In 2015, NBC engaged Fehr & Peers to perform a traffic signal optimization study to identify measures to reduce vehicle delays on and off of NAS North Island. The study analyzed intersections on and off-base. Traffic operations results for 2015 at intersections that were also studied in the 2008 traffic study (Alameda/First and Alameda/Fourth) were consistent with the 2008 traffic study projections for 2015.

Following are the Fehr & Peers study findings and recommendations:

- "All study intersections currently operate at LOS F with excessive congestion and delays during the mid-afternoon (p.m.) peak hour, except the Quay Road/Rogers Road intersection, which operates acceptably at LOS D.
- Stop-and-go conditions are at their maximum during approximately a 30- to 40-minute period beginning at 2:30 p.m. under existing conditions with two aircraft carriers in port.
- The volume of traffic traveling between NAS North Island and the Coronado Bridge during the peak hour results in over-saturated conditions with limited options for modifying overall travel patterns or driver behavior to improve traffic conditions.
- Coordinating the existing on-base Pedestrian Crosswalk signal (west of the McCain Boulevard gate) with the upstream signals on-base, optimizing all the signalized study intersections, and removing the stop sign on eastbound McCain Boulevard at Alameda Boulevard would improve traffic operations on-base by:
    - Increasing NAS North Island outbound vehicle throughput by 7 percent at the McCain Boulevard gate
    - Reducing overall network delay by 13 percent during the peak hour
    - Reducing the average peak hour travel time on McCain Boulevard by 28 percent, especially during the time leading up to and following the 30-minute maximum peak.
    - Potentially shifting some traffic from Quay Road onto McCain Boulevard with the additional capacity caused by the signal optimization.
- The existing Pedestrian signal will also create vehicle platooning on Fourth Street, in lieu of the consistent stop-and-go traffic flow caused by the existing stop sign at the Alameda Boulevard intersection.
- Although it would improve traffic flow on McCain Boulevard and Fourth Street, the removal of the eastbound stop sign at the Alameda Boulevard intersection would reduce the number of acceptable gaps for northbound and southbound vehicles on Alameda Boulevard to cross McCain/Fourth. This would cause the southbound queue on Alameda Boulevard to extend from Fourth Street back into the Quay Road/First Street intersection. In addition, bicyclists and pedestrians traveling northbound and southbound would also be delayed while trying to find acceptable gaps.
- The Coronado City Council recommended further engineering analysis of a new traffic signal at the Fourth Street/Alameda Boulevard intersection. This new signal at Alameda Boulevard would have similar effects on vehicle operations and platooning within NAS North Island, and would improve connectivity northbound and southbound connectivity across McCain Boulevard/Fourth Street for all users (vehicles, bicyclists and pedestrians).
- Only minimal signal timing adjustments are possible at the Fourth Street/Orange Avenue intersection and these adjustments would provide limited benefit to NAS North Island traffic operations.
- Restricting eastbound right-turns at the Quay Road/First Street intersection would cause secondary impacts both on and off the base and is not recommended.
- Implementing a more staggered work schedule at NAS North Island would significantly reduce vehicle delays during the peak traffic hours.
- P.m. peak hour traffic volumes would need to be reduced by 40 to 45 percent to achieve LOS D operations at almost all of the on-base study intersections." (Fehr & Peers, 2015)

The Fehr and Peer study advised against using a pedestrian crosswalk signal to meter traffic and recommended further engineering analysis of the new traffic signal at the intersection of Fourth Street and Alameda. The City of Coronado is moving forward with the engineering analysis and plans to install the traffic signal by February 2018.

3.5.2.2 Alternative Transportation

The Navy offers a Transportation Incentive Program for active duty military and Navy civilian employees to promote the use of commuting alternatives to personal vehicles. The Transportation Incentive Program is managed by the Navy Fringe Benefit Program and is designed to reduce federal employees' contribution to traffic congestion and air pollution. The program issues a debit card that provides subsidies or free use of Coaster train service, bus, trolley, ferry, or vanpool.

The Metropolitan Transit System provides train service (Coaster and Trolley commuter train) from points outside San Diego to downtown. Metropolitan Transit System bus route 904 provides bus service from downtown San Diego to Coronado and NAS North Island. The Coronado Ferry provides service from San Diego to the Coronado Ferry Landing at First Street, one-half mile from the NAS North Island gate (see **Figure 3.5-1).**

Vanpools are coordinated with SANDAG and may be formed with a minimum of six adults, or riders may register with a vanpool vendor.

3.6 BIOLOGICAL RESOURCES

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

Within this EA, biological resources are divided into three major categories: (1) terrestrial vegetation, (2) terrestrial wildlife, and (3) marine wildlife. Marine vegetation and wildlife would not be impacted by the Proposed Action and, therefore, are not addressed in this EA.

Federally listed species are discussed in **Section 3.6.2.2.5** (Federally Listed Species) and other special status species are discussed in **Section 3.6.2.2.6 (**Other Special Status Species).

The United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) system was accessed to request an *Official Species List* under Section 7(c) of the Endangered Species Act (ESA). The *Official Species List* (Consultation Code: 08ECAR00-2017-SLI-1361) was received via letter dated September 14, 2017 (USFWS, 2017a) and is provided in **Appendix D**. **Table 3.6-1** lists all federally listed species that are potentially present within or in the vicinity of NAS North Island as noted in the USFWS *Official Species List* and the installation's Integrated Natural Resources Management Plan (INRMP), but as noted herein, outside of the project area. Federally listed species that do not have the potential to occur within or adjacent to the project area are not carried forward for analysis. Federally listed marine species that have the potential to occur in the open ocean and coastal waters near NAS North Island and would not be impacted by the Proposed Action are described in **Section 3.6.2.2.5** (Federally Listed Species), but are not carried forward for analysis.

Table 3.6-1: Federally Listed Species with Potential to Occur at NAS North Island

Common Name (Scientific Name)	***Status***	***Habitat***	***Potential to Occur within the Project Area Or* Known Habitat Adjacent to the Project Area**
Plants			
Orcutt's Spineflower (*Chorizanthe orcuttiana*)	FE, CE	Chaparral, coastal sage scrub, closed-cone pine forest	None
San Diego Ambrosia (*Ambrosia pumila*)	FE	Vernal pools and freshwater wetlands of valley grassland, and coastal sage scrub communities	None
San Diego Button-celery *(Eryngium aristulatum var. parishii)*	FE	Vernal pools and freshwater wetlands of chaparral, valley grassland, and coastal sage scrub communities	None
San Diego Thornmint (*Acanthomintha ilicifolia*)	FT, CE	Vernal pools and freshwater wetlands of valley grassland, and coastal sage scrub communities	None
Birds			
California Least Tern (*Sternula antillarum browni*)	FE, CE, CFP, MSCP	Salt pannes, beaches, dunes	yes, this species has nested adjacent to the project area at the MAT site and near Helipad 2
Coastal California Gnatctacher (*Polioptila californica californica*)	FT	Coastal and open sage scrub, sage scrub grassland, and sagebrush	none
Least Bell's Vireo (*Vireo bellii pusillus*)	FE, CE	Riparian woodlands	None
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	FE, CE	Dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands	None
Western Snowy Plover (*Charadrius nivosus nivosus*)	FT, BCC, SSC, MSCP	Intertidal mudflats, beaches, dunes, salt flats	yes, this species has nested adjacent to the project area at the MAT site and near Helipad 2
Terrestrial Mammals			
Pacific Pocket Mouse (*Perognathus longimembris pacificus*)	FE	Coastal strand, coastal dunes, and coastal sage scrub growing on marine terraces	None
Marine Mammals			
Blue Whale (*Balaenoptera musculus*)	FE, MMPA	Open ocean and coastal waters (found in all major oceans), from sub-polar to sub-tropical latitudes. Migrate through the Gulf of California from June to September	potential to occur in the open ocean and coastal waters near NAS North Island

Table 3.6-1: Federally Listed Species with Potential to Occur at NAS North Island (cont.)

Common Name (Scientific Name)	*Status*	*Habitat*	*Potential to Occur within the Project Area Or* Known Habitat Adjacent to the Project Area
Marine Mammals (cont.)			
Fin Whale (*Balaenoptera physalus*)	FE, MMPA	Open ocean and coastal waters (deep, offshore waters of all major oceans). Present in deep pacific waters year round	potential to occur in the open ocean and coastal waters near NAS North Island
Humpback Whale (*Megaptera novaeangliae*)	FT, MMPA	Open ocean and coastal waters (found in all major oceans), from sub-polar to sub-tropical latitudes. Migrate through the Gulf of California from June to September	potential to occur in the open ocean and coastal waters near NAS North Island
Killer Whale – Southern Resident Population (*Orcinus orca*)	FE, MMPA	Open ocean and coastal waters (all major oceans). Present in pacific waters year round.	potential to occur in the open ocean and coastal waters near NAS North Island
Reptiles			
Green Sea Turtle (*Chelonia mydas*)	FT (eastern North-Pacific Range)	Eelgrass beds, Pacific Ocean off coast of California (July-September)	potential to occur in the open ocean and coastal waters near NAS North Island

Sources: Navy, 2013c; 2013d; National Oceanic and Atmospheric Administration, 2017; USFWS, 2017a
Notes: BCC= Birds of Conservation Concern; CE=California Endangered; CFP=California Fully Protected Species; FE=Federally Endangered; FT=Federally Threatened; MMPA= Marine Mammal Protection Act; MSCP=Covered under the Managed Species Conservation Program; SSC=California Species of Special Concern

3.6.1 REGULATORY SETTING

Special-status species, for the purposes of this EA, are those species listed as threatened or endangered under the ESA and species afforded federal protection under the Marine Mammal Protection Act (MMPA), or the Bald and Golden Eagle Protection Act (BGEPA).

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires action proponents to consult with the USFWS or National Oceanic and Atmospheric Administration Fisheries to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of designated critical habitat. Critical habitat cannot be designated on any areas owned, controlled, or designated for use by the DoD where an INRMP has been developed that, as determined by the Department of Interior or Department of Commerce Secretary, provides a benefit to the species subject to critical habitat designation.

All marine mammals are protected under the provisions of the MMPA. The MMPA prohibits any person or vessel from "taking" marine mammals in the United States or the high seas without authorization.

In addition to the special status species noted, birds, both migratory and most native-resident bird species, are protected under the Migratory Bird Treaty Act (MBTA), and their conservation by federal agencies is mandated by EO 13186 (Migratory Bird Conservation). Under the MBTA it is unlawful by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, [or] possess migratory birds or their nests or eggs at any time, unless permitted by regulation. The 2003 National Defense Authorization Act gave the Secretary of the Interior authority to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during authorized military readiness activities. The final rule authorizing the DoD to take migratory birds in such cases include a requirement that the Armed Forces must confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate adverse effects of the Proposed Action if the action will have a significant negative effect on the sustainability of a population of a migratory bird species.

Birds of Conservation Concern (BCC) are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCC have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which BCC have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the MBTA and EO 13186 (USFWS, 2008).

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

3.6.2 AFFECTED ENVIRONMENT

The affected environment for biological resources includes the portions of NAS North Island where permanent and temporary impacts could occur from implementing the Proposed Action.

Information about biological resources is based on existing data. The following sources were reviewed to obtain relevant biological data:

- NBC Biological Resource Surveys (Navy, 2017a)
- USFWS IPaC *Official Species List* (Consultation Code: 08ECAR00-2017-SLI-1361) (USFWS, 2017a)
- Coastal Campus EIS (Navy, 2015a)
- NBC California Least Tern and Western Snowy Plover Nest Monitoring Reports (Fournier et al., 2013 and 2014; Boylan et al., 2016 and 2015; and Schuetz et al., 2012)
- EA for the Decentralization of the Steam System at NBC (Navy, 2014b)
- NBC BASH Program Reports (USDA, 2010; USDA, 2011; USDA, 2012; USDA, 2013, and USDA, 2014)
- NBC INRMP (Navy, 2013c)
- San Diego Bay INRMP (Navy, 2013d)
- EA for Helicopter Wings Realignment and MH-60R/S Helicopter Transition at Naval Base Coronado (Navy, 2011a)

3.6.2.1 Terrestrial Vegetation

NAS North Island is primarily urbanized and includes developed areas, a golf course, and an airfield. The airfield is mowed regularly and is surrounded by ruderal habitat[5] that is dominated by non-native herbaceous species. Much of the remaining vegetated areas are located along the southern edge of the installation and include sand verbena-beach bursage series, saltgrass series, and cattail series. Eucalyptus woodland, ruderal habitat, and ornamental vegetation surround much of the developed areas. The Proposed Action would occur in a developed area mainly devoid of natural habitat areas or plant communities. **Figure 3.6-1** shows the vegetation communities at NAS North Island.

3.6.2.1.1 Terrestrial Wildlife

This section describes common terrestrial wildlife that are known to occur at NAS North Island. Federally listed wildlife species, migratory birds, and other special status wildlife species are described separately. Detailed information on terrestrial wildlife occurring at NAS North Island is provided in the NBC INRMP (Navy, 2013c). Appendix F of the INRMP includes a full list of all species that have been observed at the installation. Additionally, a natural resources inventory was recently completed during base-wide surveys conducted in 2015 and 2016 at NAS North Island (Navy, 2017a). A summary of wildlife documented at NAS North Island is presented below.

Surveys conducted in 2015 and 2016 identified two reptile species, the western side-blotched lizard (*Uta stansburiana elegans*) and the California legless lizard (*Anniella pulchra*). No amphibian or snake species were detected or are known to occur at NAS North Island. A total of 279 insect species (including 75 species of Lepidoptera, 48 Hymenoptera, 48 Diptera, 29 Coleoptera, 34 Hemiptera, and 31 insects of other orders) were collected or observed, including one special status species of butterfly, the wandering skipper (*Panoquina errans*) (Navy, 2017a). This species is discussed in **Section 3.6.2.2.6** (Other Special Status Species).

A total of 99 avian species were identified during the 2015 and 2016 point count surveys. The most abundant species detected were western grebe (*Aechmophorus occidentalis*), sanderling (*Calidris alba*), California brown pelican (*Pelecanus occidentalis californicus*), Brandt's cormorant (*Phalacrocorax penicillatus*), and western gull (*Larus occidentalis*) in areas adjacent to open water and coastal areas. American wigeon (*Anas americana*), American coot (*Fulica americana*), yellow-rumped warbler (*Setophaga coronata*), and house finch (*Haemorhous mexicanus*) were observed in abundance near woodland areas and the golf course (Navy, 2017a). Twelve special status bird species were detected and are discussed in **Section 3.6.2.2.6** (Other Special Status Species).

Mammal species detected during surveys included the striped skunk (Mephitis *mephitis*), Virginia opossum (*Didelphis virginiana*), California ground squirrel (*Spermophilus beecheyi*), domestic dog (*Canis lupus familiaris*), feral cat (*Felis catus*), and one California Department of Fish and Wildlife Species of Special Concern, the San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). This species is discussed in **Section 3.6.2.2.6** (Other Special Status Species). The big brown bat (*Eptesicus fuscus*) and western pipistrelle (*Parastrellus hesperus*) were the only bat species detected during surveys at NAS North Island. No bats were observed roosting in buildings or infrastructure during roost searches (Navy, 2017a).

[5] Weedy vegetation growing on compacted or disturbed ground

Figure 3.6-1: Vegetation Communities at NAS North Island

Terrestrial wildlife species at NAS North Island are generally limited by the extensive development and constrained areas of natural habitat. The Proposed Action would occur in a developed area mainly devoid of natural habitat areas or plant communities. However, many common wildlife species described above may be found in developed areas.

3.6.2.2 Marine Wildlife

Information on marine wildlife occurring at NAS North Island is provided in the NBC INRMP (Navy, 2013c). Appendix F of the INRMP includes a full list of all species that have been observed or detected at the installation.

The San Diego Bay supports at least 70 species of fish; 300 species of resident or migratory birds; and at least 650 species of marine, estuarine, and salt marsh invertebrates (Navy, 2013c). The Proposed Action would not take place underwater and would not affect marine fish or essential fish habitat. Additionally, marine invertebrate species and habitats (riprap with a few sandy beach areas) at NAS North Island would not be impacted under the Proposed Action. As described in **Section 4.2** (Noise), implementation of the Proposed Action would not result in a perceptible change to noise. As such, impacts to marine wildlife species are not anticipated and are not discussed further in this document.

3.6.2.2.1 Marine Mammals

The MMPA is administered by the USFWS and National Marine Fisheries Service (NMFS) to protect and manage marine mammals. Two year-round species protected under the MMPA are known to occur in the San Diego Bay and have been occasionally observed at NAS North Island: the California sea lion (*Zalophus californianus*) and Pacific harbor seal (*Phoca vitulina*). Both species hunt and feed exclusively in the ocean, but may utilize coastal beaches to rest, molt, and breed (Navy, 2013c). Coastal beach habitat would not be impacted under the Proposed Action. Blue, humpback, fin, and killer whales may be present in the open ocean and coastal waters near NAS North Island; however, the Proposed Action would not take place underwater and would not affect underwater habitat. As described in **Section 4.2** (Noise), implementation of the Proposed Action would not result in a perceptible change to noise, including noise over the marine environment. Consequently, the Navy has determined that the Proposed Action would not result in reasonably foreseeable takes of a marine mammal species by harassment, injury, or mortality, as defined under the MMPA, and there would be no impact to marine mammals. As such, marine mammals are not discussed further in this document.

3.6.2.2.2 Seabirds

San Diego Bay is part of a network of southern California bays that provide habitat for a large diversity of seabirds due to their sheltered and nutrient-rich waters. The shallow water and shoreline provide roosting, foraging, and nesting areas for ducks, terns, shorebirds, pelicans, cormorants, gulls, herons, raptors (such as ospreys and Northern harriers [*Circus cyaneus*]), and various passerines in the surrounding vegetation (Navy, 2013c). Waterfowl, especially surf scoter (*Melanitta perspicillata*), scaup (*Aythya* spp.), and brant (*Branta bernicla*) are present in high numbers in late fall and winter (Navy, 2017a). Two federally listed seabirds are known to occur at NAS North Island: western snowy plover and California least tern (*Sternula antillarum browni*). These species are discussed in **Section 3.6.2.2.5** (Federally Listed Species). Marine/coastal habitat would not be impacted under the Proposed Action. In addition, as described in **Section 4.2** (Noise), implementation of the Proposed Action would not result in a perceptible change to noise, including noise over the marine environment. As such, seabirds are not discussed further in this document.

3.6.2.2.3 Migratory Birds

San Diego Bay is part of a major bird migratory pathway, the Pacific Flyway, and supports large populations of over-wintering birds traveling between northern breeding grounds and southern wintering sites. Over 300 migratory and resident bird species have been documented to use San Diego Bay, including shore birds, gulls, and other waterfowl. According to the USFWS' BCC list (USFWS, 2008), NAS North Island lies within BCR 32 – (Coastal California, U.S. portion only). Of the 46 bird species listed by USFWS for BCR 32, 12 species are known to occur at NAS North Island. **Table 3.6-2** presents these species. Five of these species (burrowing owl, western snowy plover, peregrine falcon, gull-billed tern, and California least tern) have the potential to occur within the project area.

Table 3.6-2: Birds of Conservation Concern Observed at NAS North Island

Common Name (Scientific Name)	***Seasonal Occurrence/ Population in San Diego County[1]***	***Potential to Occur within the Project Area***
Burrowing Owl (*Athene cunicularia hypogea)*	Year-round/ 46 breeding pairs	low, this species has historically been observed at NAS North Island
Red Knot (*Calidris canutus)*	Wintering	None
Western Snowy Plover (*Charadrius nivosus nivosus)*	Year-round/ 140 breeding pairs	yes, this species has nested adjacent to the project area at the MAT site and near Helo Pad 2
Peregrine Falcon (*Falco peregrinus)*	Year-round/ 15 breeding pairs	yes, this species is known to occur (flying and perched) at NAS North Island and has potential to fly or stop over
Gull-billed Tern (*Gelochelidon nilotica)*	Breeding/ 32-37 breeding pairs	unlikely; but has potential to fly or stop over
Loggerhead Shrike (*Lanius ludovicianus)*	Year-round	None
Short-billed Dowitcher (*Limnodromus griseus)*	Wintering	None
Marbled Godwit (*Limosa fedoa)*	Wintering	None
Long-billed Curlew *(Numenius americanus*)	Wintering	None
Whimbrel (*Numenius phaeopus)*	Wintering	None
Black Skimmer (*Rynchops niger)*	Year-round	None
California Least Tern (*Sternula antillarum browni)*	Breeding/ 2,492 breeding pairs	yes, this species has nested adjacent to the project area at the MAT site and within and adjacent to the project area near Helipad 2

Sources: California Department of Fish and Wildlife, 2016; Lincer and Bloom, 2007; Navy, 2013c and 2017a; U.S. Forest Service (USFS), 2017; USFWS, 2008 and 2016; Unitt, 2004

Notes:

MAT site = California least tern Management Area; NAS=Naval Air Station

[1] Population information is only provided for species that have a potential to occur within the project area

A complete list of all species of migratory birds protected under the MBTA is in the Federal Register (50 CFR 10.13). In addition, Appendix F of the NBC INRMP lists all of the bird species known to occur at NAS North Island. Almost all birds found on NAS North Island throughout the year are protected under the MBTA with the exception of common, non-native species (e.g., rock pigeons [*Columba livia*], European starlings [*Sturnus vulgaris*], and house sparrows [*Passer domesticus*]) and some nuisance pests. Of the over 100 species of bird recorded at NAS North Island, 35 have some special status assigned by government agencies (Navy, 2013c).

A number of MBTA-protected species are known to occur at NAS North Island, including burrowing owl (listed as a California Species of Special Concern by the California Department of Fish and Wildlife and a BCC by the USFWS), California brown pelican (delisted under ESA and listed as endangered under the California ESA), and many species of egret and herons. Great blue herons, black-crowned night herons, snowy egret, and great egrets are the most common on the installation (USDA, 2014). NAS North Island continues to support wintering and migratory burrowing owls; however, the burrowing owl has not nested successfully on NAS North Island since 2011.

NAS North Island manages heron and egrets under the NBC INRMP, including maintenance of nesting trees, while balancing and coordinating management with BASH concerns. Egret and heron nesting/roosting sites are located throughout the installation. The nearest heron and egret nesting site is located less than 50 feet north of the project area boundary and approximately 120 feet north of the nearest building proposed for demolition (Building 306) (**Figure 3.6-2**). The Navy has taken measures to discourage nesting in this area to reduce the BASH risk and safety hazards caused by these birds (USDA, 2014).

The Navy holds two MBTA permits; a permit for predator control to protect the federally listed California least tern and western snowy plover, and a permit for removal of certain migratory bird species in and around the runways and taxiways in order to reduce BASH issues.

3.6.2.2.4 Bird/Animal Aircraft Strike Hazards

The presence of resident and migratory birds (particularly large-bodied, flocking, and soaring species) creates a BASH risk at NAS North Island that is managed closely under the installation's BASH program (Navy, 2013c). The airfield's proximity to marine waters, artificial freshwater ponds on the golf course, several large hangars, and expanses of grass adjacent to the airfield amplifies the BASH risk.

A BASH Plan was developed for NBC in 2008 and updated in 2012 (Navy, 2012). The BASH Plan prescribes an ongoing process to reduce the potential for collisions between aircraft and birds or other animals and includes: "(1) conducting wildlife monitoring; (2) implementing a habitat management program; (3) using bird dispersal techniques when appropriate and warranted; (4) implementing a species specific population control program; (5) developing operation procedures to address bird/animal aircraft strike hazards; (6) adopting a zero-tolerance policy for birds within the primary surface area, with exceptions that maybe granted by the Bird Hazard Working Group for specific birds such as federally listed species or species of conservation concern; and (7) increased communications and safety and training of aviators, aircrews, and operational personnel related to BASH issues."

A control program for BASH is in place at NAS North Island, which includes a full-time USDA Wildlife Services BASH biologist who actively hazes birds away from the airfield. The BASH program also includes habitat alterations to reduce bird attractants near the airfield and education to promote proper trash management and not feeding wildlife.

Bird strikes have been regularly reported at NAS North Island since the start of record keeping in 1981, with 232 reported bird strikes to aircraft between 1981 and 2014 (USDA, 2014). During 2014, eight bird strikes were reported at NAS North Island. The number of BASH incidents at NAS North Island has shown a reduction from 27 bird/aircraft strikes in 1996, to a low of 2 strikes occurring in 2006. Between 2004 and 2014 the average of strikes was seven per year (USDA, 2014).

3.6.2.2.5 Federally Listed Species

Table 3.6-1 identifies the federally listed wildlife species that have the potential to occur at NAS North Island, along with their status and habitat. Of the 15 federally listed species only two avian species (western snowy plover and California least tern) are known to occur at NAS North Island. **Figure 3.6-2** provides location information for the western snowy plover and California least tern in proximity to the project area. The federally listed green sea turtle and the four federally listed marine mammals (blue whale, fin whale, humpback whale, and killer whale-southern resident population) are known to occur offshore of NAS North Island. Marine mammals are discussed in **Section 3.6.2.2.1**. The western snowy plover, California least tern, and green sea turtle are described below.

California Least Tern

The California least tern is listed as endangered under the federal and state ESA, is a fully protected California Department of Fish and Wildlife species, and is protected under the MBTA. This species is known to occur and nest at NAS North Island (**Figure 3.6-2**). Due to the Navy's management under the INRMP, no designated critical habitat for this species currently exists on NAS North Island.

Portions of the project area are located within 500 feet of California least tern nesting locations (**Figure 3.6-2**). California least tern are known to nest within the 21-acre managed nesting site, herein referred to as the MAT site, located adjacent to the southern boundary of the project area (**Figure 3.6-2**). The MAT site was established by the Navy for California least tern nesting to offset impacts to nesting habitat from the LAMPSMK III project (FWS-SDG-1-1-82-F-123) and is located immediately south of the project area adjacent to the runway. In addition, California least tern nests have been found within and adjacent to the northern portion of the project area near Helipad 2 and the adjacent taxiway (**Figure 3.6-2**).

This species is a small gray and white seabird with long, narrow, black-tipped wings and a black cap. One of the smallest members in its family, this bird averages only 9 inches in length. The tern's breeding range extends from San Francisco Bay into Baja California. In the late spring and summer, the tern migrates north from wintering areas in Central and South America to southern California coastal areas to nest and raise its young. Terns generally breed in and around San Diego Bay between April 15 and August 15. California least terns nest colonially along the coast. The primary reasons for the failure of breeding colonies adjacent to San Diego Bay are bird and mammal predation, loss of preferred habitat, and human disturbance. Limited nesting sites are available throughout their breeding range and the species is continually being forced into larger colonies (Navy, 2013c).

California least tern at NAS North Island are managed in accordance with the NBC INRMP and in accordance with several Biological Opinions (BOs) and informal consultations with the USFWS, including Ongoing Airfield Operations and Management Strategies at NAS North Island BO (FWS-SDG-3908.3, 1 April 2005) (herein referred to as the Airfield BO) addressing airfield operations at NAS North Island. There have been several amendments to the Airfield BO. Applicable amendments are discussed further below. California least tern have been monitored since the late 1970s and are monitored yearly under an ongoing Navy-funded monitoring program.

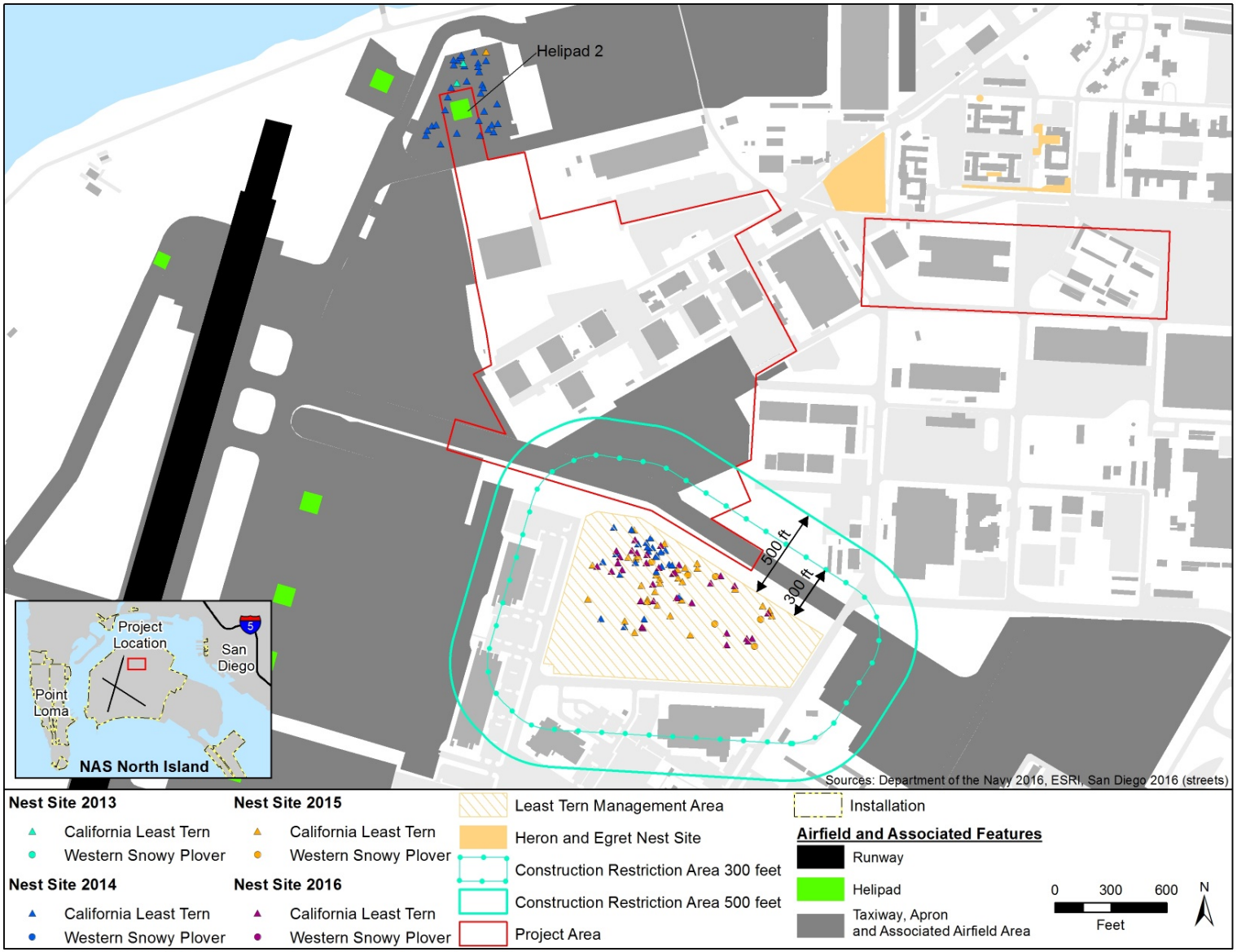


Figure 3.6-2: Federally Listed and Other Special Status Species Near Project Area at NAS North Island

In 2015, 32 nests of California least tern were observed within the MAT site and one nest was observed north of Helipad 2 (Boylan et al., 2016). As authorized within the Airfield BO amendment dated July 23, 2014 (FWS-SDG-11B0284-11F0424), the Navy actively deters California least terns from nesting at the taxiway site near Helipad 2 (primarily via habitat modification) (USFWS, 2011 and 2015). This species has not nested at the site since 2015 when only a single nest was laid and soon abandoned.

The NBC Public Works office, in coordination with the NBC Natural Resources Officer, is currently preparing a test site on NAS North Island with future plans to relocate the MAT site if the test site is successful (Navy, 2013c) and following ESA section 7 consultation with USFWS. The USFWS requires that it can be demonstrated that California least tern use an alternative nesting site on NAS North Island before the MAT site can be developed. The California least tern has not yet successfully nested at the new prepared MAT site (Boylan et al., 2015).

Predator management activities are performed on NAS North Island as a requirement of various BOs related to management strategies for the California least tern and western snowy plover (discussed below). The following species have been trapped at NAS North Island during predator control activities: feral cat (*Felis domesticus*), striped skunk, raccoon, Virginia opossum (*Didelphis virginiana*), gray fox (*Urocyon cinereoargenteus*), black-tailed jackrabbit (due to trampling and predator attractant potential), California ground squirrel, black rat (*Rattus rattus*), and Norway rat (*Rattus norvegicus*) (Navy, 2003c; Navy, 2004b; Navy, 2005; and Navy, 2006).

Western Snowy Plover

The western snowy plover is federally listed as threatened under the ESA, is a California Species of Special Concern, and is protected under the MBTA. Western snowy plovers are observed yearly during migration and winter roosting flocks are observed regularly at NAS North Island (Navy, 2013c). This species has historically nested on the beach and within the airfield at NAS North Island. Portions of the project area are located within 500 feet of the MAT site (managed nesting site) (**Figure 3.6-2**).

Western snowy plovers at NAS North Island are managed in accordance with the NBC INRMP and in accordance with several BOs and informal consultations with the USFWS, including, the Airfield BO (FWS-SDG-3908.3, 1 April 2005) addressing airfield operations at NAS North Island. There have been several amendments to the Airfield BO. Applicable amendments are discussed further below.

Due to the Navy's management under the INRMP, no critical habitat has been designated for the western snowy plover on NAS North Island's facilities. Current management for the western snowy plover, such as predator control in nesting areas, overlaps with management actions for the California least tern. Due to BASH concerns, and based on the Airfield BO, nesting is discouraged on the airfield by using various hazing techniques. All western snowy plover nests found on the NAS North Island airfield (including those laid within the MAT site) are collected by Navy personnel and taken to Sea World to be incubated and hatched. This is conducted under the Airfield BO and associated amendment dated 17 June 2015 (FWS-SDG-11B0284-11F0424-R003) (USFWS, 2011 and 2015). Chicks are raised in captivity and later released (Navy, 2013c). If plover nests are to be relocated, the Navy notifies the USFWS and California Department of Fish and Wildlife of all nests collected from the airfield through a weekly email report. Western snowy plovers are observed yearly during migration and winter at NAS North Island. Winter roosting flocks are observed regularly at NAS North Island.

Based on the Navy Lodge expansion and associated BO (FWS-SDG-3908.5), a plover management area is provided on 14.9 acres of managed land along NAS North Island's southern beach.

Western snowy plover surveys are conducted throughout the year at NAS North Island to document both breeding and non-breeding populations and distribution to determine the species' abundance and nesting success. In 2015, six western snowy plover nests were observed at the MAT site and ten nests were observed within the airfield (Boylan et al., 2016). For the first time in 2017, three snowy plover nests were found near the taxiway adjacent to Helipad 2 and collected under the Airfield BO.

Green Sea Turtle

The green sea turtle is federally threatened throughout its eastern North-Pacific range. Green sea turtles are often found off the coast of California from July through September. The population of green sea turtles in San Diego Bay is comprised of approximately 30 to 60 individuals (Navy, 2013c). Female green sea turtles are believed to migrate from San Diego Bay to nesting grounds in Mexico before nesting season, while male adults and sub adults stay in San Diego Bay. Green sea turtles are known to feed in eelgrass beds on associated algae and invertebrates. Green sea turtles have the potential to occur offshore of NAS North Island while in transit in and out of the San Diego Bay and within the eelgrass beds on the ocean and bay sides of NAS North Island (Navy, 2013c). The green sea turtle is managed under the San Diego Bay IRNMP and surveys are conducted on a regular basis to determine if individuals are present in San Diego Bay and near NAS North Island.

Aquatic habitat for the green sea turtle does not occur within the project area for the Proposed Action and would not be impacted by proposed operations of the Navy V-22 at NAS North Island. Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the green sea turtle. This species is not carried forward for further analysis in this EA.

3.6.2.2.6 Other Special Status Species

In addition to federally listed species, NAS North Island recognizes species that occur at a level of rarity that currently does not warrant federal listing. At NAS North Island, special status species include: California Department of Fish and Wildlife protected species, California Native Plant Society plants, Candidate Conservation Agreement species, Department of Defense Partners in Flight Priority species, BCCs, NatureServe listed species, and species protected under the MMPA. Marine mammals are discussed in **Section 3.6.2.2.1**.

Twenty special status species were identified during surveys conducted in 2015 and 2016 (Navy, 2017a) (**Table 3.6-3**). However, only two species (California least tern and western snowy plover) are known to occur within the project area (refer to **Figure 3.6-2**). Both the California least tern and western snowy plover are federally listed. Potential impacts to these species are discussed in **Section 4.6.2.5** (Federally Listed Species).

Other special status species with potential to occur within the project area include special status avian species and the San Diego black-tailed jackrabbit. Avian species may migrate through or stop over the project area (for feeding or resting) and are at risk of potential collision impacts with aircraft. Potential impacts to these species are discussed in **Section 4.6.2.4** (Migratory Birds) and **Section 4.6.2.3** (Bird/Animal Aircraft Strike Hazards).

The San Diego black-tailed jackrabbit is commonly observed within the built areas of NAS North Island, primarily in the ruderal habitats (e.g., vegetated areas and lawns). Jackrabbits are occasionally observed on the beach and in the sand verbena-beach bursage habitat. They may traverse improved areas with turf grass; however, they do not utilize areas within the project area for nesting. Jackrabbits require

shrubs or small conifers for hiding, nesting, and thermal cover. This species is not carried forward for further analysis in this EA.

Special status plant and invertebrate species are not known to occur within the project area, no suitable habitat exists, and/or habitat for these species would not be impacted by construction or operation of the Proposed Action at NAS North Island (**Figure 3.6-3**). Accordingly, the Navy has determined that the Proposed Action would not affect other special status plant species and therefore they are not carried forward for further analysis in this EA.

Special status bird species may be present in the open ocean and coastal waters near NAS North Island; however, marine/coastal habitat would not be impacted under the Proposed Action. In addition, as described in **Section 4.2** (Noise), implementation of the Proposed Action would not result in a perceptible change to noise, including noise over the marine environment. Consequently, the Navy has determined that there would be no impact to special status coastal/marine bird species. As such, these species are not discussed further in this document.

3.6.2.2.7 Climate Change

An overall discussion of climate change is provided in **Section 3.4.2.2** (Greenhouse Gases and Climate Change). This section provides a discussion of climate change as it relates to biological resources at NAS North Island. Climate is an important environmental influence on ecosystems. Changing climate affects ecosystems in various ways. For instance, warming may force species to migrate to higher latitudes or higher elevations where temperatures are more conducive to their survival. Similarly, as the sea level rises, saltwater intrusion into a freshwater system may force some key species to relocate or die, thus removing predators or prey that are critical in the existing food chain.

Ecosystems can serve as natural buffers from extreme events such as wildfires, flooding, and drought. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Examples include reefs and barrier islands that protect coastal ecosystems from storm surges, wetland ecosystems that absorb floodwaters, and cyclical wildfires that clear excess forest debris and reduce the risk of dangerously large fires.

Climate change and shifts in ecological conditions could support the spread of pathogens, parasites, and diseases, with potentially serious effects on human health, agriculture, and fisheries. Climate change, along with habitat destruction and pollution, is one of the important stressors that can contribute to species extinction. The Intergovernmental Panel on Climate Change estimates that 20 to 30 percent of the plant and animal species evaluated so far in climate change studies are at risk of extinction if temperatures reach the levels projected to occur by the end of this century.

While the implications of climate change may influence the various ecological processes noted above, the factors applicable to the Proposed Action at NAS North Island include extreme weather and sea level rise, as described in **Section 3.4** (Air Quality).

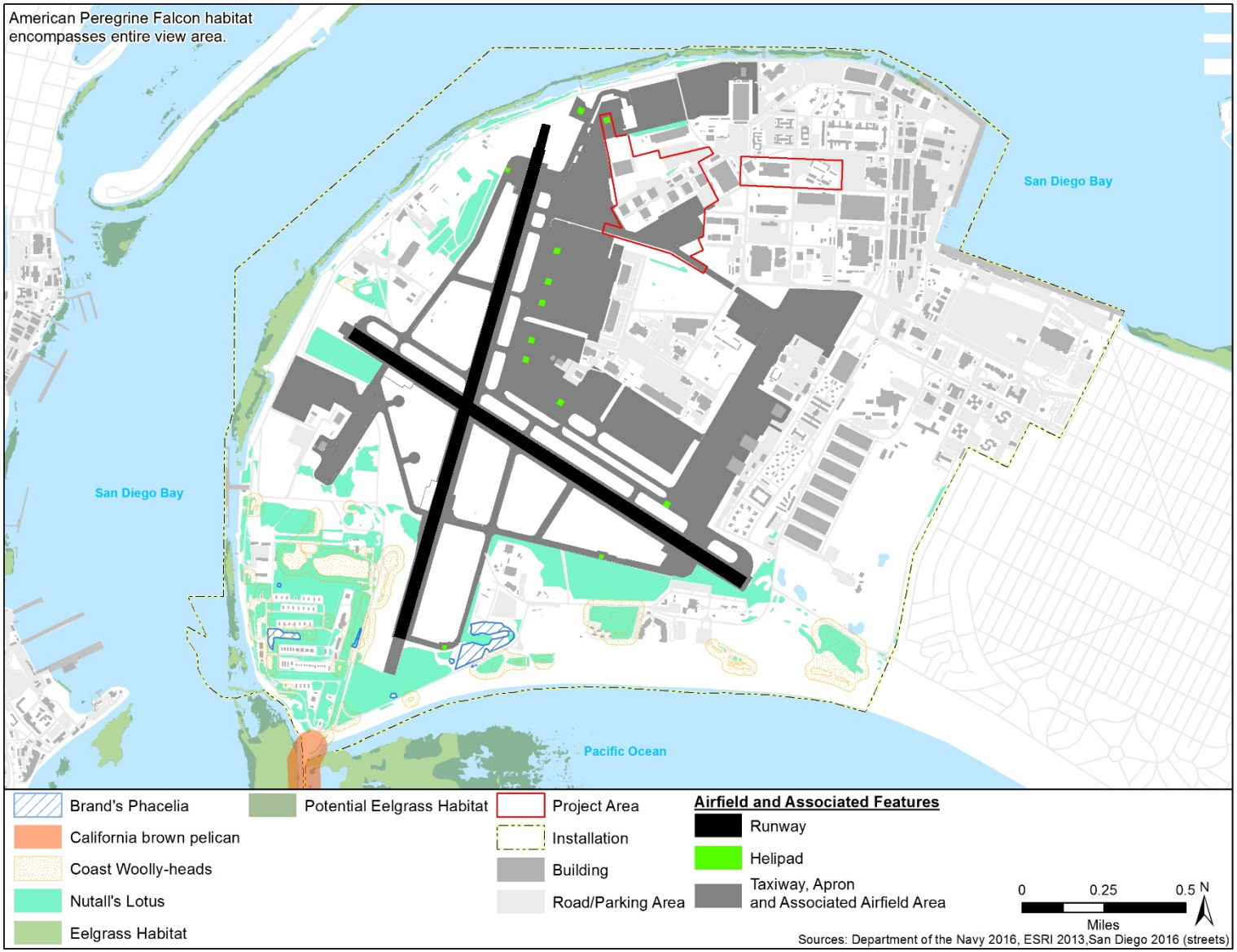


Figure 3.6-3: Other Special Status Species at NAS North Island

Table 3.6-3: Special Status Species Observed at NAS North Island

Common Name (Scientific Name)	*Status*	*Habitat*	*Potential to Occur within the Project Area Or Known Habitat Adjacent to the Project Area*
Birds			
Allen's Hummingbird (*Selasphorus sasin*)	PIF	Coastal forest, scrub, and chaparral	none[1]
American Peregrine Falcon (*Falco peregrinus anatum*)	BCC, CFP	Coastal estuaries and inland oases during migration periods and during the winter months	yes; this species is known to occur (flying and perched) at NAS North Island and has potential to fly or stop over
Black Skimmer (*Rynchops niger*)	SSC, BCC	Coastal estuaries protected from open surf. Nests on sandy islands, beaches, shell banks	potential to occur in coastal habitat adjacent to NAS North Island
Brant (*Branta bernicla*)	SSC	Coastal estuaries, salt bays	potential to occur in coastal habitat adjacent to NAS North Island
California Brown Pelican (*Pelecanus occidentalis californicus*)	CFP	Coastal areas, nests on islands	unlikely; but has potential to fly or stop over
California Least Tern (*Sternula antillarum browni*)	CE, CFP, MSCP	Salt pannes, beaches, dunes	yes, this species has nested adjacent to the project area at the MAT site and within and adjacent to the project area near Helipad 2
Caspian Tern (*Hydroprogne caspia*)	BCC	Coastal areas, beaches, nests on islands on bare ground among driftwood or debris	potential to occur in coastal habitat adjacent to NAS North Island
Common Loon (*Gavia immer*)	SSC	Coastal areas	potential to occur in coastal habitat adjacent to NAS North Island
Elegant Tern (*Thalasseus elegans*)	PIF	Coastal areas, beaches, estuaries, nests on sandy islands	potential to occur in coastal habitat adjacent to NAS North Island
Loggerhead Shrike (*Lanius ludovicianus*)	SSC, BCC, PIF	Grassland habitats with isolated trees or shrubs	none[1]
Long-billed Curlew (*Numenius americanus*)	BCC, PIF	High plains, rangeland, tidal flats, salt marshes	potential to occur in coastal habitat adjacent to NAS North Island
Western burrowing owls (*Athene cunicularia hypugea*)	SSC, BCC, PIF	Ruderal areas	low, species has been historically observed at NAS North Island
Western Snowy Plover (*Charadrius nivosus nivosus*)	BCC, SSC, MSCP	Intertidal mudflats, beaches, dunes, salt flats	yes, this species has nested adjacent to the project area at the MAT site
Yellow Warbler (*Setophaga petechia*)	SSC, BCC	Dry scrub, marshes, and forests	none[1]
Invertebrates			
Wandering skipper (*Panoquina errans*)	S2	Coastal areas, salt marshes	none[1]

Table 3.6-3: Special Status Species Observed at NAS North Island (cont.)

Common Name (Scientific Name)	*Status*	*Habitat*	*Potential to Occur within the Project Area Or Known Habitat Adjacent to the Project Area*
Mammals			
San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)	SSC	Ruderal areas, beaches, sand verbena-beach bursage	may traverse turf areas
Reptiles			
California legless lizard (*Anniella pulchra*)	SSC	Coastal dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces	none[1]
Plants			
Brand's Phacelia *(Phacelia stellaris*)	CCA	Sandy openings in Diegan coastal sage scrub near the coast	none[1]
Coast woolly-heads (*Nemacaulis demudata var. denudate*)	CRPR 1B.2	Ruderal areas, beaches, sand verbena-beach bursage	none[1]
Nuttall's lotus (*Lotus nuttallianus*)	CRPR 1B	Ruderal areas, sand verbena-beach bursage, and cracks of pavement near the developed areas	yes, known to occur within the MAT site adjacent to the project area
Torrey Pine (*Pinus torreyana*)	CRPR 1B.2	Coastal sage scrub	none[1]

Sources: Audubon, 2017; Navy, 2013c and 2017a; USFWS, 2017a

Notes: BCC= USFWS Bird of Conservation Concern; CCA= Candidate Conservation Agreement; CE= Candidate Endangered; CFP = CDFW Fully Protected Species; CRPR = California Native Plant Society Rare Plant Ranking (1B Rare, threatened, or endangered in California; 0.2-Moderately threatened in California [20-80% occurrences threatened / moderate degree and immediacy of threat]); MSCP= Multiple Species Conservation Program; NAS=Naval Air Station; PIF = Department of Defense Partners in Flight Priority Species; SSC = California Department of Fish and Wildlife Species of Special Concern; S2 = NatureServe State rank Imperiled

[1]none = species with no potential to occur are not carried forward for further analysis in the EA

3.7 WATER RESOURCES

This discussion of water resources includes groundwater, surface water, wetlands, and floodplains. This section discusses the physical characteristics of these resources; wildlife and vegetation are addressed in **Section 3.6** (Biological Resources).

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

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load (TMDL) is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur.

Wetlands are jointly defined by USEPA and U.S. Army Corps of Engineers (USACE) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in

saturated soil conditions." Wetlands generally include "swamps, marshes, bogs and similar areas" (40 CFR section 230.3[t] and 33 CFR section 328.3[b]).

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation, that is, the 100-year and 500-year flood. Floodplain delineation maps are produced by the Federal Emergency Management Agency and provide a basis for comparing the locale of the Proposed Action to the floodplains.

3.7.1 REGULATORY SETTING

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

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

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

Section 438 of the Energy Independence and Security Act (42 U.S.C. section 17094) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 square feet 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 California NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to obtain coverage under an NPDES Construction General Permit for stormwater discharges. Construction or demolition that necessitates an individual permit also requires preparation of a Notice of Intent to discharge stormwater and a Stormwater Pollution Prevention Plan (SWPPP) that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Wetlands are currently regulated by USACE under Section 404 of the CWA as a subset of all "waters of the U.S." The term "waters of the U.S." has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Jurisdictional waters of the U.S. regulated under the CWA include coastal and inland waters, lakes, rivers, ponds, streams,

intermittent streams, and "other" waters that, if degraded or destroyed, could affect interstate commerce. The full regulatory definition of waters of the U.S. is provided in the CWA.

EO 11990, *Protection of Wetlands,* requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other waters of the U.S. Any discharge of dredge or fill into waters of the U.S. requires a permit from USACE.

EO 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a one percent chance of inundation by a flood event in a given year.

The Coastal Zone Management Act (CZMA) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Actions occurring within the coastal zone commonly have several resource areas that may be relevant to the CZMA. The CZMA regulatory setting discussion is discussed in **Section 9.1.1** (Coastal Zone Management).

3.7.2 AFFECTED ENVIRONMENT

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

3.7.2.1 Groundwater

Groundwater on Coronado Peninsula, because of its proximity to San Diego Bay and the Pacific Ocean, is too saline for potable uses (Navy, 2013c). Accordingly, the Water Quality Control Plan for the San Diego Basin (Basin Plan), which designates beneficial uses for water bodies in the San Diego Region, exempts the Coronado Subunit from Municipal Groundwater as a beneficial use (California Regional Water Quality Control Board, 2016).

The groundwater gradient beneath NAS North Island is low, and the flow is west to northwest through the unconfined aquifer. The groundwater has a high total dissolved solids content, and has no designated use as an available water supply (Navy, 2013c). Groundwater at NAS North Island is anticipated to occur at depths of approximately 2 to 5 feet below the ground surface, which corresponds to a water elevation of approximately 8 to 9 feet above mean sea level (AMSL) (Navy, 2013c).

3.7.2.2 Surface Water

NAS North Island is within the Coronado Subunit of the Otay Hydrographic Unit and is bounded by the waters of San Diego Bay and the Pacific Ocean (Navy, 2013c). There are no naturally occurring streams or freshwater courses at NAS North Island, but manmade streams and ponds exist within the golf course area. The golf course is located along the eastern and southern extent of NAS North Island and is bounded by the City of Coronado to the east and the Pacific Ocean to the south.

Stormwater runoff originating from the project area is collected in stormwater inlets and routed through storm drains to stormwater outfalls to San Diego Bay. San Diego Bay is approximately 0.4 miles

north of the project area. San Diego Bay is a 303(d) impaired water due to copper and polychlorinated biphenyl concentrations.

NAS North Island operates under a NPDES permit for NBC (NDPES permit #CA0109185, Order No. R9-2015-0117) that covers outfalls that discharge stormwater from various industrial facilities on the installation, including NAS North Island. As part of the permit program, NBC has prepared a SWPPP to control stormwater discharges from the installation that could adversely affect water quality in surrounding surface waters. The SWPPP identifies sources of pollution that affect the quality of stormwater discharges from industrial areas associated with the NAS North Island airfield operation and support activities. The SWPPP also provides guidelines for the installation's stormwater pollution prevention program and technical procedures such as best management practices (BMPs) to prevent illicit discharges to the stormwater drainage system.

3.7.2.3 Wetlands

Wetlands and non-wetland jurisdictional waters of the United States, as defined by USACE, were identified during a planning level delineation on NAS North Island in 2005. A total of 0.2 acres of wetlands and 64.3 acres of non-wetland jurisdictional waters of the United States were delineated on NAS North Island. **Figure 3.7-1** shows wetlands and other waters of the U.S. that occur at NAS North Island. In addition, 0.1 acres of wetlands and 2.7 acres of non-wetland waters of the United States were considered exempt from USACE jurisdiction due to a lack of connection to navigable waters (Navy, 2006). Wetland habitat on NAS North Island includes patches of hydrophytic vegetation within the two tidally influenced coastal brackish marsh channels on the south part of the station. Positive indicators of all three wetland parameters were observed at these locations and the channels connect directly to the Pacific Ocean (Navy, 2006).

Non-wetland waters of the United States delineated on NAS North Island include the majority of the brackish channels (beyond the wetland habitat), the beach from the high tide line to the open water, and the open waters of the ocean and San Diego Bay. USACE regulatory jurisdiction extends within a zone of 3 nautical miles of the limits of land, including bays and harbors, and therefore applies to open water on the San Diego Bay and ocean side within the limits of NAS North Island (Navy, 2006).

The water hazards on the Sea 'N Air Golf Course on NAS North Island and a small wetland found near the helicopter wash area on the airfield are considered exempt from USACE jurisdiction due to the lack of connection to navigable waters (Navy, 2006).

Stormwater runoff from the project area discharges into San Diego Bay, a non-wetland water of the U.S. However, no wetlands or non-wetland waters of the U.S. occur in the project area. Therefore, wetlands are not discussed further in this EA.

3.7.2.4 Floodplains

The 100-year floodplain near NAS North Island, shown in **Figure 3.7-2**, corresponds roughly to the 10 feet AMSL contour line. Water is expected to reach this level only with the simultaneous occurrence of a 100-year storm, an extremely high tide, or a seismic tidal wave (Navy, 2006).

The elevation of the project area is approximately 20 feet AMSL and above the 100-year floodplain contour of 10 feet AMSL. The project area has been mapped as an area of undetermined but possible flood hazard (**Figure 3.7-2**). Under the Proposed Action, project facilities within the project area would not be impacted by flooding under current mean sea level elevations. Therefore, floodplains are not discussed further in **Section 4.7** (Water Resources).

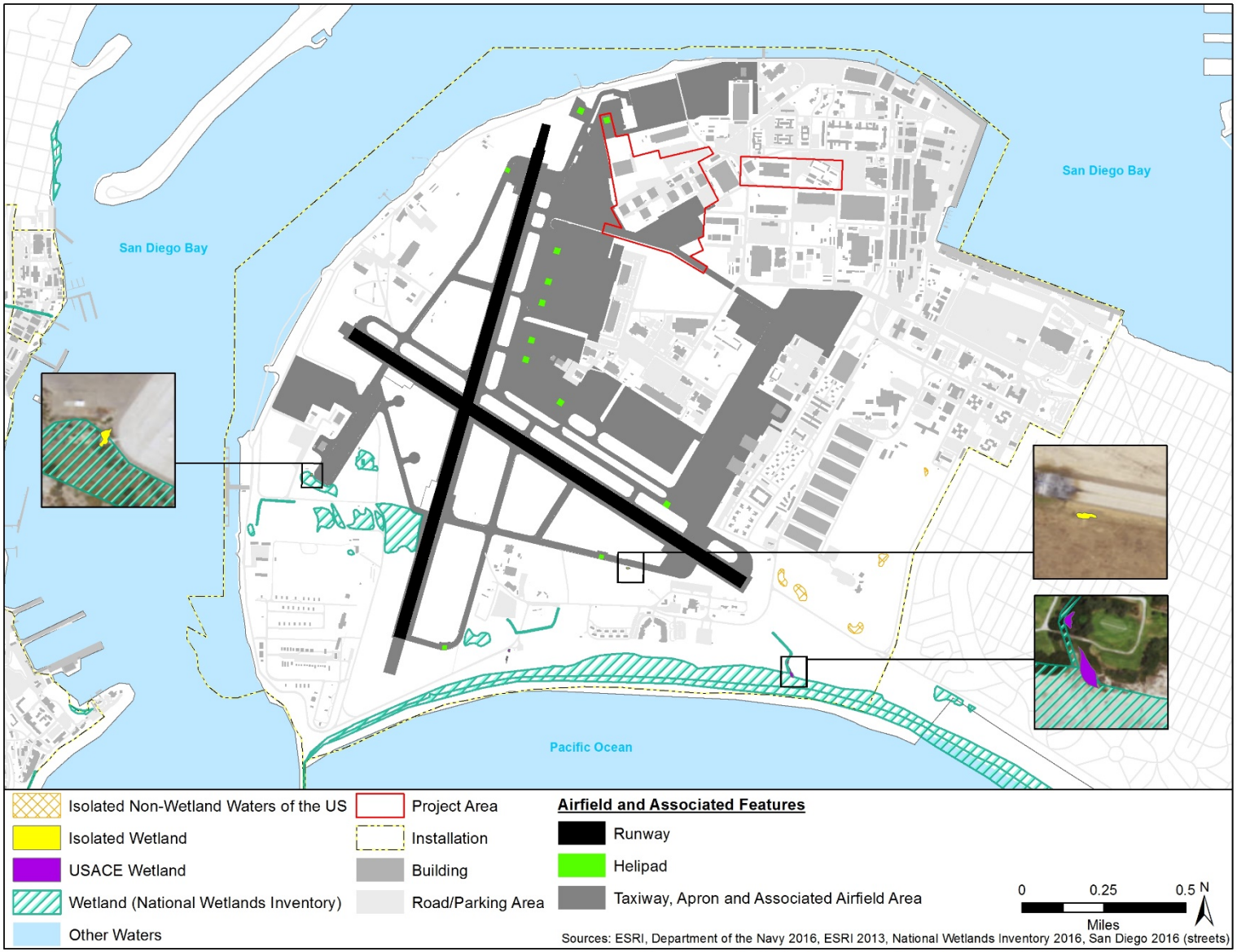


Figure 3.7-1: Wetlands and other Waters of the United States at NAS North Island

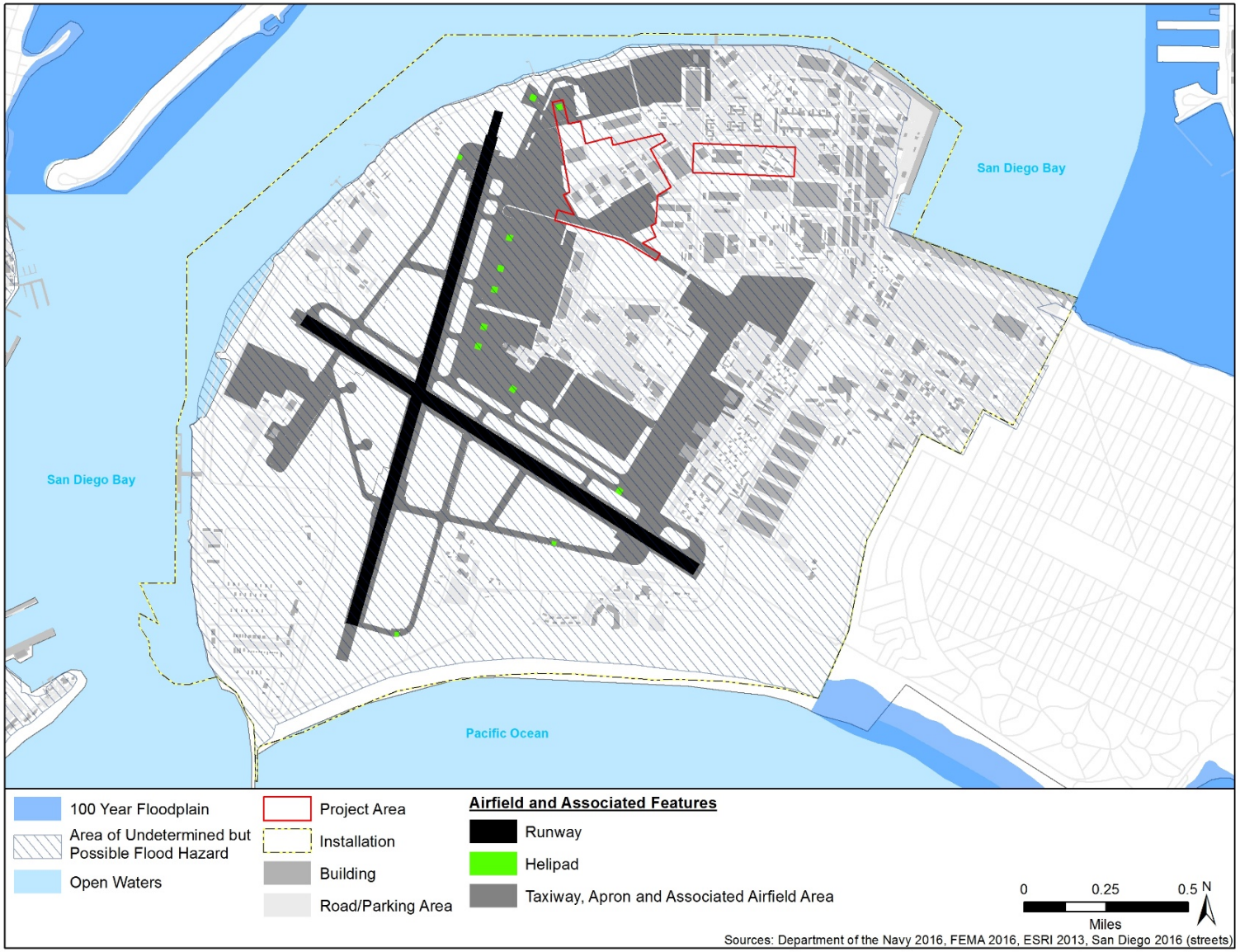


Figure 3.7-2: 100-Year Floodplain at NAS North Island

3.7.2.5 Climate Change

An overall discussion of climate change is provided in **Section 3.4.2.2** (Greenhouse Gases and Climate Change). This section provides a discussion of climate change as it relates to water resources at NAS North Island. Projections of future sea level rise depend on assumptions about GHG emissions, land subsidence or uplift, and the amount of ocean warming and ice sheet loss (National Research Council, 2012 and Coastal Ocean Working Group of California Climate Action Team, 2013). There is a wide range of predications based on the various assumptions. Based on a 2012 study by the National Research Council, the sea levels are predicted to rise along the California coast by 2 to 12 inches by 2030, 5 to 24 inches by 2050, and 17 to 66 inches by 2100 (National Research Council, 2012). A 2015 sea level rise study evaluated the impacts of local mean sea level rise of 0.5 meters (2 feet), 1 meter (3 feet), 1.5 meters (5 feet), and 2 meters (7 feet) on NBC, including NAS North Island (Chadwick et al., 2015). While portions of NAS North Island are estimated to be affected by sea level rise, the project area would not be subjected to flooding in most scenarios.

Under a 7-foot sea level rise scenario combined with a 100-year flood event, small portions of the project area would be temporarily under water (Chadwick et al., 2015). Sea level rise and storm surge can also have impacts far beyond the area directly affected, as they can combine with other climate-related impacts and existing pressures such as land subsidence, causing significant economic and ecological implications. Freshwater supplies from rivers, streams, and groundwater sources near the coast are at risk from accelerated saltwater intrusion due to higher sea levels. Porous aquifers in some areas make them particularly vulnerable to saltwater intrusion. However, the groundwater under NAS North Island is not a water supply; therefore, saltwater intrusion of the shallow aquifer would not impact the water supply.

3.8 INFRASTRUCTURE

This section discusses infrastructure, including utilities (e.g., water distribution, wastewater collection, stormwater collection, solid waste management, and energy) and facilities. Transportation systems and traffic are addressed separately in **Section 3.5** (Transportation).

3.8.1 REGULATORY SETTING

EO 13834, *Efficient Federal Operations* requires federal departments and agencies to meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. The goals of this EO focus on increasing building energy efficiency, renewable energy usage, reducing potable and non-potable water consumption, conforming with sustainable design principles, and implementing waste prevention/recycling measures. In accordance with this EO, the Navy must prioritize actions that reduce waste, cut costs, enhance the resilience of federal infrastructure and operations, and enable more effective accomplishment of its mission.

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

3.8.2 AFFECTED ENVIRONMENT

3.8.2.1 Water Distribution

NAS North Island's drinking water is sourced from the City of San Diego. The water is treated at the City of San Diego's Alvarado Filtration Plant which has a capacity of 120 million gallons per day (MGD). The city, through past agreements, sells treated water to the California American Water Company, which provides water service to NAS North Island. The City of San Diego imports an average of 85 percent of its water supply. This imported water is provided by the San Diego County Water Authority, which purchases water from the Metropolitan Water District of Southern California. Raw water is primarily sourced from the Colorado River as well as State Water Project supplies (City of San Diego, 2015b; Navy, 2016a). In 2015, NAS North Island purchased 1,568 acre-feet of water, which equates to an average daily consumption of approximately 1.4 MGD (City of San Diego, 2015c). Naval Facilities Engineering Command (NAVFAC) Southwest Utilities operates and maintains the internal water distribution systems for domestic use and fire protection at the installation.

3.8.2.2 Wastewater Collection

Wastewater throughout NAS North Island is collected via a sanitary sewer system featuring a mix of gravity lines, pumps, lift stations, and force mains. The system on the installation is operated and maintained by NAVFAC Southwest Utilities. Wastewater from the installation is then pumped south to the City of Coronado and then on to the San Diego Metropolitan Sewerage System's Point Loma Treatment Plant via a pipeline that crosses San Diego Bay. On average, the City of Coronado transfers 3.2 MGD of sewage to the treatment plant. The Point Loma Treatment Plant currently treats 175 MGD and has a capacity of 240 MGD (City of San Diego, 2016).

NAS North Island has an Industrial Wastewater Treatment Plant that discharges treated industrial wastewater to the sewer system. The wastewater is from metal plating facilities and other industrial processes at NAS North Island. The Industrial Wastewater Treatment Plant is permitted by the City of San Diego to discharge to the San Diego Metropolitan Sewerage System up to 3,097 gallons per day. NAS North Island also has an oil recovery plant which discharges treated oily wastewater to the San Diego Metropolitan Sewerage System. The oily wastewater is from the ships, ballast and bilge water, aircraft wash racks, and other facilities at NAS North Island. The oil recovery plant is permitted by the City of San Diego to discharge to the sanitary sewer up to 26,100 gallons per day. The stormwater at the Industrial Wastewater Treatment Plant and oil recovery plant facility is collected and diverted to the San Diego Metropolitan Sewerage System (California Regional Water Quality Control Board, 2015).

3.8.2.3 Stormwater Collection

Conventional storm drainage exists throughout NAS North Island. NAS North Island operates under a California NPDES permit that specifies effluent and other requirements for industrial and Small Military Base Municipal Separate Storm Sewer System outfalls. Several stormwater treatment devices and BMPs are located throughout the installation. Pump stations are located throughout the installation in the event of excessive ponding. The Proposed Action would not result in an alteration of the stormwater collection system. Therefore, stormwater collection infrastructure is not addressed further in this EA.

3.8.2.4 Solid Waste Management

Non-hazardous solid waste and potentially recyclable materials generated by NAS North Island are separated on the installation by a private contractor. NAS North Island solid waste and non-recyclable materials are transported to the City of San Diego's Miramar Landfill, while recyclable materials are

taken to a recycling center located on the installation. Miramar Landfill has a closure date of 2022; however, the County of San Diego has enough daily permitted disposal capacity for the next 17 years (County of San Diego, 2012).

The Navy has partnered with the City of San Diego to assist in extending the life of landfills and to meet solid waste reduction and diversion goals. The Navy has implemented policies and procedures in the Regional Integrated Solid Waste Management Plan (NAVFAC, 2014a) to maximize the diversion of materials entering the landfills, particularly construction and demolition debris. The Navy's goal is to divert 50 percent of non-hazardous solid waste from landfills. NBC generated approximately 10,600 tons of landfilled solid waste in 2014 and diverted 36.2 percent of its solid waste for recycling (NAVFAC, 2014a). In addition, NBC diverted 48 percent of its construction and demolition debris for recycling (NAVFAC, 2014a).

3.8.2.5 Energy

Electricity and natural gas are supplied to NAS North Island from San Diego Gas and Electric (SDG&E), a regulated utility. SDG&E operates and maintains the natural gas infrastructure throughout San Diego and Orange counties, including distribution of natural gas to NAS North Island. SDG&E provides energy service to approximately 3.6 million people in a 4,100-square-mile service area (SDG&E, 2016). Electricity enters NAS North Island via a 69-kilovolt overhead line and is stepped down to 12 kilovolts for distribution throughout the installation. Additional electricity is generated at NAS North Island from a 50-megawatt cogeneration plant (a plant that produces electricity and steam) and a 750-kilowatt solar electric carport. NAS North Island uses about 175,000 megawatt hours of electricity annually. The cogeneration plant is slated for deactivation in the near future and at that time any required additional electricity would be provided by SDG&E. The current installation load at NAS North Island is approximately 45 megawatts with three carriers in port (Mugg, 2016).

SDG&E supplies natural gas from a 4-inch steel main with metering located throughout the installation. NAS North Island currently burns the natural gas equivalent of about 480,942 million British Thermal Units annually. All electric and gas infrastructure on the installation is operated and maintained by NAVFAC Southwest Utilities (Navy, 2014b).

Steam is currently produced by the cogeneration plant and is distributed throughout the installation. Steam loads at NAS North Island consist of buildings, ships, and distribution losses. The cogeneration plant is slated for deactivation in the near future. Steam loads at NAS North Island would then be supplied by new boilers located throughout the installation (decentralized) (Navy, 2014b).

The Defense Fuel Support Point at NB Point Loma provides fuel (JP-5 and diesel) to NAS North Island. Purchased from private contractors, the fuel is pumped through two 10-inch-diameter pipelines to storage tanks at NAS North Island. Pipelines located on NAS North Island are the installation's responsibility, while the fuel pipelines located off installation are owned and maintained by the Defense Fuel Support Point.

3.9 CULTURAL RESOURCES

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

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Traditional cultural properties (TCPs) may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

3.9.1 REGULATORY SETTING

Cultural resources are governed by other federal laws and regulations, including the National Historic Preservation Act (NHPA), Archeological and Historic Preservation Act, American Indian Religious Freedom Act, Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Federal agencies' responsibility for protecting historic properties is defined primarily by sections 106 and 110 of the NHPA. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties. Section 110 of the NHPA requires federal agencies to establish—in conjunction with the Secretary of the Interior—historic preservation programs for the identification, evaluation, and protection of historic properties. Cultural resources also may be covered by state, local, and territorial laws.

3.9.2 AFFECTED ENVIRONMENT

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

The Navy has conducted inventories of cultural resources at NAS North Island to identify historic properties that are listed or potentially eligible for listing in the NRHP (NAVFAC, 2012).

For NAS North Island, compliance with Section 106 of the NHPA and 36 CFR 800 follows the NBC Programmatic Agreement (PA), executed in May 2014 between Commanding Officer, NBC, the Advisory Council on Historic Preservation, and the SHPO (Commanding Officer, NBC and California SHPO, 2014). The NBC PA provides for Commanding Officer, NBC determinations of an undertaking's area of potential effect (APE), identification of potentially affected historic properties, and assessment of "no historic properties affected" and "no adverse effect" without further consultations with SHPO as normally required under 36 CFR 800.

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

In conformance with Stipulation VI of the NBC PA, Commanding Officer, NBC identified the APE for this Proposed Action as the project area (i.e., where facilities construction and demolition would occur) (**Figure 2.1-1**) and buffers of 98 feet and 328 feet surrounding the project area. The 98-foot buffer is for

potential effects to NRHP-eligible or NRHP-listed archaeological resources, and the 328-foot buffer is for potential effects to NRHP-eligible or NRHP-listed historic districts, buildings, structures, or landscapes.

Typically, the Navy in accordance with DoD policy would also consider the 65 dB CNEL noise contour as defining the APE in order to evaluate the potential impacts of the Proposed Action as it relates to cultural resources and historic properties, including architectural or built resources, archaeological resources and American Indian Resources. Typically, this analysis would evaluate the undertaking with the potential to affect historic properties and consider both the direct effects of the proposed action (construction, renovation and demolition activities) as related to architectural features of historic properties and the indirect effects of the proposed action (noise, vibration and aesthetics of aircraft operations) on historic properties. Since there is no discernable change in aircraft noise contours (refer to **Section 4.2** [Noise]) between the No Action Alternative and the action alternatives, and a very slight change in operational tempo at the airfield, any potential effects of the undertaking would be nearly identical to current conditions. Furthermore, the Navy is relying on previous consultations for the broader area under the 65 dB CNEL noise contour. Therefore, the Navy is focusing its analysis on the direct effects of the Proposed Action related to construction, renovation, and demolition activities and indirect effects of noise, vibration, and aesthetics of those construction activities within the viewshed.

3.9.2.1 Architectural Resources

Nine separate studies have been conducted on the historic buildings and structures at NAS North Island. These studies consisted of the 1975 nomination of the Rockwell Field Historic District to the NRHP; a historic context of North Island, evaluations of historic buildings, and subsequent NRHP nominations prepared for the NAS San Diego Historic District and Rockwell Field Historic District; a nomination for Seaplane Hangar 340 as a California Historical Civil Engineering Landmark; a maintenance plan for buildings identified as historically significant; and a historic context and evaluation for 13 buildings at NAS North Island that are outside the boundaries of the two established historic districts (NAVFAC, 2012). **Figure 3.9-1** illustrates the locations of the NRHP-listed and NRHP-eligible architectural resources in relation to the project area. None of the buildings that would be demolished under the proposed alternatives are historic properties and/or contributing elements to a historic district.

3.9.2.1.1 Naval Air Station San Diego Historic District

The NAS San Diego Historic District is located in the northeast corner of the installation. These buildings and structures were constructed during the period from World War I to World War II, and they played a fundamental role in the development of the nation's aviation program. The historic district is significant under NRHP Criterion A in the area of military history for its association with the early development of naval aviation and its role as the main naval aviation station for the Pacific Fleet. It is also eligible under Criterion C for its architectural significance as a representation of the work of master architect Bertram Goodhue, and as a good example of the mission and Spanish revival architectural styles (NAVFAC, 2012).

The NAS San Diego Historic District is located outside the project area, but some of the contributing elements are within the 328-foot buffer of the project area included in the APE for the proposed alternatives.

3.9.2.1.2 Rockwell Field Historic District

The Rockwell Field Historic District is located at the southern end of NAS North Island and represents the principal industrial and residential core of the first permanent Army airfield in the United States as well as the first Army school to provide flight training for military pilots. This historic district is significant

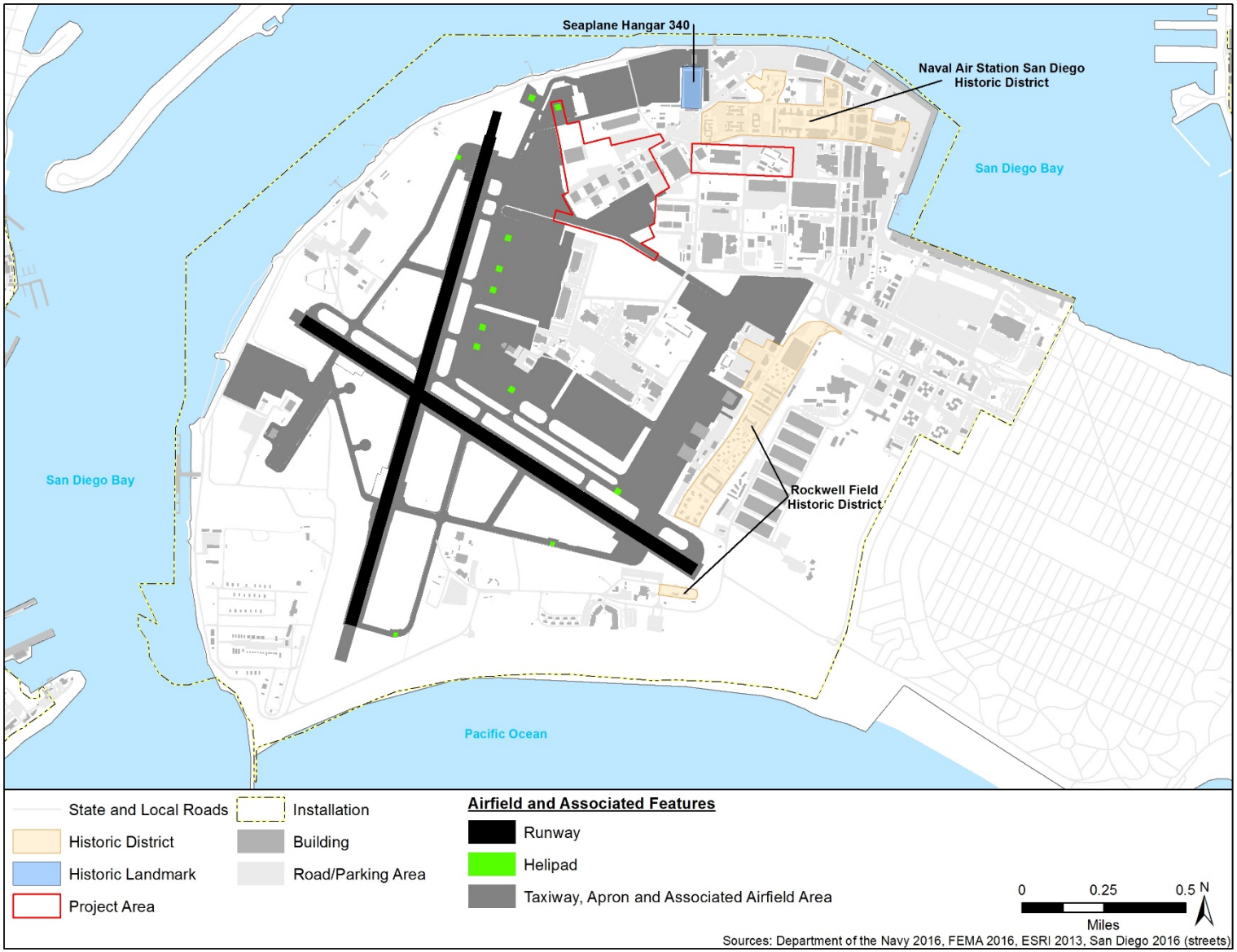


Figure 3.9-1: Historic Properties at NAS North Island

under NRHP Criterion A in the area of military history as the first permanent Army airfield in the nation and for its association with early military aviation, and under Criterion C for its architectural significance as a good example of the mission and Spanish revival architectural styles, as well as a representation of the work of master architect Albert Kahn (NAVFAC, 2012). The Rockwell Field Historic District is located outside the APE for the proposed alternatives.

3.9.2.1.3 Seaplane Hangar 340 California Historical Civil Engineering Landmark

Seaplane Hangar 340 has been determined eligible for listing on the NRHP. Located adjacent to the NAS San Diego Historic District, Hangar 340 was built to house seaplanes in 1941 as part of the pre-World War II expansion of NAS North Island. The 2012 Integrated Cultural Resources Management Plan (ICRMP) for NBC notes that the hangar is significant in the area of military history, as it contributed to NAS North Island's role in World War II, and is an architectural representation of a specific method of construction and military building type (NAVFAC, 2012). Seaplane Hangar 340 was the largest reinforced concrete hangar in the United States, with a cylindrical shell roof considered to be more resistant to bomb blasts and harder to see from the air. The hangar also utilized trusses, arches, and rigid frames to provide enclosed areas to perform maintenance on the aircraft (NAVFAC, 2012). Seaplane Hangar 340 was designated a California Historical Civil Engineering Landmark in 1997 (NAVFAC, 2012).

Seaplane Hangar 340 is located outside the APE for the proposed alternatives.

3.9.2.2 Archaeological Resources

The earliest known archaeological inventory on NAS North Island was done in the early 1900s by Howard O. Welty (NAS North Island, 1997), prior to the extension of the island through filling of tidal wetlands and the Spanish Bight to accommodate the expansion of the installation's key role during World War II (NAVFAC, 2012). Welty mapped and described five prehistoric shell midden sites of various sizes, distributed along the shorelines of the southern margin of the island as it existed at that time. The location of these sites have not been formally located or recorded, although it is possible that some of them may exist below the pavement in front of the existing hangars in the APE (Yatsko, 2016).

Three studies have been conducted pertaining to archaeological resources on the installation as it is currently configured. These studies consist of a cultural resources survey of NAS North Island and Naval Outlying Field Imperial Beach, which identified four archaeological sites; two other studies evaluated the NRHP significance of the four known archaeological sites at NAS North Island. Three of these sites have been recommended as eligible for listing on the NRHP, and none of them are located within the APE, which includes the project area and a 98-foot buffer surrounding the project area.

3.9.2.3 Traditional Cultural Properties

The Navy consults with federally recognized Indian tribes on actions with the potential to significantly affect protected tribal resources, tribal treaty rights, or Indian lands. In the case of NAS North Island, the Kumeyaay Indian Tribes are the federally recognized tribe. The 12 Kumeyaay Indian Tribes established a common consultation entity, the Kumeyaay Cultural Repatriation Committee that is comprised of members representing each tribe and sanctioned by all 12 tribal governments to consult in their interests (NAVFAC, 2012).

There are no TCPs at NAS North Island that are listed in the National Register and no known TCPs that are considered potentially eligible for listing. The California Native American Heritage Commission TCP register lists no Kumeyaay or other Native American TCPs associated with NAS North Island. This was

confirmed during consultation for the 2014 NBC PA, at which time the Kumeyaay Indian Tribes did not identify any TCPs (Commanding Officer, NBC and California SHPO, 2014).

3.10 HAZARDOUS MATERIALS AND WASTE

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

3.10.1 REGULATORY SETTING

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

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR part 273. Four types of waste are currently covered under the universal wastes regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). USEPA is given authority to regulate special hazard substances by the Toxic Substances Control Act. Asbestos is also regulated by USEPA under the Clean Air Act, and the Comprehensive Environmental Response, Compensation, and Liability Act.

Included in the special hazards analysis are perfluorinated compounds (PFC) and polyfluoroalkyl substances (PFAS). PFC and PFAS are a suite of over 100 chemicals, several of which are of emerging public health concern to the Navy, USEPA, state regulators, public water systems, and the general public. USEPA uses the Unregulated Contaminant Monitoring Rule (UCMR) to collect data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA). Under this rule the Navy was required to sample drinking water at 17 installations. Independent of the UCMR, the Navy is also taking action to identify PFC/PFAS potential areas of concern (AOCs) at all of its installations. In accordance with the memorandum on the identification of potential AOCs (Navy, 2016b), the Navy is committed to identifying, evaluating, and where appropriate, remediating contamination resulting from its activities.

The most common Navy activity that results in the release of PFC/PFAS to the environment is through the use of aqueous film forming foam (AFFF) for testing, training, firefighting, and other emergency responses. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are the primary PFOSs of concern. Current Navy Policy on AFFF Control, Removal, and Disposal (Navy, 2016c) prohibits the

uncontrolled environmental release of AFFF except for emergency responses and requires that hangar AFFF systems have appropriate controls in place to prevent environmental releases. The Navy intends to remove, dispose, and replace legacy AFFF that contains PFAS once environmentally suitable substitutes are identified and certified to meet Military Defense Specifications. The most recent formulations are free of PFOS but may contain trace quantities of PFOA. The Navy is removing all uninstalled PFOS-containing AFFF in drums and cans to prevent future environmental releases.

The DoD established the Defense Environmental Restoration Program (DERP) to facilitate thorough investigation and cleanup of contaminated sites on military installations (active installations, installations subject to Base Realignment and Closure, and formerly used defense sites). The Installation Restoration Program and the Military Munitions Response Program are components of the DERP. The Installation Restoration Program requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The Military Munitions Response Program addresses nonoperational rangelands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination. The Environmental Restoration Program is the Navy's initiative to address DERP.

3.10.2 AFFECTED ENVIRONMENT

The Navy has implemented a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for all activities. These programs are governed Navy-wide by applicable Office of the Chief of Naval Operations (OPNAV) instructions and at the installation by specific instructions issued by the Base Commander. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes. Resource, Conservation, and Recovery Act and Installation Restoration Program (IRP) Sites at NAS North Island are shown in **Figure 3.10-1**.

3.10.2.1 Hazardous Materials

Various hazardous materials (e.g., gasoline, diesel fuel, aviation fuel, engine oil, various lubricants, painting materials, and ethylene glycol) are used to support building, aircraft, target, and vehicle operations and maintenance at NBC (Navy, 2017b). NBC obtains certified unified facility program permits for hazardous waste generation. NBC also obtains certified unified facility program permits for underground storage tanks storing hazardous materials and for aboveground storage tanks storing petroleum, oil and lubricants, pursuant to the Aboveground Petroleum Storage Tank Act. NBC also complies with Emergency Planning and Community Right to Know Act reporting, including annual 312 reporting of hazardous materials, by March of every year using the California Environmental Reporting System. In an agreement with the California Environmental Protection Agency, the Emergency Planning and Community Right to Know Act 312 reporting is performed using the state reporting thresholds (55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for gases) without taking any exemptions. NBC also complies with the Emergency Planning and Community Right to Know Act 313 annual Toxic Release Inventory reporting by July of every year using the USEPA TriMeWeb software application.

Transport on public roads of hazardous materials is controlled and regulated by the U.S. Department of Transportation (49 CFR section 177). The state enforces federal transportation safety regulations within its jurisdiction. Bulk hazardous material loads are prohibited from using Coronado Bridge, so hazardous materials for NAS North Island must be transported from Interstate (I)-5 via Imperial Beach on SR-75 to Interstate (I)-5 (Navy, 2011b).

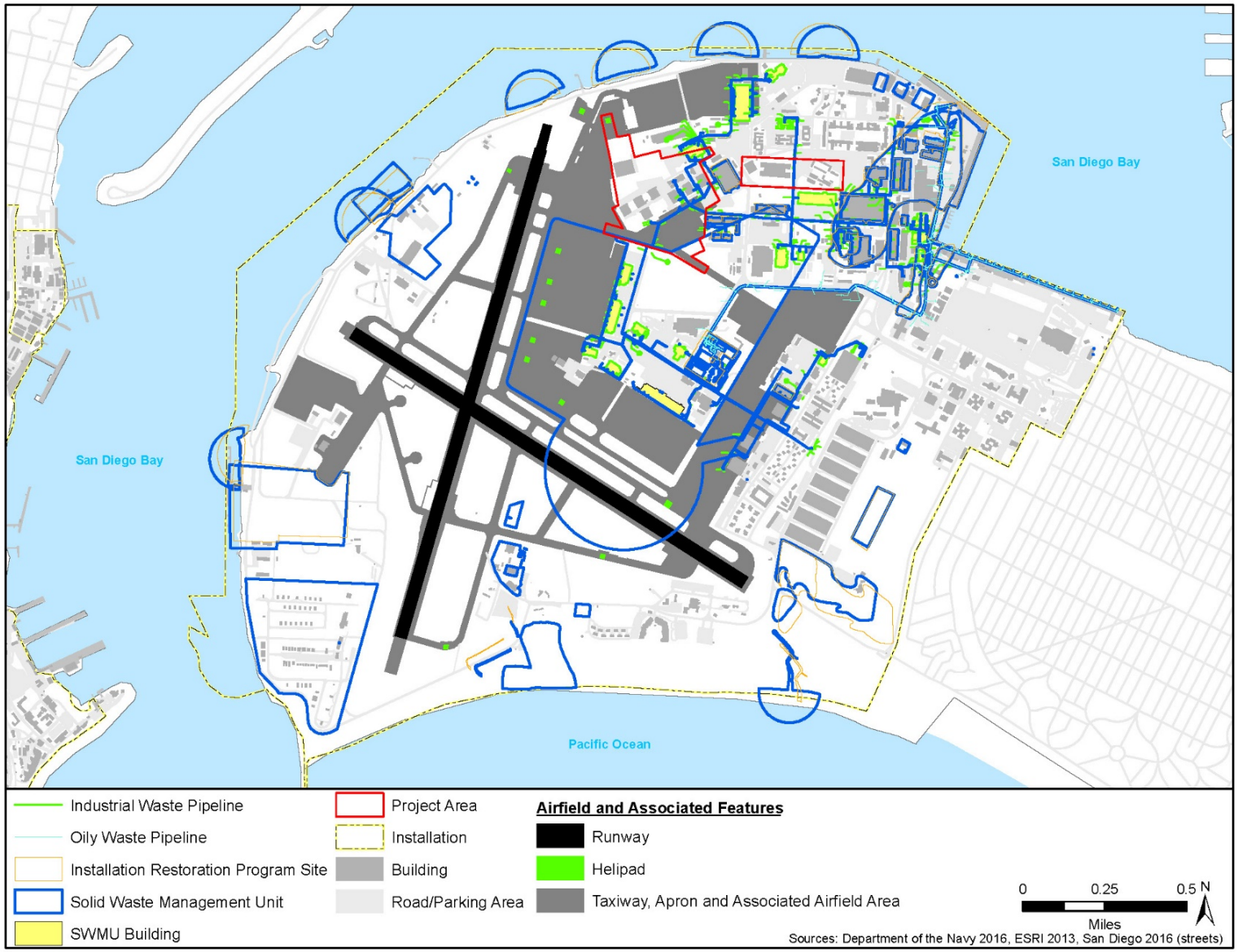


Figure 3.10-1: Resource, Conservation, and Recovery Act and Installation Restoration Program Sites at NAS North Island

3.10.2.2 Hazardous Waste

NAS North Island is a large-quantity generator of hazardous waste in compliance with RCRA (USEPA RCRA Identification Number CA7170090016). The Navy has implemented a Hazardous Waste Minimization Program for all naval activities. These programs are governed Navy-wide by applicable OPNAVINSTs and at NAS North Island by specific instructions issued by the base commander. Hazardous waste is managed in accordance with the Commander Navy Region Southwest Hazardous Waste Management Plan (Navy, 2015b). The plan provides comprehensive and consistent guidance to personnel at NAS North Island for characterization, storage, disposal, and record-keeping of hazardous waste. The Navy continues to monitor its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes (Navy, 2011b).

Hazardous waste is taken to the Hazardous Waste Facility, which is a contractor run RCRA Part B permitted facility. The Commander Navy Region Southwest is the permit owner. The Hazardous Waste Facility has two containerized waste storage units, one Industrial Waste Treatment Plant unit and one oil recovery plant unit. The Hazardous Waste Facility handles wastes from federal facility operations only, and those generated both on-site and from off-site. Disposal of hazardous materials, oils, lubricants, solvents, etc. is conducted in accordance with applicable federal and Navy regulations (Navy, 2011b).

3.10.2.3 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyfluoroalkyl Substances)

ACMs can be present in any age building, but are most likely to be found in buildings constructed prior to 1989. LBP can be present in buildings constructed prior to the 1978 ban. PCBs can be present in products and equipment produced before the 1979 ban. Because the Navy has operated the various portions of NAS North Island for several decades, it is assumed that some buildings contain ACMs, LBP, and PCBs (Navy, 2017b).

AFFF is used for fire suppression at NAS North Island. Per the EPA UCMR, NAS North Island was not required to sample for PFAS/PFC contamination. No AOCs for PFAS/PFC contamination have been identified at NAS North Island (Navy, 2016b).

3.10.2.4 Defense Environmental Restoration Program

As of October 2012, 146 active IRP sites were identified at NAS North Island (Navy, 2014b). As shown in **Figure 3.10-1**, no IRP sites are located in the project area. Therefore, IRP sites are not evaluated further in **Section 4.10** (Hazardous Materials and Waste)

3.11 SOCIOECONOMICS

This section discusses population demographics and economic indicators to provide key insights into socioeconomic conditions that might be affected by a proposed action.

The USEPA defines Environmental Justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

3.11.1 REGULATORY SETTING

Socioeconomic data shown in this section are presented at the city, county statistical area, and county levels to characterize baseline socioeconomic conditions in the context of local and regional trends. Data have been collected from previously published documents issued by federal, state, and local agencies and from state and national databases (e.g., USCB).

Consistent with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations. The Council on Environmental Quality (CEQ) Environmental Guidance under NEPA defines a minority population as either: (1) the minority population of the affected area exceeds 50 percent, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the appropriate community of comparison (CEQ, 1997). Low-income environmental justice communities are identified by comparing the percentage of the population living below the poverty level to the larger community as a whole (CEQ, 1997). If the percentage of residents with incomes below the poverty level in the community is greater than (or equal to) the percentage of residents in the community of comparison who have incomes below the poverty level, then there is a low-income environmental justice community.

3.11.2 AFFECTED ENVIRONMENT

3.11.2.1 Demographics

Demographics include data on population, race, age, housing, and income. The project area is located in the San Diego Bay area, which is within the southwestern portion of San Diego County. NAS North Island is bordered to the south by the City of Coronado. San Diego County has been divided into six major statistical areas (MSAs). The project area is within the Central MSA (MSA 0). The City of Coronado, City of San Diego, the Central MSA 0, and San Diego County comprise the affected environment. **Table 3.11-1** presents demographic data for the City of Coronado, City of San Diego, Central MSA 0, and San Diego County.

Table 3.11-1: Demographics

Population	*City of Coronado*	*City of San Diego*	*Central MSA 0*	*San Diego County*
Population (2010)	24,697	1,307,402	630,376	3,095,313
Population Projection (2020)	26,370	1,453,267	725,331	3,535,000
Population Projection (2030)	26,811	1,665,609 (2035)	802,366	3,870,000
Minority (2020)	29%	59%	72%	54%
Median Age (2020)	31.4	35.2	33.6	37.4
Under Age 18 (2020)	15.0%	21.3%	24.4%	26.9%
Housing Units (2020)	9,580	559,143	264,516	1,262,488
Housing Units (2030)	9,651	640,668	294,652	1,369,807
Per Capita Income (2015)	$49,037	33,902	N/A	$31,266
Median Household Income (2015)	$90,256	66,116	N/A	$64,309
Individuals Living Below the Poverty Level (2015)	6.0%	15.4%	N/A	13.9%

Sources: USCB, 2016; SANDAG 2011a, 2011b, 2013; California Department of Finance, 2017
Note: N/A=not applicable

In Coronado, population growth is expected to be 6.8 percent between 2010 and 2020, slowing to 1.7 percent between 2020 and 2030. In the City of San Diego, population growth is expected to be 11 percent between 2010 and 2020 and 15 percent between 2020 and 2035. Within the Central MSA 0, population growth over the same time period is expected to be 15.1 percent and 10.6 percent, respectively. The County of San Diego is expected to grow 14.2 percent and 9.5 percent over the same time periods.

The median age is lower in Coronado (31.4 years) than in the Central MSA 0 (33.6 years) and in the county (37.4 years). The percentage of the population less than 18 years is also lower in Coronado (15 percent) than in the City of San Diego (21.3 percent), the Central MSA 0 (24.4 percent) and the county (26.9 percent).

The 2020 estimated housing stock in Coronado is projected to be 9,580 units, in San Diego 559,143, in the Central MSA 0, 264,516, and in the county, 1,262,488. The number of units is projected to increase by 1 percent, 15 percent, 11 percent, and 9 percent in 2030 in Coronado, San Diego, Central MSA 0, and San Diego County, respectively. The small increase for Coronado is attributed to the built-out character of this city. The majority of housing units are renter or owner occupied. Vacancy rates projected for 2020 are 17.7 percent in Coronado and 5.7 percent in the Central MSA 0 (SANDAG, 2011a, 2011b).

The Navy determined whether there are any areas of minority and low-income populations that may experience disproportionately high and adverse impacts from the Proposed Action. These environmental justice communities were determined by analyzing the demographic and economic characteristics of the affected area and comparing those to the characteristics of the larger community as a whole. This larger community is known as the community of comparison. For the purposes of this EA, the environmental justice analysis concentrates on the communities most likely affected by actions at NAS North Island, including areas exposed to the 65 dB CNEL or greater noise zones for aircraft operations (refer to **Section 3.2**, Noise); this includes the City of Coronado and the City of San Diego. The community of comparison is San Diego County. **Table 3.11-1** shows that the projected 2020 minority population is expected to be 29 percent in Coronado, 59 percent in the City of San Diego, 72 percent in the Central MSA 0, and 54 percent in San Diego County. Based on these demographics, the City of Coronado does not have a minority population. The City of San Diego, Central MSA 0, and San Diego County have minority populations above 50 percent (59, 72, and 54 percent, respectively), and therefore, are considered an environment justice communities, as defined by CEQ (CEQ, 1997).

Per capita income and median household income are both higher in Coronado ($49,037 and $90,256, respectively) than in the City of San Diego ($33,902 and $66,116), and in San Diego County ($31,266 and $64,309, respectively). The percentage of individuals living below the poverty line is lower in Coronado (6 percent) than in the City of San Diego (15.5 percent), and the county (13.9 percent). Therefore, Coronado does not have a low-income population, but the City of San Diego is considered to have a low-income population when compared to San Diego County.

The economy of the San Diego region is primarily based on the service, retail trade, government, and manufacturing sectors. Major employers in the county include military, federal and state governments; university and college campuses; and hospitals and medical centers. The county unemployment rate declined from 8.1 percent in 2012 to 4.7 percent in 2016. The comparable 2016 rate for the United States was 4.9 percent (California Employment Development Department, 2017).

3.11.2.2 Navy Role in Demographics

The Navy has a strong presence in the San Diego Bay area. NAS North Island is one of the eight installations making up NBC. NAS North Island is the largest naval aviation industrial complex on the West Coast and employs approximately 23,250 active duty military, reserve, and civilian personnel (Bourbeau, 2016). The Navy's total contribution to the San Diego region includes approximately 34,600 military and civilian positions (Bourbeau, 2016). The total economic benefit of the military in San Diego County in Fiscal Year 2015 included $24.8 billion in direct spending and approximately 328,000 jobs after accounting for the ripple effects of military spending (San Diego Military Advisory Council, 2015).

NBC provides military housing for unaccompanied personnel and families. There are 5,844 unaccompanied personnel beds in barracks and dormitories. For accompanied personnel, there are 9,135 family housing units across 35 sites, including 700 Public Private Venture family housing units. Approximately 400 families were on the wait list as of the end of Fiscal Year 2016. Wait list times range from 0 to 40 months and are dependent on location, bedroom count, and pay grade (Bourbeau, 2016).

Children of military families comprise approximately 36 percent of the City of Coronado school population. There are eight schools within one mile of NAS North Island. The Coronado Unified School District serves approximately 3,200 students in five schools (Coronado Unified School District, 2016). The San Diego County Office of Education supports approximately 780 schools and approximately 500,000 students in San Diego County (San Diego County Office of Education, 2017).

NBC also offers child and youth programs including a Child Development Center at NAS North Island with 274 spaces and at NAB Coronado with 114 spaces. The wait list at NAS North Island is approximately 650 places and at NAB Coronado, 536 places. A 24 hour, 7 day a week child and youth center is available at NAS North Island for dual/single active duty military families requiring extended care due to scheduled shiftwork and/or official duty. The waitlist is approximately 205 places (Bourbeau, 2016). NBC has plans to expand capacity of the Child Development Centers through the construction of a new center with planned capacity of 305 children. There are over 1,000 child care centers in San Diego County. Within a 5-mile radius of NAS North Island, there are 37 child care centers with total capacity for 1,877 children (Child Care Center US, 2017).

4 WEST COAST FLEET LOGISTICS CENTER ENVIRONMENTAL CONSEQUENCES

This chapter presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. The following discussion elaborates on the nature of the characteristics that might relate to resources. "Significantly," as used in the National Environmental Protection Act (NEPA), requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 Code of Federal Regulations [CFR] part 1508.27). Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would be expected to be significant.

The Proposed Action would be implemented over a 10-year period beginning in 2018 with facility construction/renovations and some personnel actions at NAS North Island and NS Norfolk. Eventually, the Navy V-22 training squadron and maintenance school would be established, either on the West Coast or the East Coast, to fully support Navy training requirements. The transition from the C-2A to the Navy V-22 would begin in 2020, with the final retirement of the C-2A planned for 2026. The transition of aircraft and personnel is expected to be complete in the 2028 timeframe.

This section includes analysis of potential impacts to airfields and airspace, noise, safety, air quality, transportation, biological resources, water resources, infrastructure, cultural resources, hazardous materials and waste, and socioeconomics. Resource areas for which impacts would be negligible or non-existent are discussed in **Section 1.5** (Scope of Environmental Analysis).

4.1 AIRFIELDS AND AIRSPACE

The analysis of airfields and airspace management involves consideration of many factors, including the types, locations, and frequency of airspace operations, the presence or absence of already designated (controlled) airspace, and the amount of air traffic using or transiting through a given area. Specifically, this assessment examines how the Proposed Action would affect airspace management structure and airfield operations related to the Naval Air Station (NAS) North Island complex. The communities surrounding Halsey Field at NAS North Island are assessed for impacts from changes to the number of annual operations

AIRFIELDS AND AIRSPACE
POTENTIAL IMPACTS AT NORTH ISLAND

Alternatives 1 and 2:

- Alternatives 1 and 2 aircraft operations increase total aircraft operations by 14 percent and 7 percent, respectively, would not adversely affect airspace management or use of local air traffic environment.
- Aircraft operations increase would be well within historical operations levels at NAS North Island and would not be significant.
- No impacts to existing base arrival or departure procedures to accommodate Navy V-22 aircraft performance or airfield sorties.

that would occur from the Proposed Action under each of the alternatives.

4.1.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, NAS North Island would not transition to Navy V-22 aircraft. In the near term, C-2A operations at the airfield and associated airspace at NAS North Island would remain consistent with existing conditions (approximately 4,500 annual operations). The C-2A would continue to operate as it currently does until it would need to be retired. Under the unlikely scenario there is no replacement aircraft, there would be a small reduction in airfield operations.

However, there would be an increase in the total number of aircraft operations at NAS North Island under the No Action Alternative due to the completion of an ongoing increase in the number of H-60 helicopters, as evaluated in a previous Environmental Assessment (EA) for Helicopter Wings Realignment and MH-60R/S Helicopter Transition, Naval Base Coronado (NBC), California (Navy, 2011a). Under the No Action Alternative, H-60 operations would increase by approximately 4,200 operations (5.6 percent). This would result in a total of approximately 79,800 annual operations at NAS North Island. Refer to **Section 4.2** (Noise) for additional details on operations.

This increase would not adversely affect airspace management and use within the local air traffic environment. Total NAS North Island operations (all aircraft) estimated for the No Action Alternative is approximately 79,800. Historical annual operations at NAS North Island have numbered over 138,000 as recently as 2002, and even if all the proposed 4,200 operations were flown at NAS North Island, the annual total would be well within historical averages (NBC, 2011). Additionally, no changes to base arrival or departure procedures would be required. These changes in operations levels would have a negligible impact on the airfield and airspace at NAS North Island.

4.1.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

Under Alternative 1, total fleet logistics support squadron aircraft at NAS North Island would increase from 10 to 23 aircraft when compared to the No Action Alternative. This increase would include 18 fleet squadron Navy V-22 aircraft assigned to NAS North Island (three of which are home guard aircraft) and five Navy V-22 training squadron aircraft. The Navy anticipates a total of approximately 16,000 annual airfield operations by Navy V-22 aircraft at NAS North Island under Alternative 1, which along with a reduction in C-2A operations, represents an increase of approximately 11,500 Navy V-22 operations above the No Action Alternative. This increase equates to approximately 16 aircraft departures and 16 aircraft arrivals per day (based on 365 days). Total NAS North Island operations (all aircraft) estimated for the No Action Alternative is 79,800; therefore, Alternative 1 would result in an increase in total operations of approximately 14 percent. Historical annual operations at NAS North Island have numbered over 138,000 as recently as 2002; 95,000 in 2004; and 102,000 in 2010; and even if all the proposed 11,500 operations were flown at NAS North Island, the annual total would be well within historical averages (NBC, 2011; Appendix B [Noise Analysis])). Refer to **Section 4.2** (Noise) for additional details on operations. Operations at secondary airfields are discussed in **Section 2.3.2.4** (Aircraft Operations under Alternative 1).

This increase would not adversely affect airspace management and use within the local air traffic environment. No changes to base arrival or departure procedures would be required to accommodate the Navy V-22 aircraft performance or airfield sorties. Navy V-22 operations would mirror those of the turboprop and helicopter aircraft already operating at North Island. Since the additional operations would bring the total to well below the levels that have been executed over the last 20 years, additional operations under Alternative 1 would have a negligible impact to airspace at NAS North Island.

Transit flights for access to and from the home and secondary airfields would occur throughout the southwest and mid-Atlantic regions of the United States (refer to **Section 2.1.4.3** Special Use Airspace and Transit Flights). Navy V-22 transits would occur at altitudes exceeding 3,000 feet above ground level. No changes to airspace would be required for Alternative 1. The minor increase in transits dispersed throughout the available airspace would have negligible impact to airspace.

Therefore, implementation of Alternative 1 would not result in significant impacts to airfields and airspace.

4.1.3 ALTERNATIVE 2 POTENTIAL WEST COAST IMPACTS

Under Alternative 2, total fleet logistics support squadron aircraft at NAS North Island would increase from 10 to 18 when compared to the No Action Alternative. This increase would include 18 Fleet squadron Navy V-22 aircraft assigned to NAS North Island (3 of which are home guard aircraft). The Navy anticipates a total of 10,300 annual airfield operations by Navy V-22 aircraft at NAS North Island under Alternative 2, which along with a reduction in C-2A operations, represents an increase of 5,800 operations above the No Action Alternative. This increase equates to approximately 8 aircraft departures and 8 aircraft arrivals per day (based on 365 days). Alternative 2 would result in an increase in total annual airfield operations (all aircraft) of approximately 7 percent. The annual total 85,600 operations would be well within historical averages at NAS North Island. Refer to **Section 4.2** (Noise) for additional details on operations. Operations at secondary airfields are discussed in **Section 2.3.3.4** (Aircraft Operations under Alternative 2).

Alternative 2 airfield and airspace impacts would be similar to, but less than, those described for Alternative 1. The additional operations under Alternative 2 would have a negligible impact to airspace. Therefore, implementation of Alternative 2 would not result in significant impacts to airfields and airspace at NAS North Island.

4.1.4 CONCLUSION

Alternative 1 and Alternative 2 would result in an increase compared to the No Action Alternative of 14 percent and 7 percent in total airfield operations of all aircraft at NAS North Island, respectively, but the increase would be well within historical operations levels at NAS North Island and would not be significant. Navy V-22 operations would be managed in accordance with existing procedures and established local approach and departure patterns to avoid conflicts and minimize safety risks.

Under both Alternative 1 and Alternative 2, the minor increase in transits dispersed throughout the available airspace would have negligible impact to airspace.

Therefore, implementation of Alternative 1 or Alternative 2 would not result in significant impacts to airfields and airspace at NAS North Island.

4.2 NOISE

The noise impact analysis presented in this noise section is the result of noise modeling that analyzed the projected noise levels based upon a wide range of inputs (such as flight tracks, aircraft type, and number of aircraft operations). For a full discussion of noise modeling and background data used for this analysis, refer to **Section 3.2.1** (Basics of Sound) and **Appendix B**. The noise levels analyzed and described within this study are from computer-modeled noise and not actual noise measurements at NAS North Island. Computer modeling provides a tool to assess potential noise impacts. Community Noise Equivalent Level (CNEL) noise contours are generated by a computer model that draws from a library of actual aircraft noise measurements. Noise contours produced by the model allow a comparison of existing conditions and proposed changes or alternative actions that do not currently exist or operate at the installation.

NOISE
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternatives 1 and 2:

- Short-term construction noise impacts. No sensitive receptors would be affected. Proposed construction would be located near the flight line, and aircraft-related noise would dominate the construction noise.
- Operations increase would result in less than 1 dB CNEL change and would not be perceptible; not likely expose any new population to noise levels greater than 65 dB CNEL.
- No impacts to the NBC AICUZ Program land use compatibility recommendations.
- No noise impact or minor impact at the 13 points of interest in the community for single event metrics, L_{max} and SEL, or the probability of awakening.

4.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur. However, there would be a change in the total number of aircraft operations at NAS North Island under the No Action Alternative due to the completion of an ongoing increase in the number of H-60 helicopters as part of a previous NEPA action. Under baseline conditions, there are approximately 75,600 operations of all aircraft at NAS North Island. Under the No Action Alternative, total aircraft operations would be 79,800, an increase of approximately 4,200 operations, or 5.6 percent. The C-2A would continue to operate as it currently does, and the Navy V-22 would not operate at NAS North Island. **Table 4.2-1** shows the breakdown of operations for the No Action Alternative. The day/evening/night breakdown for operations is the same as for baseline conditions (76, 20, and 4 percent, respectively). For a more thorough breakdown of operations, see **Appendix B**.

Table 4.2-1: Annual Aircraft Operations (All Aircraft) under the No Action Alternative at NAS North Island

Operation Type[1, 2]	*Acoustic Day (7:00 a.m. – 7:00 p.m.)*	*Acoustic Evening (7:00 p.m. – 10:00p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrivals	23,900	7,800	1,400	33,100
Departures	23,900	7,800	1,400	33,100
Patterns	12,500	1,000	100	13,600
Total	**60,300**	**16,600**	**2,900**	**79,800**

Notes:

[1] No Action Alternative includes projected increase above baseline established in Table 3.2-2. Operations numbers are based on an annual average. As such, some individual years will be higher than the average, and some will be lower than the average.

[2] An operation is one take-off or one landing; numbers are rounded to the nearest 100.

4.2.1.1 Projected CNEL Noise Exposure

The noise contours under the No Action Alternative are shown on **Figure 4.2-1**. The figure shows the No Action Alternative compared to the baseline conditions contours from **Section 3.2** (Noise). As shown, there are negligible differences between the contours. As with baseline conditions, most of the noise areas exposed to 65 decibel (dB) CNEL and greater occur on-base at Naval Air Station (NAS) North Island, or over the water of the Pacific Ocean and San Diego Bay. The 65 dB CNEL contour does extend southeast, along the coast over the southern portion of Coronado. The 65 dB CNEL contour also extends across the San Diego Bay to the north and west over Shelter Island and Point Loma.

Table 4.2-2 presents total noise exposure in terms of estimated acreage and population under the No Action Alternative compared to baseline conditions. Note that the acreages reported exclude water bodies.

Table 4.2-2: Acreage and Estimated Population Impacts under the No Action Alternative Compared to Baseline Conditions

CNEL (dBA)	*Total Acres[1]*	*Off-Base Acres[1]*	*Estimated Population*	*Change in Acres[1]*	*Change in Off-Base Acres[2]*	*Change in Off-Base Population[2, 3]*
85 or greater	246	0	0	0	0	0
80 or greater	555	0	0	+2	0	0
75 or greater	1,034	59	396	-11	0	0
70 or greater	1,554	126	821	-12	0	0
65 or greater	2,059	321	2,223	+6	+1	+18

Source: USCB, 2017
Notes:
dBA=A-weighted sound level
[1] Acreages exclusive of water bodies.
[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 CNEL or greater" means all acreage and population exposed to CNEL at or greater than 65 dBA and includes the acres/population in the rows above.
[3] Population is based on assumed even distribution of 2015 census block population data.

As shown in **Table 4.2-2**, there would be little change between the No Action Alternative and baseline conditions at NAS North Island. Overall, there would be one additional acre of land distributed along the outer edge of the 65 dB CNEL noise contour where noise exposure levels would be greater than 65 dB CNEL, an increase of less than 1 dB. Using the census block calculation method, described in **Section 3.2** (Noise), this would result in an estimated increase of 18 people distributed throughout the 1-acre area that may be exposed to noise levels slightly above 65 dBA CNEL. The change in acreage is approximately 0.3 percent, and given the minimal change, the No Action Alternative would likely not expose any new population to noise levels greater than 65 dB CNEL. There would effectively be no perceptible difference between the No Action Alternative and baseline conditions. As with baseline conditions, there are no impacts to any off-base areas or populations from noise levels equal to or greater than 80 dB CNEL.

The No Action Alternative would not alter baseline noise contours to the extent that there would be any impacts to the Air Installations Compatible Use Zones (AICUZ) Program recommendations. Jet aircraft that routinely use NAS North Island are the primary drivers of the noise contours. As such, the No Action Alternative would have no impact to the AICUZ Program.

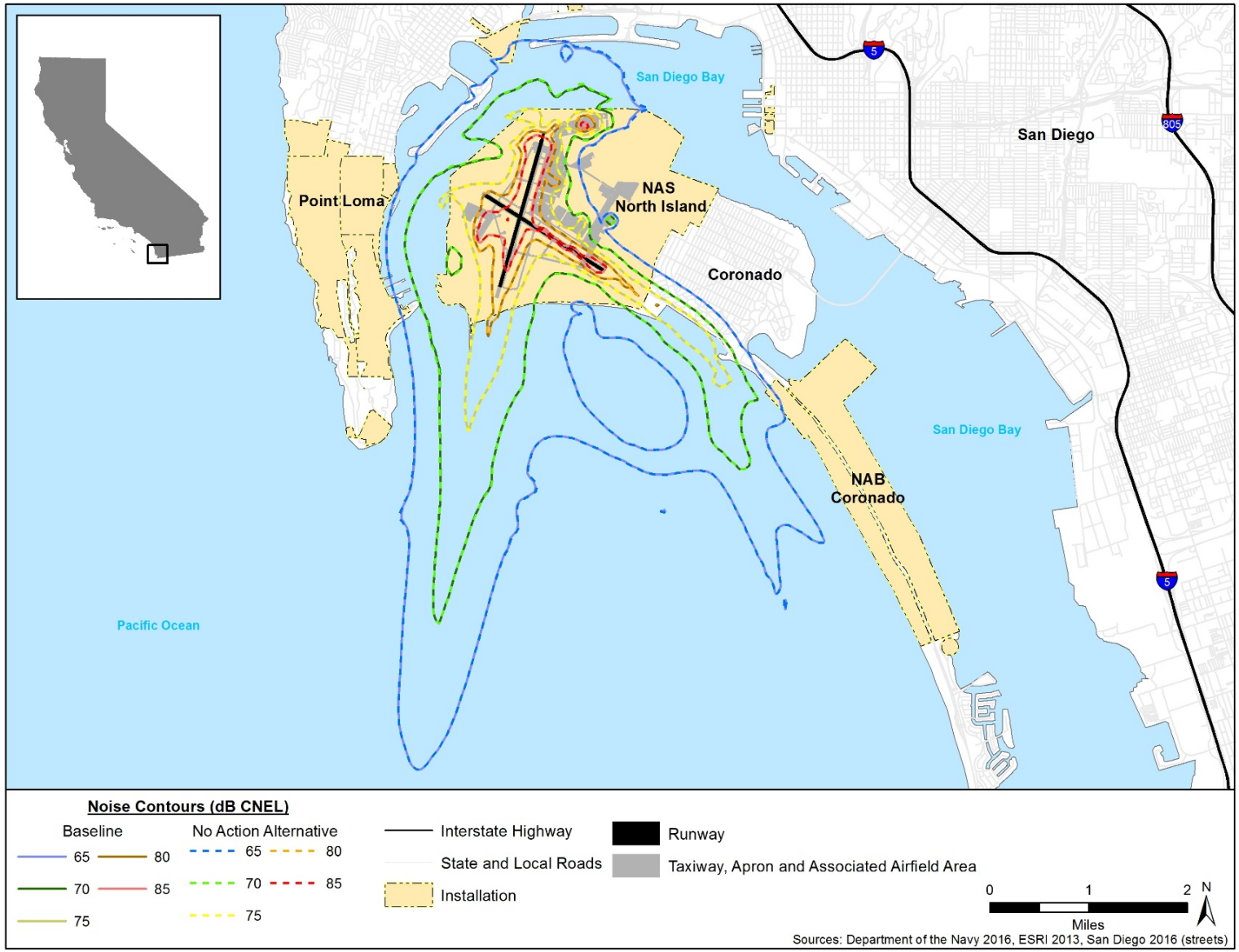


Figure 4.2-1: No Action Alternative CNEL Contours Compared to Baseline Conditions

4.2.1.2 Supplemental Noise Analysis

Table 4.2-3 shows the calculated CNEL for the No Action Alternative, as compared to baseline conditions for the 13 Points of Interest (POIs) surrounding NAS North Island. The greatest change in CNEL at any of the POIs is 1 dB CNEL at SL-7, City of Coronado Ferry Landing. This minor difference would be indistinguishable to the human ear from baseline conditions.

In addition to the 13 POIs, CNEL values were also evaluated at three representative locations (P1, P2, and P3) on the NAS North Island least tern nesting area (refer to **Figure 3.2-3**): the center of the area, the northwest edge closest to the proposed hangar and taxiway, and the southwest edge, which has the highest baseline CNEL. The modeling results from the noise study show that under the No Action Alternative, the CNEL would not change from the baseline values at any of the points.

Table 4.2-3: Baseline Conditions CNEL Values at Point of Interest Locations

POI Identification	*POI Name*	*CNEL (dB)*	*CNEL Change from Baseline*
SL-1	Centennial Park	66	0
SL-2	Point Loma	56	0
SL-4	Hotel Del Coronado	67	0
SL-6	Silver Strand South	58	0
SL-7	City of Coronado Ferry Landing	53	+1
SL-8	NAS North Island Beach	66	0
SL-13	Kona Kai Resort and Spa	65	0
SL-14	Cabrillo Elementary School	56	0
SL-15	Pier 32 Marina	46	0
SL-16	Chula Vista Marina	57	0
SL-17	Coronado Cays	53	0
SL-18	Loews Resort	53	0
SL-19	Coronado Municipal Beach	77	0

4.2.1.2.1 Maximum Sound Level and Sound Exposure Level

The loudest events at each of the POIs was calculated and compared to baseline conditions. Since the only difference between the No Action Alternative and baseline conditions is the addition of H-60 aircraft operations, there would be no changes to the loudest Sound Exposure Level (SEL) and maximum A-weighted sound level (L_{max}) values calculated for the POIs. Refer to **Table 3.2-5** for a list of the loudest aircraft noise events and the number of times these events occur. As shown in **Table 3.2-5**, the loudest events at NAS North Island are those produced by military jet aircraft. Jet aircraft operations would not change from the baseline to the No Action Alternative; therefore, there would be no changes to the loudest SEL and L_{max} values at the POIs surrounding NAS North Island.

4.2.1.2.2 Sleep Disturbance

Table 4.2-4 lists the probabilities of awakening during aircraft overflight at least once in a night between the hours of 10:00 p.m. and 7:00 a.m. under the No Action Alternative. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 3 to 4 percent at SL-19, Coronado Municipal Beach, with windows open. Of the 13 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed. Under the No Action Alternative, there would be no change to the probability of awakening at any of the POIs around NAS North Island when compared to baseline conditions.

Table 4.2-4: Probability of Awakening at Point of Interest Locations Near NAS North Island under the No Action Alternative

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
SL-1 – Centennial Park	0.08	<1%	<1%
SL-2 – Point Loma	0.05	<1%	<1%
SL-4 – Hotel Del Coronado	0.08	<1%	<1%
SL-6 – Silver Strand South	0.16	<1%	<1%
SL-7 – City of Coronado Ferry Landing	0.02	<1%	<1%
SL-8 – NAS North Island Beach	0.25	<1%	1-2%
SL-13 – Kona Kai Resort and Spa	0.16	<1%	<1%
SL-14 – Cabrillo Elementary School	0.05	<1%	<1%
SL-15 – Pier 32 Marina	0.00	<1%	<1%
SL-16 – Chula Vista Marina	0.08	<1%	<1%
SL-17 – Coronado Cays	0.02	<1%	<1%
SL-18 – Loews Resort	0.04	<1%	<1%
SL-19 – Coronado Municipal Beach	0.89	2-3%	3-4%

Notes:
[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.
[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.
[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.

4.2.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.2.2.1 Construction

Construction noise is generated by the use of heavy equipment on job sites and is generally short-term in duration (i.e., during specific times in the day and certain phases of renovation, demolition, and/or construction). Commonly, heavy equipment operation occurs sporadically throughout daytime hours. **Table 4.2-5** provides a list of representative construction equipment and associated noise levels in dBs, adjusted for the percent of time the equipment would typically be operated at full power at a construction site, from a distance of 50 feet. Overall, construction noise levels are governed primarily by the noisiest pieces of equipment, which are typically impact devices (e.g., jackhammers). Under Alternative 1 at NAS North Island, noise impacts would vary based on the construction phase and by the specific task being undertaken (United States [U.S.] Environmental Protection Agency [USEPA], 1971). For instance, demolition and construction activities typically involve bulldozers, jack hammers, scrapers, backhoes, and trucks used during excavation, land clearing, grading, and utility installation. Concrete mixers, pumps, saws, hammers, cranes, and forklifts are employed during building construction.

Typically, the dB level of a sound decreases (or attenuates) exponentially as the distance from the source increases. For a single point source, like a bulldozer, the sound level decreases by approximately 6 dB for each doubling of distance from the source where no other features such as vegetation, topography, or walls absorb or deflect the sound. For example, at 50 feet a bulldozer generates a noise level of 82 dB, at 500 feet this level would decrease to about 54 dB and generate noise levels that would not likely be distinguishable within the acoustic environment. Additionally, building walls can attenuate noise levels by 35 to 50 dB and windows from 25 to 35 dB (Federal Highway Administration, 2011).

Table 4.2-5: Predicted Noise Levels for Construction Equipment

Equipment Description	*Actual Measured Maximum Sound Level (dB) at 50 feet*
Clearing and Grading	
Flat Bed Truck	74
Dump Truck	76
Roller	80
Bulldozer	82
Grader/Scraper	84
Excavation	
Front End Loader	79
Pneumatic Tools	85
Jackhammer	89
Building Construction	
Compressor (air)	78
Concrete Mixer Truck	79
Crane/Generator/Pump	81
Warning Horn	83
Chain Saw	84
Vibrating Hopper	87
Concrete Saw/Impact Hammer	90

***Source**:* Federal Highway Administration, 2006.

The nearest receptor likely to be affected by construction noise is the least tern nesting area approximately 100 feet south of the proposed project site. Construction of portions of the proposed facilities, such as the taxiway upgrades, wash rack, and parking apron upgrade would be within 500 feet of the nesting areas. Construction within 300 feet of the least tern nesting area (MAT site) would be scheduled to occur outside the breeding season. In addition, no heavy construction would be permitted within 500 feet of the MAT site during the breeding season. Heavy construction equipment is defined as activity that produces loud noises and/or utilizes heavy equipment (to include but not limited to grading, jackhammering, excavating, and removal of large debris). Construction greater than 500 feet from the existing MAT site that could result in noise or visual impacts to nesting California least terns (e.g., building demolition, jackhammering) would be conducted outside of the California least tern breeding season to the maximum extent practicable.

Noise would be generated by trucks delivering materials to the construction site and construction worker vehicles. These noise impacts would be temporary and short term and would be consistent with existing traffic noise in an urban environment; therefore, the impact would not be significant. Minimization measures such as limiting truck traffic to regular daytime working hours would reduce these impacts.

Therefore, construction proposed under Alternative 1 would not result in significant noise impacts at NAS North Island.

4.2.2.2 Operations

Under Alternative 1, there would be a change in the number of aircraft operations at NAS North Island. The C-2A would be replaced by the Navy V-22 and there would also be a fleet training squadron stationed at NAS North Island. **Table 4.2-6** illustrates the breakdown of operations for all aircraft at NAS

North Island under Alternative 1. There would be a total of 91,300 annual operations, an increase of 14 percent above 79,800 total operations under the No Action Alternative. Alternative 1 would have 11,500 additional operations when compared to operations (all aircraft) of the No Action Alternative. This level of operations at NAS North Island is consistent with recent historical operations, which were 138,000 in 2002; 95,000 in 2004; and 102,000 in 2010; and would not represent a significant operational change (NBC, 2011; Appendix B [Noise Analysis]). This increase equates to approximately 16 aircraft departures and 16 aircraft arrivals per day (based on 365 days).

Table 4.2-6: Annual Aircraft Operations (All Aircraft) under Alternative 1 for NAS North Island

Operation Type[1, 2]	*Acoustic Day (7:00 a.m. – 7:00 p.m.)*	*Acoustic Evening (7:00 p.m. – 10:00p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrivals	25,100	8,300	1,500	34,900
Departures	25,100	8,300	1,500	34,900
Patterns	18,200	3,200	100	21,500
Total	**68,400**	**19,800**	**3,100**	**91,300**

Notes:
[1] An operation is one take-off or one landing; numbers are rounded to the nearest 100.
[2] Operations numbers are based on an annual average. As such, some individual years will be higher than the average, and some will be lower than the average.
NAS=Naval Air Station

Operations would vary from year to year due to global events. If there is a busy time of surge conditions, it is usually followed by a quieter time once squadrons have departed to support mission requirements elsewhere. The day/evening/night ratios remain very similar to the No Action Alternative, with 75 percent of the operations occurring during the day, 22 percent occurring during the evening, and 3 percent occurring at night. The additional operations would all be from Navy V-22 aircraft. All other aircraft operations at NAS North Island would remain the same as the No Action Alternative. For a more detailed breakdown of flight operations, see **Appendix B**. Operations at secondary airfields are discussed in **Section 2.3.2.4** (Aircraft Operations under Alternative 1). Navy V-22 transits to and from the home and secondary airfields (refer to **Section 2.1.4.3,** Special Use Airspace and Transit Flights) would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, noise impacts during transit flights would be negligible.

4.2.2.3 Projected CNEL Noise Exposure

The noise contours under Alternative 1 compared to the No Action Alternative are shown on **Figure 4.2-2**. As shown, there are negligible differences between the contours. As with the No Action Alternative, most of the noise areas exposed to 65 dB CNEL and greater occur on-base or over the water of the Pacific Ocean and San Diego Bay. The small changes over the water are 1 dBA CNEL or less, and would not be perceptible to biological resources or recreational users of the ocean and the bay. The 65 dB CNEL contour does extend southeast, along the coast over the southern portion of Coronado. The 65 dB CNEL contour also extends across the San Diego Bay to the north and west over Shelter Island and Point Loma.

Table 4.2-7 presents total noise exposure in terms of estimated acreage and population under Alternative 1 compared to the No Action Alternative. Population estimates were calculated using census block group data from the 2015 U.S. Census Bureau (USCB) American Community Survey five-year estimates. Note that acreages reported exclude water bodies.

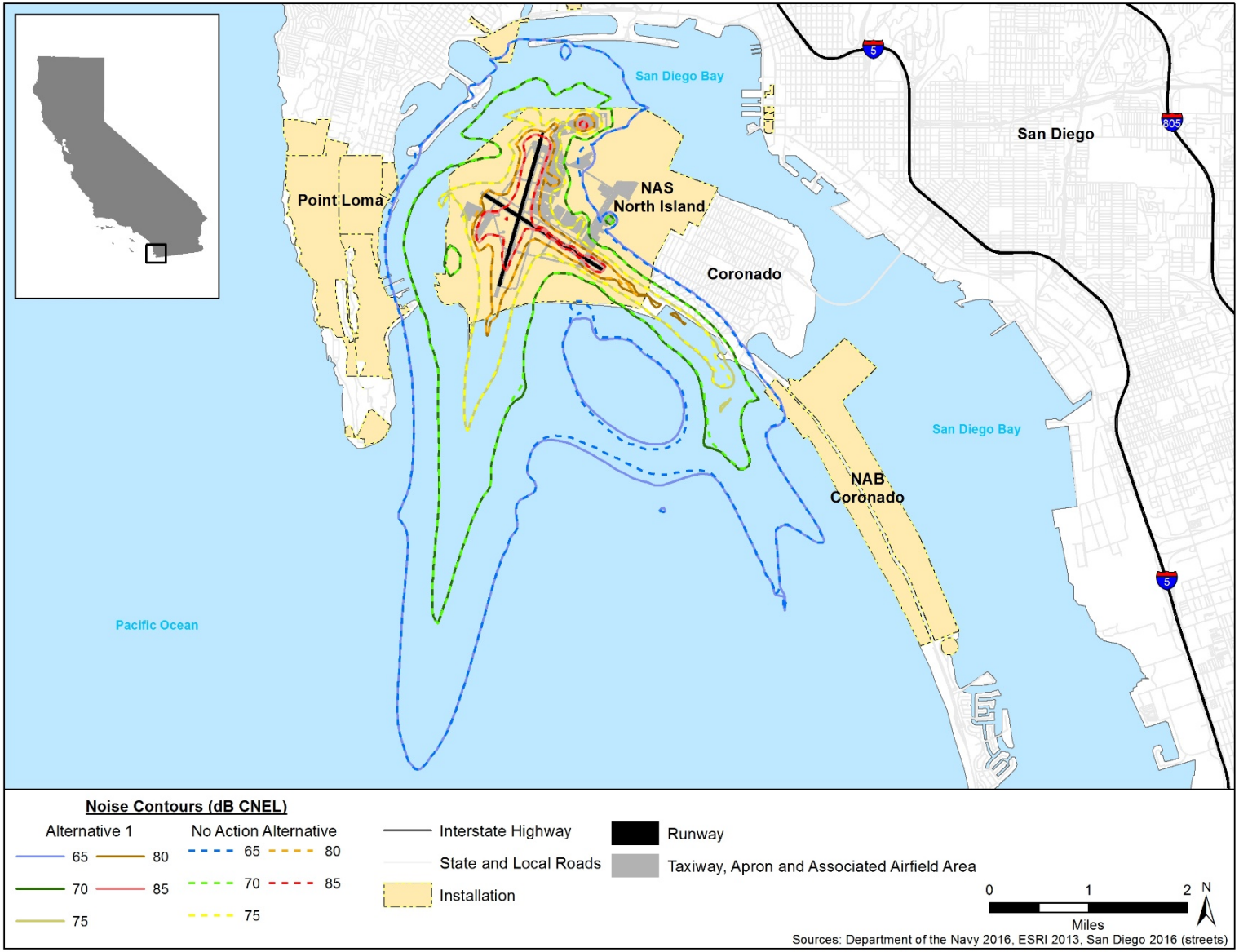


Figure 4.2-2: Alternative 1 CNEL Contours Compared to No Action Alternative

Table 4.2-7: Acreage and Estimated Population Impacts under Alternative 1 Compared to the No Action Alternative

CNEL (dBA)	*Total Acres[1]*	*Off-Base Acres*	*Estimated Population*	*Change in Acres*	*Change in Off-Base Acres[2]*	*Change in Off-Base Population[2,3]*
85 or greater	244	0	0	-2	0	0
80 or greater	562	4	30	+7	+4	0
75 or greater	1,040	65	434	+6	+6	+38
70 or greater	1,562	129	844	+8	+3	+38
65 or greater	2,093	326	2,304	+34	+5	+71

Source: USCB, 2017
Notes:
[1] Acres exclusive of water bodies.
[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 CNEL or greater" means all acreage and population exposed to CNEL at or greater than 65 dBA and includes the acres/population in the rows above.
[3] Population is based on assumed even distribution of 2015 census block population.

As **Table 4.2-7** shows, there would be a small general increase (approximately 0.2 percent) in the number of acres impacted off-base, and the estimated population that would be impacted. Under Alternative 1, there would continue to be no population impacted from noise levels equal to or greater than 80 dB CNEL. It is estimated that under Alternative 1, a total 2,304 people would be exposed to noise levels greater than 65 dB CNEL, which represents an increase of 71 people when compared to the No Action Alternative. While these numbers appear to be increases in population impacted, the actual noise increase would be less than 1 dBA and would be imperceptible in the area affected.

Given the minimal change, there would effectively be no perceptible difference between Alternative 1 and No Action Alternative.

Alternative 1 would not alter baseline noise contours to the extent that there would be any impacts to the AICUZ Program land use recommendations. Jet aircraft that routinely use NAS North Island are the primary drivers of the noise contours. As such, Alternative 1 would have no impact to the AICUZ Program.

4.2.2.4 Supplemental Noise Analysis

Table 4.2-8 shows the calculated CNEL for Alternative 1, as compared to the No Action Alternative for the 13 POIs surrounding NAS North Island. As shown, of the 13 POI locations, nine would show no change from the No Action Alternative. Of the remaining four locations, two would increase by 1 dB CNEL, and two would decrease by 1 dB CNEL. Under Alternative 1, the greatest change in CNEL at any of the POIs is 1 dB CNEL. These minor differences would be indistinguishable to the human ear in comparison to the No Action Alternative.

Table 4.2-8: Alternative 1 CNEL Values at Point of Interest Locations

POI Identification	*POI Name*	*CNEL (dB)*	*CNEL Change from No Action*
SL-1	Centennial Park	66	0
SL-2	Point Loma	57	1
SL-4	Hotel Del Coronado	68	1
SL-6	Silver Strand South	58	0
SL-7	City of Coronado Ferry Landing	53	0
SL-8	NAS North Island Beach	66	0
SL-13	Kona Kai Resort and Spa	64	-1
SL-14	Cabrillo Elementary School	55	-1
SL-15	Pier 32 Marina	46	0
SL-16	Chula Vista Marina	57	0
SL-17	Coronado Cays	53	0
SL-18	Loews Resort	53	0
SL-19	Coronado Municipal Beach	77	0

The modeling results from the noise study also show that under Alternative 1, the CNEL change at each point on the California least tern management area (refer to **Figure 3.2-3**) would be less than 1 dB at P1 and P3, and 1 dB at P2, which is assumed to be an imperceptible change to the least terns. The noisiest events are all produced by aircraft that would not change under the Alternative 1 and would not be caused by either the C-2A or the Navy V-22. Refer to **Table 3.2-5** for a list of the loudest aircraft noise events and the number times these events occur.

4.2.2.4.1 Maximum Sound Level and Sound Exposure Level

As with the No Action Alternative, the loudest events at each of the POIs was calculated under Alternative 1. While Alternative 1 does have a greater number of aircraft operations when compared to the No Action Alternative, the loudest events at NAS North Island are driven by military jet aircraft using the airfield. Under Alternative 1, the C-2A would be retired and replaced with the Navy V-22 tilt-rotor aircraft. Even with a greater number of operations, these aircraft are generally quieter than any of the jet aircraft that use NAS North Island. Therefore, there would be no changes to the loudest SEL and L_{max} values calculated for the POIs. Refer to **Table 3.2-5** for a list of the loudest aircraft noise events and the number times these events occur. As shown in **Table 3.2-5**, the loudest events at NAS North Island are those produced by military jet aircraft. Jet aircraft operations would not change from the No Action Alternative to Alternative 1.

4.2.2.4.2 Sleep Disturbance

Table 4.2-9 lists the probabilities of awakening during aircraft overflight at least once in a night between the hours of 10:00 p.m. and 7:00 a.m. under Alternative 1. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 4 to 5 percent at SL-19, Coronado Municipal Beach, with windows open. Of the 13 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed. The number of events above 90 dB SEL increases at SL-4, Hotel Del Coronado, from 0.08 events to 0.09 events and also at SL-19, Coronado Municipal Beach, from 0.89 events to 1.10 events when compared to the No Action Alternative. Other than the slight increase at SL-19, there would be almost no change in the probability of awakening from Alternative 1.

Table 4.2-9: Probability of Awakening at Point of Interest Locations Near NAS North Island under the Alternative 1

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
SL-1 – Centennial Park	0.08	<1%	<1%
SL-2 – Point Loma	0.05	<1%	<1%
SL-4 – Hotel Del Coronado	0.09	<1%	<1%
SL-6 – Silver Strand South	0.16	<1%	<1%
SL-7 – City of Coronado	0.02	<1%	<1%
SL-8 – NAS North Island Beach	0.25	<1%	1-2%
SL-13 – Kona Kai Resort and Spa	0.16	<1%	<1%
SL-14 – Cabrillo Elementary School	0.05	<1%	<1%
SL-15 – Pier 32 Marina	0.00	<1%	<1%
SL-16 – Chula Vista Marina	0.08	<1%	<1%
SL-17 – Coronado Cays	0.02	<1%	<1%
SL-18 – Loews Resort	0.04	<1%	<1%
SL-19 – Coronado Municipal Beach	1.10	2-3%	4-5%

Notes:
[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.
[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.
[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.

4.2.2.5 Vibration

The loudest SEL from Navy V-22 operations would not exceed 110 dB at the POIs. Therefore, vibration effects from Navy V-22 operations would be expected to be minor.

4.2.3 Alternative 2 Potential West Coast Impacts

4.2.3.1 Construction

Construction impacts and impact minimization measures under Alternative 2 would be same as described for Alternative 1, except the duration of construction may be reduced. Therefore, construction proposed under Alternative 2 would not result in significant noise impacts at NAS North Island.

4.2.3.2 Operations

Under Alternative 2, there would be a change in the number of aircraft operations at NAS North Island. Under this Alternative, the C-2A would be replaced by the Navy V-22, but the fleet training squadron would be located at NS Norfolk. **Table 4.2-10** illustrates the breakdown of operations for all aircraft at NAS North Island under Alternative 2.

Table 4.2-10: Annual Aircraft Operations under Alternative 2 for NAS North Island

Operation Type[1,2]	*Acoustic Day (7:00 a.m. – 7:00 p.m.)*	*Acoustic Evening (7:00 p.m. – 10:00p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrivals	24,500	8,100	1,500	34,100
Departures	24,500	8,100	1,500	34,100
Patterns	15,000	2,300	100	17,400
Total	**64,000**	**18,500**	**3,100**	**85,600**

Notes:
[1] An operation is one take-off or one landing; numbers are rounded to the nearest 100.
[2] Operations numbers are based on an annual average. As such, some individual years will be higher than the average, and some will be lower than the average.

Under Alternative 2, there would be a total of 85,600 annual operations, an increase of 7 percent above 79,800 total operations under the No Action Alternative. Alternative 2 would have 5,800 additional operations when compared to operations (all aircraft) of the No Action Alternative. The level of total annual operations would be well within historical averages at NAS North Island. This increase equates to approximately 8 aircraft departures and 8 aircraft arrivals per day (based on 365 days).

Operations would vary from year to year due to global events. If there is a busy time of surge conditions, it is usually followed by a quieter time once squadrons have departed to support mission requirements elsewhere. The day/evening/night ratios remain very similar to the No Action with 75 percent of the operations occurring during the day, 22 percent occurring during the evening, and 3 percent occurring at night. The proposed additional operations would all be from Navy V-22 aircraft. All other aircraft operations at NAS North Island would remain the same as the No Action Alternative. For a more detailed breakdown of flight operations, see **Appendix B**. Operations at secondary airfields are discussed in **Section 2.3.3.4** (Aircraft Operations under Alternative 2). Navy V-22 transits to and from the home and secondary airfields (refer to **Section 2.1.4.3,** Special Use Airspace and Transit Flights) would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, noise impacts during transit flights would be negligible.

4.2.3.3 Projected CNEL Noise Exposure

The noise contours under the Alternative 2 compared to the No Action Alternative are shown on **Figure 4.2-3**. As shown, there are negligible differences between the contours. As with the No Action Alternative, most of the noise areas exposed to 65 dB CNEL and greater occur on-base at NAS North Island, or over the water of the Pacific Ocean and San Diego Bay. The small changes over the water are 1 dBA CNEL or less, and would not be perceptible to biological resources or recreational users of the ocean and the bay. The 65 dB CNEL contour does extend southeast, along the coast over the southern portion of Coronado. The 65 dB CNEL contour also extends across the San Diego Bay to the north and west over Shelter Island and Point Loma.

Table 4.2-11 presents total noise exposure in terms of estimated acreage and population under Alternative 2 as compared to the No Action Alternative. Population estimates were calculated using census block group data from the 2015 USCB American Community Survey five-year estimates. Note that acreages reported exclude water bodies.

Table 4.2-11: Acreage and Estimated Population Impacts under Alternative 2 Compared to the No Action Alternative

CNEL (dBA)	*Total Acres[1]*	*Off-Base Acres*	*Estimated Population*	*Change in Acreage*	*Change in Off-Base Acres[2]*	*Change in Off-Base Population[2,3]*
85 or greater	244	0	0	-2	0	0
80 or greater	557	1	0	+2	+1	0
75 or greater	1,036	62	408	+2	+3	+12
70 or greater	1,557	128	825	+3	+2	+12
65 or greater	2,084	322	2,256	+25	+1	+23

Source: USCB, 2017

Notes: dBA=A-weighted sound level

[1]Acres exclusive of water bodies.

[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 CNEL or greater" means all acreage and population exposed to CNEL at or greater than 65 dBA and includes the acres/population in the rows above.

[3] Population is based on assumed even distribution of 2015 census block population.

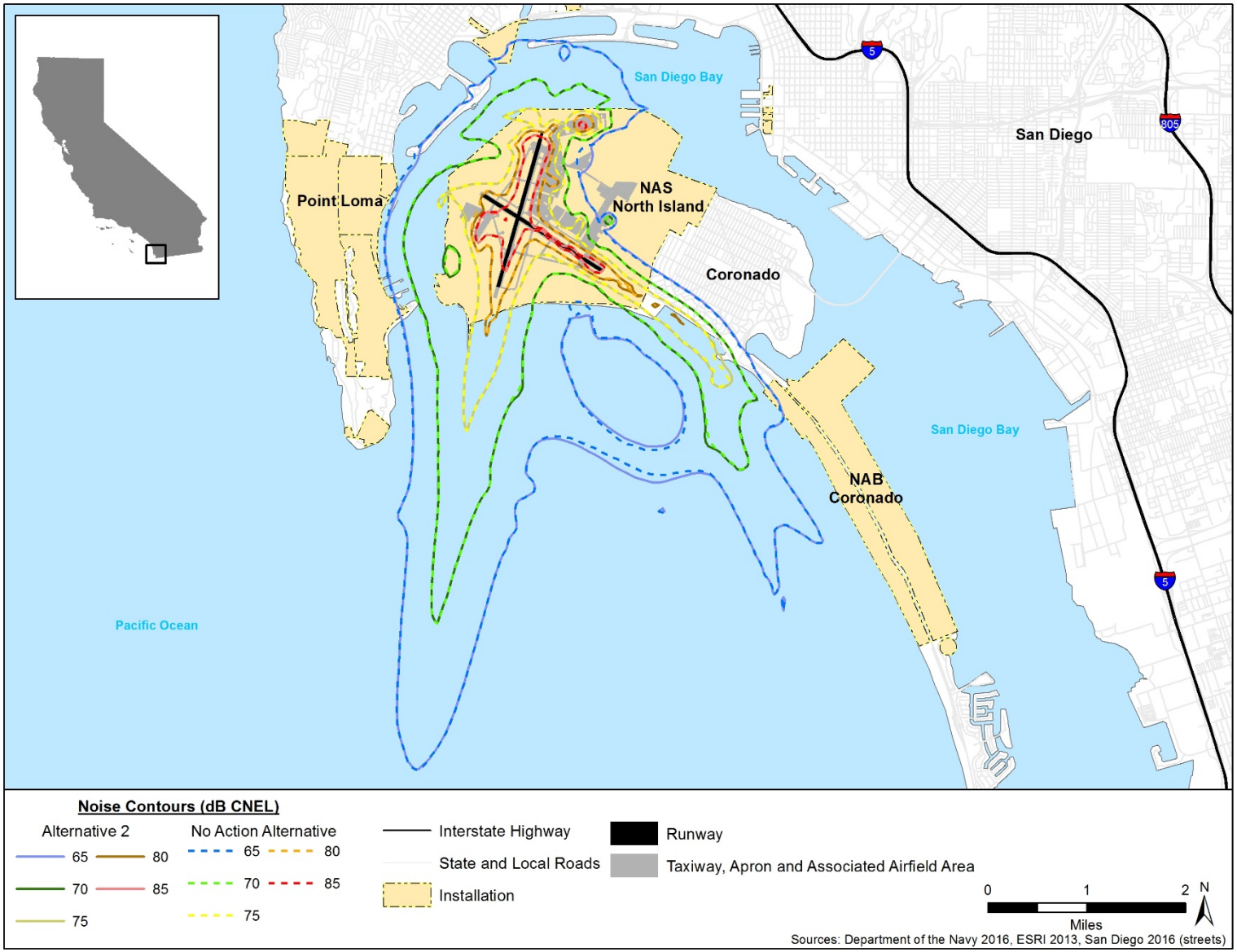


Figure 4.2-3: Alternative 2 CNEL Contours Compared to No Action Alternative

As **Table 4.2-11** shows, there would be a small general increase in the number of acres impacted off-base, and the estimated population that would be impacted when compared to the No Action Alternative. Under Alternative 2, there would continue to be no population impacted from noise levels equal to or greater than 80 dB CNEL. It is estimated that under Alternative 2, a total 2,256 people would be exposed to noise levels greater than 65 dB CNEL, which represents an increase of 23 people when compared to the No Action Alternative. While these numbers appear to be increases in population impacted, the actual noise increase would be less than 1 dBA and would be imperceptible in the area affected. Given the minimal change, there would effectively be no perceptible difference between Alternative 2 and the No Action Alternative.

Alternative 2 would not alter baseline noise contours to the extent that there would be any impacts to AICUZ Program land use recommendations. Jet aircraft that routinely use NAS North Island are the primary drivers of the noise contours. As such, Alternative 2 would have no impact to the AICUZ Program.

4.2.3.4 Supplemental Noise Analysis

Table 4.2-12 shows the calculated CNEL for Alternative 2, as compared to the No Action Alternative for the 13 POIs surrounding NAS North Island. As shown, of the 13 POI locations, 10 would show no change from the No Action Alternative. Of the remaining three locations, one would increase by 1 dB CNEL, and two would decrease by 1 dB CNEL. Under Alternative 1, the greatest change in CNEL at any of the POIs is 1 dB CNEL. These minor differences would be indistinguishable to the human ear from the No Action Alternative.

Table 4.2-12: Alternative 2 CNEL Values at Point of Interest Locations

POI Identification	*POI Name*	*CNEL (dB)*	*CNEL Change from No Action*
SL-1	Centennial Park	66	0
SL-2	Point Loma	56	0
SL-4	Hotel Del Coronado	68	+1
SL-6	Silver Strand South	58	0
SL-7	City of Coronado Ferry Landing	53	0
SL-8	NAS North Island Beach	66	0
SL-13	Kona Kai Resort and Spa	64	-1
SL-14	Cabrillo Elementary School	55	-1
SL-15	Pier 32 Marina	46	0
SL-16	Chula Vista Marina	57	0
SL-17	Coronado Cays	53	0
SL-18	Loews Resort	53	0
SL-19	Coronado Municipal Beach	77	0

The modeling results from the noise study also show that under Alternative 2, the CNEL change at each point on the California least tern nesting area (refer to **Figure 3.2-3**) would be less than 1 dB at P1, P2, and P3, which is assumed to be imperceptible to the least terns. The noisiest events are all produced by aircraft that would not change under the Alternative 2 and would not be caused by either the C-2A or the Navy V-22. Refer to **Table 3.2-5** for a list of the loudest aircraft noise events and the number times these events occur.

4.2.3.4.1 Maximum Sound Level and Sound Exposure Level

The loudest events at each of the POIs were calculated under Alternative 2. While Alternative 2 does have a greater number of aircraft operations when compared to the No Action Alternative, the loudest events at NAS North Island are driven by military jet aircraft using the airfield. Under Alternative 2, the C-2A would be retired and replaced with the Navy V-22. Even with a greater number of operations, these aircraft are generally quieter than any of the jet aircraft that use NAS North Island. Therefore, there would be no changes to the loudest SEL and L_{max} values calculated for the POIs. Refer to **Table 3.2-5** for a list of the loudest aircraft noise events and the number times these events occur. As shown in **Table 3.2-5**, the loudest events at NAS North Island are those produced by military jet aircraft. Jet aircraft operations would not change from the No Action Alternative to Alternative 2.

4.2.3.4.2 Sleep Disturbance

Table 4.2-13 lists the probabilities of awakening during aircraft overflight at least once during a night between the hours of 10:00 p.m. and 7:00 a.m. under the Alternative 2. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 3 to 4 percent at SL-19, Coronado Municipal Beach, with windows open. Of the 13 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed. The number of events above 90 dB SEL increases at SL-4, Hotel Del Coronado, from 0.08 events to 0.09 events and also at SL-19, Coronado Municipal Beach, from 0.89 events to 1.07 events when compared to the No Action Alternative. Other than the slight increase at SL-19, there would be almost no change in the probability of awakening from Alternative 2.

Table 4.2-13: Probability of Awakening at Point of Interest Locations Near NAS North Island under the Alternative 2

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
SL-1 – Centennial Park	0.08	<1%	<1%
SL-2 – Point Loma	0.05	<1%	<1%
SL-4 – Hotel Del Coronado	0.09	<1%	<1%
SL-6 – Silver Strand South	0.16	<1%	<1%
SL-7 – City of Coronado	0.02	<1%	<1%
SL-8 – NAS North Island Beach	0.25	<1%	1-2%
SL-13 – Kona Kai Resort and Spa	0.16	<1%	<1%
SL-14 – Cabrillo Elementary School	0.05	<1%	<1%
SL-15 – Pier 32 Marina	0.00	<1%	<1%
SL-16 – Chula Vista Marina	0.08	<1%	<1%
SL-17 – Coronado Cays	0.02	<1%	<1%
SL-18 – Loews Resort	0.04	<1%	<1%
SL-19 – Coronado Municipal Beach	1.07	2-3%	3-4%

Notes:

[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.

[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.

[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.

4.2.3.5 Vibration

The loudest SEL from Navy V-22 operations would not exceed 110 dB at the POIs. Therefore, vibration effects from Navy V-22 operations would be expected to be minor.

4.2.4 CONCLUSION

Under the No Action Alternative, there would be no perceptible change in noise with the minor ongoing increase in air operations. Implementation of Alternative 1 or Alternative 2 would not result in a perceptible change to noise at NAS North Island compared to the No Action Alternative. None of the alternatives would result in a perceptible change in the Department of Defense's (DoD's) primary noise metric in California, CNEL. In fact, the results are nearly indistinguishable from the baseline. This indicates that the aircraft and types of events that cause the primary contribution to the CNEL are not affected by the proposed alternatives at NAS North Island.

Implementation of Alternative 1 or Alternative 2 would not alter existing CNEL noise contours to the extent that there would be any impacts to the NBC AICUZ Program land use recommendations. Jet aircraft that routinely use NAS North Island are the primary drivers of the CNEL noise contours. As such, the alternatives would have no impact to the AICUZ Program.

At the 13 POIs in the community, the loudest expected regular events were also analyzed. The results of calculating the single event metrics L_{max} and SEL for the loudest events at each of the POIs showed no difference from the baseline or in comparing the alternatives. This indicates that for the representative sampling of the surrounding area, the events that the public would experience as the loudest regular events would not change under Alternative 1 or Alternative 2.

Those same POIs were examined for changes to the probability of awakening, a measurement of the loudness and frequency of occurrence of loud events during the nighttime. These results show that for 12 of the 13 points, there would be less than a 1 percent change in the probability of awakening during any given night. At POI 19, near the approach end of Runway 29, there would be a 1 percent increase in the probability of awakening under the condition that a person would be trying to sleep there with the windows open during night flying activity at NAS North Island.

Therefore, implementation of Alternative 1 or Alternative 2 would not result in significant noise impacts at NAS North Island.

PUBLIC HEALTH AND SAFETY
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternatives 1 and 2:

- Minor increases in the number of air operations at NAS North Island would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield.
- Airborne training augmented with extensive training on a flight simulator (i.e., containerized flight training device), would minimize risk associated with mishaps.
- No impact to BASH Plan recommendations on airfield habitat.
- No environmental health risks or safety risks that may disproportionately affect children.

4.3 PUBLIC HEALTH AND SAFETY

The safety and environmental health analysis contained in the respective sections addresses issues related to the health and well-being of military personnel and civilians, including children, living on or in the vicinity of NAS North Island. Specifically, this section provides information on hazards associated with flight safety, Bird/Animal Aircraft Strike Hazard (BASH), Accident Potential Zones (APZs), and potential health and safety risks to children.

In this EA, potential impacts associated with flight safety at NAS North Island are analyzed by considering the possible changes to mishap rates as a result of proposed Navy V-22 operations. Potential changes to

Clear Zones and/or APZs for NAS North Island are analyzed in accordance with Office of the Chief of Naval Operations Instruction (OPNAVINST) 11010.36C, which sets Clear Zone and APZ requirements for Navy airfields. The number and types of operations proposed under each alternative determine if changes to airfield Clear Zones or APZs are required.

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these safety measures are implemented, risks are minimized, even though they can never be eliminated.

To complement airspace management measures, all Navy pilots use state-of-the-art simulators. Simulator training includes flight operations and comprehensive emergency procedures, which minimizes risk associated with pilot error. Additionally, highly trained maintenance crews perform inspections on each aircraft in accordance with Navy regulations, and maintenance activities are monitored to ensure that aircraft are equipped to withstand the rigors of operational and training events safely.

4.3.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, ongoing actions at NAS North Island will increase rotary-wing operations over the current baseline. This increase is part of an ongoing helicopter squadron transition to MH-60 helicopters expected to be complete by 2020. This action (unrelated to the Proposed Action of this EA) was evaluated in a 2011 EA (Navy, 2011a), which concluded that with an increase in operations the potential for BASH increases slightly; however the risk is managed through continued application of BASH measures and the risk of BASH would be expect to remain similar to existing levels. No changes to established Clear Zones, APZs, or other established airfield safety features would be required.

The No Action Alternative would not change the potential for public health or safety impacts to children. As discussed above and in **Section 3.3** (Public Health and Safety), the APZs would not change, there would be no congregation of children within the APZs (i.e., no schools or playgrounds within the APZs), no measurable effects to flight safety, and no perceptible change in noise.

Therefore, no significant direct or indirect impacts to public health and safety would occur under the No Action Alternative. The No Action Alternative would not result in environmental health risks or safety risks that may disproportionately affect children.

Therefore, the No Action Alternative would not result in significant impacts to public health and safety.

4.3.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

Proposed renovation and infrastructure improvement projects related to this alternative would have no impact on APZs or aircraft take-off or landing surface areas. New construction and building renovation activity would not result in any greater safety risk or obstructions to navigation.

Under Alternative 1, there would be an increase of approximately 14 percent in NAS North Island airfield operations compared to the No Action Alternative. While the Navy V-22 replacement would result in 13 more aircraft assigned and 11,500 additional annual flight operations, this total would remain well within recent historical airfield numbers. Operations at secondary airfields are discussed in **Section**

2.3.2.4 (Aircraft Operations under Alternative 1). Navy V-22 transits to and from the home and secondary airfields are discussed in **Section 2.1.4.3** (Special Use Airspace and Transit Flights).

This increase in take-offs, landings, proficiency training, and other flights would result in a commensurate increase in the safety risk to aircrews and personnel. Current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and Navy V-22 airfield flight operations would adhere to established safety procedures. The airfield would update the emergency and mishap response plans specific to the Navy V-22, if changes are required.

To augment airborne training missions, pilots flying the Navy V-22 would train extensively on a flight simulator (i.e., containerized flight training device). Simulator training includes all facets of flight operations and comprehensive emergency procedures. The sophistication and fidelity of current simulators and related computer programs are commensurate with the advancements made in aircraft technology and are extremely realistic. These factors would minimize risk associated with mishaps due to pilot error.

Alternative 1 would increase the number of operations and the potential for BASH events. However, BASH Program recommendations are primarily based on airfield habitat and its attractiveness to birds and other wildlife, not types of aircraft operating at the airfield. No aspect of the Alternative 1 would create attractants with the potential to increase the concentration of birds in the vicinity of the airfields. Alternative 1 would incorporate BASH requirements into the design to deter birds from nesting/perching within the project area. While there would be an increase in air operations proposed under this alternative, there would be no proposed change planned to existing flight procedures for NAS North Island. Risk is managed through continued application of BASH measures, and the risk of BASH would be expected to remain similar to existing levels.

The operation of the Navy V-22 is not expected to change the BASH Program. Aircrews operating in North Island airspace would be required to follow applicable procedures outlined in the NBC BASH Program (NBC, 2012). Special briefings are provided to all pilots whenever the potential exists for greater bird-strike events within the airspace and operations are restricted if necessary. Navy V-22 pilots would be subject to these same procedures. Therefore, the potential for Alternative 1 to result in BASH-related impacts would be negligible.

Operations would fall within the same general types as those that have historically occurred at North Island. For example, the Navy V-22 would follow established local approach and departure patterns used. The existing APZs have been established for fixed-wing aircraft, and are therefore more expansive than what is required for a rotary-wing aircraft. As such, no changes to established Clear Zones, APZs, or other established airfield safety features would be required.

Given the low likelihood for an aircraft accident or BASH mishap to occur in the local airfield area and even lower likelihood for civilians to be impacted, the potential impacts to safety in the vicinity of NAS North Island as a result of Alternative 1 would be negligible.

Alternative 1 would not change the potential for public health or safety impacts to children. As discussed above, and in **Section 3.1** (Airfields and Airspace) and **Section 3.2** (Noise), the APZs would not change, there would be no congregations of children within the APZs (i.e., no schools or playgrounds within the APZs), no measurable effects to flight safety, and no perceptible change in noise.

Therefore, no significant direct or indirect impacts to public health and safety would occur with implementation of Alternative 1. Alternative 1 would not result in environmental health risks or safety risks that may disproportionately affect children.

4.3.3 ALTERNATIVE 2 POTENTIAL WEST COAST IMPACTS

Under Alternative 2, impacts related to safety would be the same as described for Alternative 1, except there would only be an increase of approximately 7 percent in NAS North Island airfield operations compared to the No Action Alternative. Operations at secondary airfields are discussed in **Section 2.3.3.4** (Aircraft Operations under Alternative 2). Navy V-22 transits to and from the home and secondary airfields are discussed in **Section 2.1.4.3** (Special Use Airspace and Transit Flights).

Alternative 2 would also incorporate BASH requirements into the design to deter birds from nesting/perching within the project area. For reasons discussed under Alternative 1, given the low likelihood for an aircraft accident or BASH mishap to occur in the local airfield area, and even lower likelihood for civilians to be impacted, the potential impacts to safety in the vicinity of NAS North Island as a result of the implementation of Alternative 2 would be negligible.

Alternative 2 would not change the potential for public health or safety impacts to children. As discussed above, and in **Section 3.1** (Airfields and Airspace) and **Section 3.2** (Noise), the APZs would not change, there would be no congregations of children within the APZs (i.e., no schools or playgrounds within the APZs), no measurable effects to flight safety, and no perceptible change in noise.

Therefore, no significant direct or indirect impacts to public health and safety would occur with implementation of Alternative 2. Alternative 2 would not result in environmental health risks or safety risks that may disproportionately affect children.

4.3.4 CONCLUSION

Minor ongoing increases in the number of air operations at NAS North Island under the No Action Alternative would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield. With implementation of Alternative 1 or Alternative 2, the Navy would continue to meet the primary goal of the AICUZ Program, which is to protect the public's health, safety, and welfare through collaboration with the local community. Alternative 1 and 2 would slightly increase the volume of air operations at NAS North Island compared to the No Action Alternative; however, it would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield.

The analysis determined that potential safety impacts would be negligible. Alternatives 1 and 2 would not change the potential for public health or safety impacts to children.

Therefore, implementation of Alternative 1 or Alternative 2 would not result in significant impacts to public health and safety at NAS North Island, and would not result in environmental health risks or safety risks that may disproportionately affect children.

4.4 AIR QUALITY

AIR QUALITY
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternatives 1 and 2:

- Construction air emissions would be well below the applicable annual significance thresholds.
- The net increase in operational emissions would not exceed any significance threshold and would not cause or contribute to a violation of any NAAQS or CAAQS. A General Conformity Record of Non-applicability is provided in **Appendix C**.

Effects on air quality are based on estimated direct and indirect emissions associated with the action alternatives. The region of influence (ROI) for assessing air quality impacts includes the San Diego Air Basin (SDAB). Estimated emissions from a proposed action are typically compared to relevant national and state standards to assess the potential for increases in pollutant concentrations.

In the case of criteria pollutants for which the ROI is in attainment of a National Ambient Air Quality Standards (NAAQS), the analysis used the USEPA Prevention of Significant Deterioration (PSD) major source threshold of 250 tons per year of that pollutant as an indicator of the significance of projected air quality impacts. In the case of criteria pollutants for which the project region does not attain a NAAQS, the analysis used the pollutant threshold that requires a conformity determination for that region. If proposed emissions exceed a PSD or conformity threshold, further analysis was conducted to determine whether impacts were significant. In such cases, if proposed emissions: (1) would not be expected to contribute to an exceedance of an ambient air quality standard, or (2) would conform to the approved SIP, then impacts would be less than significant. For the ROI within the SDAB, the applicable analysis thresholds are: (1) 100 tons per year of volatile organic compounds (VOCs), carbon monoxide (CO), and nitrogen oxide (NO_x), and (2) 250 tons per year of sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in diameter (PM_{10}), and particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$).

The potential effects of proposed greenhouse gas (GHG) emissions are by nature global impacts, as worldwide sources of GHGs contribute to climate change. However, these global impacts would be manifested as impacts on resources and ecosystems in California, as discussed below. This EA presents estimates of GHGs that would occur from each project alternative and uses these estimates as indicators of their potential contributions to climate change effects.

The analysis of proposed aircraft operations is limited to operations that occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer where the release of aircraft emissions would affect ground-level concentrations of criteria pollutants. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level criteria pollutant concentrations.

4.4.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur, but future operations would increase slightly under ongoing actions at NAS North Island. The increase would result in only a minor increase in emissions compared to those generated by baseline operations. The increase would be below the applicable General Conformity *de minimis* and PSD thresholds. Therefore, no significant impacts to air quality or air resources would occur with the No Action Alternative.

4.4.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.4.2.1 Construction

Air quality impacts from demolition and construction/renovation activities proposed under Alternative 1 would occur from: (1) combustive emissions due to the use of fossil fuel-powered equipment and trucks and, (2) fugitive dust emissions (PM_{10} and $PM_{2.5}$) during demolition activities and the use of equipment and vehicles on exposed soils. Construction activity data associated with Alternative 1 were used to estimate project combustive and fugitive dust emissions. It is estimated that construction under this alternative would occur over approximately a 2-year period and prior to emissions generated by proposed operations. **Appendix C** includes data and assumptions used to calculate emissions from these proposed activities.

Factors needed to derive construction source emission rates were obtained from the EMFAC2014 model for on-road vehicles (California Air Resources Board [ARB], 2014), the California ARB OFFROAD2011 emissions model for off-road equipment (California ARB, 2011), and special studies on fugitive dust (Countess Environmental, 2006). The analysis assumes that implementation of fugitive dust control measures for construction and construction equipment that would reduce emissions of PM_{10} and $PM_{2.5}$ due to fugitive dust by 74 percent from uncontrolled levels during construction. A description of these measures is provided in **Appendix C**.

Table 4.4-1 summarizes the total emissions associated with two years of construction activities under Alternative 1. These data show that even if all construction activities were to occur in one year and not two, their total air pollutant emissions would be well below the applicable Conformity *de minimis* and PSD annual thresholds. As a result, construction of Alternative 1 would not result in any significant air quality impacts.

Table 4.4-1: Estimated Emissions from Construction of Alternative 1 at NAS North Island

Source Activity	*Air Pollutant Emissions (tons)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
Demolish Buildings	0.11	0.29	1.61	0.00	0.90	0.15	180
Building Construction	0.61	2.48	6.35	0.01	4.59	0.79	684
Airfield Demolition	0.09	0.22	1.62	0.00	0.19	0.06	154
Airfield Paving	0.01	0.69	0.16	0.00	0.02	0.01	34
Vehicle Parking Lot Paving	0.01	0.03	0.15	0.00	0.05	0.01	18
Re-Stripe Airfield	0.00	0.01	0.02	0.00	0.01	0.00	2
Aircraft Wash Rack	0.00	0.01	0.02	0.00	0.00	0.00	2
Total Emissions	0.83	3.73	9.93	0.01	5.76	1.02	1,074
Conformity Threshold	100	100	100	N/A	N/A	N/A	N/A
PSD Threshold	N/A	N/A	N/A	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes:
CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NAS=Naval Air Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; PSD= Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound

4.4.2.2 Operations

The operational impact analysis methodology for Alternative 1 is based on the net change in emissions that would occur from the replacement of existing C-2A activities with the proposed Navy V-22 activities. Sources associated with operation of the proposed Navy V-22 mission at NAS North Island would include: (1) Navy V-22 aircraft operations and on-wing engine maintenance/testing, (2) aerospace ground equipment, (3) on-site privately owned vehicles (POVs), and (4) off-site commuting of POVs. Emissions from projected Navy V-22 aircraft activities were based on data developed for the project noise analyses (refer to **Section 4.2** [Noise]) and special studies on aircraft operations (Navy Aircraft Environmental Support Office [AESO], 2015c, and 2016). **Appendix C** includes data and assumptions used to calculate emissions from proposed operational activities.

Operations at secondary airfields are discussed in **Section 2.3.2.4** (Aircraft Operations under Alternative 1). Navy V-22 transits to and from the home and secondary airfields (refer to **Section 2.1.4.3** Special Use Airspace and Transit Flights) would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, emissions are above the USEPA's presumed mixing height for criteria air pollutants (USEPA, 1999a). The minor increase in transits dispersed throughout the available airspace would have negligible impact to air quality.

Emissions from non-aircraft sources generated by Alternative 1 activities were estimated by the following methods:

- Emissions for the use of aerospace ground equipment by Navy V-22 aircraft are based on usages developed for generic aircraft groups by the U.S. Air Force (Air Force Civil Engineer Center, 2016) and emission factors obtained from the MOVES2014a emissions model.
- Emissions from POVs are based on vehicle trip generation rates developed by the project traffic analysis. On- and off-site miles driven per vehicle trip were obtained from recent NEPA documents for NAS North Island (Navy, 2011a). The analysis obtained emission factors from the EMFAC2014 emissions model to estimate on-road vehicle emissions (California ARB, 2014).

The air quality analysis focuses on the first year after full transition from the C-2A to Navy V-22 aircraft because it represents the highest net increase in aircraft and associated activities, which would result in peak annual emission increases. Emissions during the transition from C-2A to Navy V-22 would result in lower net increases in activities and resulting emissions.

Table 4.4-2 summarizes the peak annual operational emissions that would result under Alternative 1 in year 2025. Navy V-22 aircraft operations and on-wing engine testing activities are the primary contributors to these emissions increases. The data in **Table 4.4-2** show that the net increase in emissions from the replacement of existing C-2A aircraft operations with the proposed Navy V-22 operations would not exceed any conformity *de minimis* or PSD threshold. Therefore, implementation of Alternative 1 at NAS North Island would not produce significant air quality impacts.

Table 4.4-2: Estimated Emissions from Operation of Alternative 1 at NAS North Island

Source Activity	*Air Pollutant Emissions (tons per year)*						
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e (mt)*
Navy V-22 Aircraft Operations	0.14	7.84	32.31	4.25	4.71	4.71	9,483
In-Frame Aircraft Engine Testing – Navy V-22	0.28	8.53	12.53	2.47	1.28	1.28	5,523
Aerospace Ground Support Equipment	0.74	1.49	2.97	0.01	0.20	0.20	1,960
POVs – On- and Off-Base	0.03	1.30	0.13	0.006	0.004	0.004	529
Total Annual Emissions - Alternative 1	1.19	19.16	47.94	6.74	6.19	6.19	17,495
Baseline C-2A Emissions	0.91	5.79	14.88	1.80	1.36	1.36	4,712
Net Emissions Change for Alternative 1 [1]	0.28	13.37	33.06	4.94	4.83	4.83	12,783
Conformity Threshold	100	100	100	N/A	N/A	N/A	N/A
PSD Threshold	N/A	N/A	N/A	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes:
CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NAS=Naval Air Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; POV=personal-owned vehicle; PSD = Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound
[1] Equal to Navy V-22 Alternative 1 emissions minus Baseline C-2A emissions.

The Navy has determined that the projected emissions from construction and operations of Alternative 1 would not cause or contribute to a violation of any NAAQS or California Ambient Air Quality Standards (CAAQS). Emissions would be below the applicable General Conformity *de minimis* thresholds. The General Conformity Record of Non-Applicability (RONA) is provided in **Appendix C.**

4.4.2.3 Climate Change

The potential effects of proposed GHG emissions are by nature global because worldwide sources of GHGs contribute to climate change. The total annual emissions of CO_2e from construction activities would be 1,074 metric tons under Alternative 1 (**Table 4.4-1**). The increase in annual emissions of CO_2e from Alternative 1 at NAS North Island would amount to 12,783 metric tons from operations (**Table 4.4-2**). Adding these emissions increases to the global inventory of GHGs would produce a negligible contribution to future climate change, the effects of which are identified in **Section 3.4.2** (Affected Environment) of this EA.

In an effort to reduce energy consumption, reduce GHGs, reduce dependence on petroleum, and increase the use of renewable energy resources, the Navy has established Fiscal Year (FY) 2020 GHG emissions reduction targets of 34 percent from a FY 2008 baseline for direct GHG emissions and 13.5 percent for indirect emissions. Examples of Navy-wide GHG reduction projects include improvements in operational efficiencies, energy efficient construction, thermal and photovoltaic solar systems, geothermal power plants, and the generation of electricity with wind energy. These renewable energy initiatives are not emission reductions proposed to directly offset GHG emissions produced by the project alternatives, but rather demonstrate initial responses for the Navy to factor GHG management into Navy proposals and impact analyses.

Climate change could impact implementation of Alternative 1 at NAS North Island and the adaptation strategies needed to respond to future conditions. For the region within the County and the location of NAS North Island, the main effect of climate change is increased temperature and aridity, as documented by climate analyses presented in **Chapter 3**, **Section 3.4.2** (Air Quality Affected Environment). These analyses predict that in the future, the region will experience: (1) an increase in temperatures, droughts, sea levels, coastal erosion, and wildfires, and (2) scarcities of water supplies. Current operations at NAS North Island have adapted to droughts, high temperatures, wildfires, and scarce water supplies. However, exacerbation of these conditions in the future could impede proposed activities during extreme events. Therefore, additional measures at NAS North Island could be needed to protect infrastructure and personnel from these effects. Regarding sea level rise and its potential to displace coastal operations and infrastructure, the DoD has an active program to develop measures for installations to adapt to this threat (DoD Strategic Environmental Research and Development Program, 2014 and 2016). In particular, the Navy has evaluated potential threats of sea level rise to NAS North Island (Space and Naval Warfare Systems Center Pacific, 2015).

4.4.3 ALTERNATIVE 2 POTENTIAL WEST COAST IMPACTS

4.4.3.1 Construction

Construction activities due to Alternative 2 would be the same as those identified for Alternative 1, except that they would not include the demolition and construction activities for the training squadron hangar and its associated components. The methods used to estimate combustive and fugitive dust emissions from construction of Alternative 1 also were used to estimate emissions for construction of Alternative 2.

Table 4.4-3 summarizes the total emissions associated with two years of construction activities under Alternative 2. These data show that even if all construction activities were to occur in one year and not two, their total air pollutant emissions would be well below the applicable conformity *de minimis* and PSD annual thresholds. As a result, construction of Alternative 2 would not result in any significant air quality impacts.

Table 4.4-3: Estimated Emissions from Construction of Alternative 2 at NAS North Island

Source Activity	*Air Pollutant Emissions (tons)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
Demolish Buildings	0.08	0.21	1.18	0.00	0.66	0.11	132
Building Construction	0.46	1.87	4.79	0.01	3.47	0.60	517
Airfield Demolition	0.07	0.17	1.26	0.00	0.15	0.05	119
Airfield Paving	0.01	0.54	0.13	0.00	0.02	0.00	26
Vehicle Parking Lot Paving	0.00	0.01	0.06	0.00	0.02	0.00	7
Re-Stripe Airfield	0.00	0.01	0.02	0.00	0.01	0.00	2
Aircraft Wash Rack	0.00	0.01	0.02	0.00	0.00	0.00	2
Total Emissions	0.62	2.82	7.46	0.01	4.33	0.76	805
Conformity Threshold	100	100	100	N/A	N/A	N/A	N/A
PSD Threshold	N/A	N/A	N/A	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes:
CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NAS=Naval Air Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; PSD = Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound

4.4.3.2 Operations

Alternative 2 would include the same operational activities as Alternative 1. However, Alternative 2 would base fewer Navy V-22 aircraft, which would result in lower usages of the Navy V-22 aircraft and associated sources.

Table 4.4-4 summarizes the peak annual operational emissions that would result under Alternative 2 in year 2025. Navy V-22 aircraft operations and on-wing engine testing activities are the primary contributors to these emissions increases. The data in **Table 4.4-4** show that the net increase in emissions from the replacement of existing C-2A aircraft operations with the proposed Navy V-22 operations would not exceed any conformity *de minimis* or PSD threshold. Therefore, implementation of Alternative 2 would not result in significant impacts to air quality at NAS North Island.

Table 4.4-4: Estimated Emissions from Operation of Alternative 2 at NAS North Island

Source Activity	*Air Pollutant Emissions (tons per year)*						
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e (mt)*
Navy V-22 Aircraft Operations	0.10	5.34	20.98	2.80	3.09	3.09	6,243
In-Frame Engine Testing – Navy V-22	0.22	6.68	9.81	1.93	1.00	1.00	4,322
Aerospace Ground Support Equipment	0.51	1.02	2.05	0.01	0.15	0.14	1,353
POVs – On- and Off-Base	0.02	0.98	0.09	0.004	0.003	0.003	398
Total Annual Emissions - Alternative 2	0.85	14.02	32.93	4.74	4.24	4.23	12,316
Baseline C-2A Emissions	0.91	5.79	14.88	1.80	1.36	1.36	4,712
Net Emissions Change for Alternative 2 [1]	(0.06)	8.23	18.05	2.94	2.88	2.87	7,604
Conformity Threshold	100	100	100	N/A	N/A	N/A	N/A
PSD Threshold	N/A	N/A	N/A	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes:
CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NAS=Naval Air Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; POV=privately owned vehicle; PSD = Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound
[1] Equal to Navy V-22 Alternative 2 emissions minus C-2A Baseline emissions.

The Navy has determined that the projected emissions from construction and operations of Alternative 2 would not cause or contribute to a violation of any NAAQs or CAAQs. Emissions would be below the applicable General Conformity *de minimis* thresholds. The General Conformity RONA is provided in **Appendix C**.

4.4.3.3 Climate Change

The potential effects of proposed GHG emissions are by nature global because worldwide sources of GHGs contribute to climate change. Impacts to climate change from Alternative 2 would be similar to, but less than those for Alternative 1. The total annual emissions of CO_2e from construction activities would be 805 metric tons under Alternative 2 (**Table 4.4-3**). The increase in annual emissions of CO_2e from Alternative 2 at NAS North Island would amount to about 7,604 metric tons from operations (**Table 4.4-4**). Adding these emissions increases to the global inventory of GHGs would produce a negligible

contribution to future climate change, the effects of which are identified in **Section 3.4.2** (Air Quality Affected Environment) of this EA.

As described for Alternative 1, the Navy has established Fiscal Year (FY) 2020 GHG emissions reduction targets of 34 percent from a FY 2008 baseline for direct GHG emissions and 13.5 percent for indirect emissions to demonstrate initial responses for the Navy to factor GHG management into Navy proposals and impact analyses.

Climate change could impact implementation of Alternative 2 at NAS North Island and the adaptation strategies needed to respond to future conditions. Therefore, additional measures at NAS North Island could be needed to protect infrastructure and personnel from these effects. Regarding sea level rise and its potential to displace coastal operations and infrastructure, the DoD has an active program to develop measures for installations to adapt to this threat (DoD Strategic Environmental Research and Development Program, 2014 and 2016). In particular, the Navy has evaluated potential threats of sea level rise to NAS North Island (Space and Naval Warfare Systems Center Pacific, 2015).

4.4.4 CONCLUSION

Under the No Action Alternative, a slight increase in future operations would result in only a minor increase in emissions compared to those generated by baseline operations.

Total air pollutant emissions associated with construction activities under Alternative 1 and 2, even if all construction activities were to occur in one year and not two, would be well below the applicable annual significance thresholds. Therefore, construction of Alternatives 1 and 2 would not result in significant air quality impacts.

The net increase in emissions from the replacement of existing C-2A aircraft operations with the proposed Navy V-22 operations under Alternatives 1 and 2 would not exceed any significance threshold. Therefore, implementation of Alternatives 1 and 2 would not result in significant air quality impacts.

The Navy has determined that the potential emissions of Alternatives 1 and 2 would not cause or contribute to a violation of any NAAQS or CAAQS. Emissions would be below the applicable General Conformity *de minimis* thresholds. The General Conformity RONA is provided in **Appendix C**.

The potential effects of proposed GHG emissions are by nature global because worldwide sources of GHGs contribute to climate change. The total annual emissions of CO_2e from construction of Alternative 1 and Alternative 2 at NAS North Island would be 1,074 and 805 metric tons, respectively. The increase in annual emissions of CO_2e from operations of Alternative 1 and Alternative 2 at NAS North Island would amount to 12,783 and 7,604 metric tons, respectively. Adding these emissions increases to the global inventory of GHGs would produce a negligible contribution to future climate change, the effects of which are identified in **Section 3.4.2** (Air Quality Affected Environment) of this EA.

4.5 TRANSPORTATION

Impacts to transportation are analyzed by considering the possible effects of proposed increases in commuter and construction traffic on existing traffic conditions.

TRANSPORTATION
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternative 1:

- Short-term construction truck traffic (average of five truck trips per work day) and construction worker vehicles.
- Additional commuters would generate estimated 340 ADT, less than 1 percent of existing NAS North Island daily traffic.
- This increase in ADT was previously accounted for in the 2008 SEIS traffic impact study.
- Cumulative traffic impacts are discussed in Section 5 (Cumulative Impacts – Transportation)

Alternative 2:

- Short-term average of four construction truck trips per work day and construction worker vehicles.
- Same as Alternative 1, except additional commuters would generate estimated 160 ADT, less than 1 percent of existing NAS North Island daily traffic.

4.5.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline transportation. Therefore, no significant impacts to transportation would occur with the No Action Alternative.

4.5.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.5.2.1 Construction

During the construction period, there would be a short-term increase in trucks traveling to/from NAS North Island to deliver construction materials, and in construction worker vehicles. It is estimated that there would be an average of five truck trips per work day (Monday through Friday) over a construction period of 24 months. There may be periods of increased truck trips followed by periods of decreased truck trips, depending on the work that is scheduled. A portion of the construction workers would be expected to carpool, but worker's vehicles would add to traffic in the a.m. and the p.m. during work days.

Many of the trucks, depending on the status of other construction in the area, would avoid traveling over the Coronado Bridge and would typically travel SR-75 via Silver Strand Boulevard to the contractor entrance gate on Third Street next to the NAS North Island main gate. The use of a concrete batch plant may be considered by the construction contractor, if feasible, but concrete materials would still be delivered by truck. The additional truck and other construction vehicle traffic would result in a temporary impact on City of Coronado and NAS North Island roadways and Silver Strand Boulevard, but would not result in a significant traffic impact. To minimize construction traffic, the Navy would consider the establishment of truck routes and/or construction worker carpooling.

4.5.2.2 Operations

This analysis of potential vehicular traffic-related impacts that may result from the addition of personnel for the Proposed Action at NAS North Island is based on, and incorporates by reference, the 2008 Supplemental Environment Impact Study (SEIS) and traffic study discussed in **Section 3.5.2** (Transportation Affected Environment).

An additional 341 personnel would be added to the base population at NAS North Island under Alternative 1. A portion of these personnel would commute to the base daily in personal vehicles. Of

341 personnel, 20 percent would be expected to reside in on-base housing. On any given day, 25 percent would be on duty (i.e., not leaving NAS North Island daily); 10 percent would be on vacation, temporary assigned duty, or training at off-base locations; and 5 percent would use carpools, vanpools, or other alternative transportation. Therefore, the number of new daily commuters that would use personal vehicles for travel to NAS North Island on an average day is estimated to be 136. Using a trip generation rate provided by San Diego Association of Governments (SANDAG) of 2.5 trips per day (SANDAG, 2002) for each of the 136 commuters, the estimated additional traffic on an average day would be 340 average daily traffic (ADT).

This additional ADT would represent less than 1 percent of NAS North Island traffic, which was counted at 48,570 ADT in 2015 at the NAS North Island gates. This increase in ADT was previously accounted for in the 2008 SEIS traffic impact study within an assumed increase of 4,000 ADT associated with future projects (refer to **Section 5.4.5** Cumulative Impacts, Transportation) and would not change the LOS results projected in the 2008 traffic study. The current status of the future projects is evaluated in **Section 5** (Cumulative Impacts).

Therefore, implementation of Alternative 1 at NAS North Island would not result in significant direct operational traffic impacts for the following reasons:

- Expected ADT under Alternative 1 represents less the one percent of the total ADT in the regional network;
- Alternative 1 traffic flow has already been accounted for in the previous traffic impact analysis undertaken at NAS North Island; and
- While Alternative 1 traffic impacts would be minor and not directly significant, traffic volume would contribute cumulatively to traffic congestion in Coronado. Cumulative traffic impacts are evaluated in **Section 5** (Cumulative Impacts).

4.5.2.3 Alternative Transportation

Approximately 17 of 341 additional personnel under Alternative 1 would be expected to travel by carpool, vanpool, or mass transit (e.g., train, bus, and/or ferry). This additional ridership would have minimal impact on the capacity of these services. SANDAG, the City of Coronado, and NBC Transportation Improvement Program continue to plan for the enhancement of the local and regional transportation system to provide residents and military personnel with increased options for transportation (SANDAG, 2011c; City of Coronado, 2016).

4.5.3 Alternative 2 Potential West Coast Impacts

4.5.3.1 Construction

Construction impacts under Alternative 2 would be similar but slightly less than described for Alternative 1 because there would be less construction of required hangar spaces. It is estimated that an average of four truck trips per day would occur over a construction period of 24 months (Monday through Friday). There may be periods of increased truck trips followed by periods of decreased truck trips, depending on the work that is scheduled. The additional truck and other construction vehicle traffic would result in a temporary impact on City of Coronado roadways and Silver Strand Boulevard, but would not result in a significant traffic impact. To minimize construction traffic, the Navy would consider the establishment of truck routes and/or construction worker carpooling.

4.5.3.2 Operations

Under Alternative 2, an additional 161 personnel would be added to the base population at NAS North Island. A portion of these personnel would commute to the base daily in personal vehicles. Of 161 personnel, 20 percent would be expected to reside in on-base housing. On any given day, 25 percent would be on duty (i.e., not leaving NAS North Island daily); 10 percent would be on vacation, temporary assigned duty, or training at off-base locations; and 5 percent would use carpools, vanpools, or other alternative transportation. Therefore, the number of new daily commuters that would use personal vehicles for travel to NAS North Island on an average day is estimated to be 64.

Using a trip generation rate provided by SANDAG of 2.5 trips per day (SANDAG, 2002) for each of the 64 commuters, the estimated additional traffic on an average day would be 160 ADT. The traffic analysis for Alternative 2 is the same as presented for Alternative 1, except additional traffic volume would be approximately one half. Therefore, implementation of Alternative 2 would not result in significant impacts to traffic.

4.5.3.3 Alternative Transportation

Impacts to alternative transportation under Alternative 2 would be similar to those described for Alternative 1. Approximately 8 of 161 additional personnel would be expected to travel by carpool, vanpool, or mass transit (e.g., train, bus, and/or ferry). This additional ridership would have minimal impact on the capacity of these services.

4.5.4 CONCLUSION

Implementation of Alternative 1 or Alternative 2 would not result in significant impacts to transportation at the West Coast Fleet Logistics Center, NAS North Island.

Alternative 1 would result is a short-term increase in construction delivery trucks and construction worker vehicles, which would have a temporary impact on City of Coronado roadways. On average, approximately five truck trips per work day (Monday through Friday) would travel to NAS North Island over a construction period of 24 months. Under Alternative 2, approximately of four truck trips per work day would travel to the construction site over a period of 24 months. To minimize construction traffic, the Navy would consider the establishment of truck routes and/or construction worker carpooling

For Alternative 1, an additional 341 personnel would generate an estimated 340 ADT, less than 1 percent of existing NAS North Island daily traffic. This increase in ADT was previously accounted for in projected future cumulative projects and analyzed in the 2008 SEIS traffic impact study. Cumulative traffic impacts are discussed further in **Section 5** (Cumulative Impacts – Transportation). Under Alternative 2, the additional 161 personnel would generate an estimated 160 ADT, less than 1 percent of existing NAS North Island daily traffic.

Alternatives 1 and 2 would have a minimal impact on the capacity of carpool, vanpool, and other alternative transportation.

4.6 BIOLOGICAL RESOURCES

This analysis focuses on wildlife or vegetation types that are important to the function of the ecosystem or are protected under federal or state law or statute.

BIOLOGICAL RESOURCES
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternatives 1 and 2:

- Increase in aircraft operations would have the potential to increase BASH and takes of migratory birds.
- Aircraft operations would be conducted in accordance with the BASH Plan and the NBC INRMP, which would minimize the risk of collision impacts to wildlife.
- Migratory bird takes would be in compliance with the MBTA, the MOU to promote the conservation of migratory birds, and the regulations authorizing incidental take of migratory birds from military readiness activities during operations.
- The Proposed Action *may affect, but is not likely to adversely affect* the California least tern and the western snowy plover; therefore, informal consultation with the USFWS was conducted.
- *No effect* on other federally listed species.

- Alternatives impacts to biological resources would not be exacerbated under climate change conditions.

4.6.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline biological resources. Therefore, no significant impacts to biological resources would occur with the No Action Alternative.

4.6.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.6.2.1 Terrestrial Vegetation

The Proposed Action would occur in a developed area mainly devoid of natural habitat areas or plant communities. Therefore, no impacts to vegetation would be expected as a result of demolition, construction/renovation, or operation of Alternative 1.

Construction equipment has the potential to introduce and spread invasive non-native plant species outside of the project area. Therefore, all vehicles, equipment, and footwear would be cleaned of dirt, debris, seeds, mud, and visible plant material prior to being brought onto and before leaving the project area. Vehicles will also be cleaned after construction prior to being used elsewhere on NAS North Island. Any weeds removed would be placed in bags or dumpsters and hauled away. Any removed vegetation would not be dumped on-site or off-site. Adherence to these measures would prevent the introduction and spread of invasive non-native plant species.

Alterative 1 would include landscaping within the developed project area. The list of plants to be incorporated into the landscaping would be submitted to the NBC Botanist, NBC Wildlife Biologist, and Naval Facilities Engineering Command (NAVFAC) Landscape Architect for review and approval prior to planting. Eighty percent of plant material (within each stratum i.e., herbs, shrubs, trees) will be from the approved plant list of California native species (California Native Plant Society, 2017). The remaining 20 percent would consist of drought tolerant plants on the plant list. Trees and large scrubs may not be planted within the project area because they may increase BASH risk and predation risk on endangered species nesting sites south of the project area.

4.6.2.2 Terrestrial Wildlife

The project area for Alternative 1 is located within a developed area at NAS North Island that provides little to no habitat for most wildlife species. Ground disturbing activities associated with constructing proposed facilities would not occur in any sensitive habitat areas or natural plant communities, and wildlife habitats would not be removed or modified.

Potential impacts to terrestrial wildlife could result from construction and aircraft noise. Construction noise and activity would be localized, short-term, and only during daylight hours. The project area is developed military industrial land subject to frequent elevated noise and activity levels. Common wildlife in or immediately adjacent to the project area are exposed to elevated noise under baseline conditions. The temporary addition of localized construction noise and activity would not reduce the suitability of the project area for common wildlife.

The increase in annual aircraft operations (11,500) under Alternative 1 would have negligible effects on the existing noise environment (see **Section 4.2** [Noise]), which is primarily driven by ongoing jet aircraft operations. The proposed Navy V-22 would operate in an airfield environment similar to the existing conditions and would follow established local approach and departure patterns. Common wildlife near the airfield are accustomed to a noisy military aircraft operational environment and would not be expected to react or modify behavior as a result of Alternative 1.

4.6.2.3 Bird/Animal Aircraft Strike Hazards

Under Alternative 1, aircraft operations would increase by approximately 14 percent (or, approximately 16 aircraft departures and 16 aircraft arrivals per day, based on 365 days), increasing the potential for BASH. However, there would be no changes to the existing flight paths or procedures. Aircraft operations would be conducted in accordance with the BASH Plan included in Appendix Q of the NBC Integrated Natural Resources Management Plan (INRMP) (Navy, 2013c). BASH incidents occasionally occur at NAS North Island airfield under baseline conditions. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at NAS North Island is seven strikes per year (USDA, 2014). Given the overall low numbers of BASH incidents compared to the number of existing aircraft operations, the proposed increase in aircraft operations would not be expected to cause a significant BASH impact. The NBC INRMP identifies ongoing management goals to reduce the BASH potential at NAS North Island. NBC maintains records on bird hazards to military aircraft and prepares an annual BASH report summarizing data and information collected under the BASH program (USDA, 2010; USDA, 2011; USDA, 2012; USDA, 2013, and USDA, 2014). Continued adherence to the BASH Plan would minimize the risk of collision impacts to wildlife at NAS North Island.

Additionally, no attractants would be created under Alternative 1 that would increase the concentration of birds at the airfield. Alternative 1 would incorporate BASH requirements into the design to deter birds from nesting/perching within the project area. Bird deterrent devices (e.g., Nixalite) would be installed on all hangars, support buildings, antennas, light poles and other perching surfaces, and roof pitching would be designed to minimize bird perching, roosting, nesting, and loafing. Any trash receptacles placed around the new buildings would be designed with secure lids. If revegetation or landscaping would occur within areas of new construction, trees and large shrubs would not be considered for planting because they may increase avian usage of the site and predation risk. Therefore, Alternative 1 would not result in a significant BASH impact.

4.6.2.4 Migratory Birds

Impacts to California least tern and western snowy plover are described in **Section 4.2.2.5** (Federally Listed Species).

Construction

The heron rookery and egret nest sites located at NAS North Island are considered a migratory bird resource in addition to being considered a protected/sensitive habitat by California Department of Fish and Wildlife. Under Alternative 1, the nearest heron and egret nest sites are less than 50 feet north of the project area boundary and approximately 120 feet north of the nearest building proposed for demolition (Building 306) (**Figure 3.6-2**). At this distance, and given that the birds have already acclimated to human presence and noise disturbance (Navy, 2013c), construction and associated noise resulting from Alternative 1 would not be expected to affect roosting or nesting birds using the rookery. In addition, Alternative 1 includes the construction of new buildings within the project area. Buildings would incorporate bird-friendly design to prevent migratory birds from colliding with buildings (primarily through consideration of glass and lighting design). Bird-friendly design features include: (1) transparent passageways, corners, atria, or courtyards so that birds do not get trapped; (2) appropriately shielded outside lighting that is directed away from habitats to minimize attraction to light-migrating songbirds; (3) interior lighting that is turned off at night or designed to minimize light escaping through windows; and (4) landscaping that is designed to keep birds away from the building's façade. Use of non-reflective or opaque glass; external shades (or other devices to reduce glare, transparency, or reflectiveness) on windows; ultraviolet patterned glass; angled glass; and/or louvers can aid in reducing bird collisions. Additionally, night-time lighting would include bird-friendly design features such as shielded lights (to reduce ambient light into nearby habitats), use of motion detectors, dusk-to-dawn sensor activation and other automatic controls, low-lumen or limited-spectrum lighting, and lighting design that uses shields to prevent light from shining upward in the sky. The NBC Wildlife Biologist will be consulted to ensure the minimization measures are incorporated to prevent window strikes.

Alternative 1 would demolish buildings that may contain active bird nests within the buildings or on the rooftop. Pursuant to Executive Order (EO) 13186, the U.S. Fish and Wildlife Service and DoD entered into a Memorandum of Understanding (MOU) to promote the conservation of migratory birds. This MOU does not authorize take of migratory birds but specifically pertains to evaluating the likelihood of an action to affect migratory birds. This MOU means to protect against the take of birds for installation support functions, including utilities maintenance, construction, and demolition. The executing agent/contractor would coordinate with the NBC Wildlife Biologist (619-545-3703) to ensure that work would avoid impacting birds protected under the Migratory Bird Treaty Act (MBTA) (including Birds of Conservation Concern [BCC]). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season (non-breeding season is September 1 to February 14). If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. The qualified biologist would be hired by the project proponent and approved by the NBC Wildlife Biologist. The qualified biologist must survey the area within 72 hours of commencing work to determine if active nests are present. If an active nest is found in the project area at any time during project work, work would be halted immediately and the NBC Wildlife Biologist would be contacted. The contractor cannot take action to remove the bird or the nest from the area that is being used. Any removal action must be overseen by the NBC Wildlife Biologist. The NBC Wildlife Biologist, in coordination with the qualified biologist, must confirm that there would be no impacts to active nests before construction work could resume. With implementation of

these measures, construction activities associated with Alternative 1 would not result in a significant adverse effect on a migratory bird (including BCC) species or their active nests.

Operations

As described in **Section 4.6.2.3** (Bird/Animal Aircraft Strike Hazards), an increase in aircraft operations under, Alternative 1 could result in a minor increase BASH potential at NAS North Island. Accordingly, the Navy has determined that the Proposed Action may result in potential for takes of migratory birds, including BCC as a result of collision impact. BASH incidents occur at the NAS North Island airfield under baseline conditions. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at NAS North Island is seven strikes per year (USDA, 2014). Given the overall low numbers of BASH incidents compared to the number of existing aircraft operations, the proposed increase in aircraft operations would not be expected to cause a significant increase in BASH incidents. As previously discussed in **Section 4.6.2.4** (Migratory Birds), no aspect of Alternative 1 would create attractants with the potential to increase the concentration of birds at the airfield. While there is a slight increase in air operations proposed under Alternative 1, there are no proposed changes to existing flight procedures. Therefore, the risk of impacts to migratory birds is managed through continued application of BASH measures and the risk of impacts to MBTA species would be expected to remain similar to existing levels. Additionally, aircraft operations under the Proposed Action are a military readiness activity. Military readiness activities are exempt from the take prohibitions of the MBTA, provided they would not result in a significant adverse effect on a population of migratory bird species. As shown in **Table 3.6-2**, five BCC species (burrowing owl, western snowy plover, peregrine falcon, gull-billed tern, and California least tern) have the potential to occur within the project area. Given the San Diego County population size of the burrowing owl (46 breeding pairs; Lincer and Bloom, 2007), western snowy plover (140 breeding pairs; California Department of Fish and Wildlife, 2016); peregrine falcon (15-35 individuals; U.S. Forest Service [USFS], 2017), gull-billed tern (32-37 breeding pairs; Unitt, 2004), and California least tern (2,492 breeding pairs; USFWS, 2016), the minor potential for an aircraft strike is not likely to adversely impact the population of these species. Population sizes of most common migratory bird species would be larger; thus the potential impact on the population of most species would be even smaller. Therefore, Alternative 1 is not anticipated to have significant adverse effects on a population migratory birds (including BCC) that would result in the need for mitigation and consultation with the USFWS.

4.6.2.5 Federally Listed Species

4.6.2.5.1 California Least Tern

The Navy has determined that implementing Alternative 1 *may affect, but is not likely to adversely affect* the California least tern; therefore, informal consultation with the USFWS was conducted, as required by Section 7 of the Endangered Species Act (ESA). In a letter dated March 26, 2018, the USFWS concurred with the Navy's determination. Correspondence with the USFWS is provided in **Appendix D**.

Construction

California least tern are known to nest within the project area adjacent to the Helipad 2 (**Figure 3.6-2**). In addition, they are known to nest within the 21-acre managed nesting site (herein referred to as the MAT site), located outside of but adjacent to the southern boundary of the project area (**Figure 3.6-2**).

Under Alternative 1, construction activities to develop infrastructure to house and maintain the Navy V-22 and to repave the taxiway at NAS North Island would occur in the general vicinity of the MAT site (**Figure 3.6-2**). Repaving would also occur near known California least tern nest locations adjacent to Helipad 2 in the northern portion of the project area (**Figure 3.6-2**). California least tern nesting and

loafing around the airfield, including Helipad 2, is discouraged through harassment efforts under the NAS North Island Biological Opinion (BO) (herein referred to as the Airfield BO). This species has not nested at the site since 2015 when only a single nest was laid and soon abandoned. Construction activities that occur in proximity (defined as 500 feet) from the MAT site or other nesting locations during the nesting season may disturb nesting least terns. Building demolition and new building construction within the project area would occur greater than 500 feet from the MAT site. However, construction within the parking apron and along the taxiway would occur within 500 feet of the MAT site. In order to avoid impacts to California least terns nesting at the MAT site, construction activity will be restricted as follows: (1) no construction would be permitted within 300 feet of the MAT site during the California least tern breeding season (April 1 to August 30 or sooner if a Biological Monitor demonstrates to the satisfaction of the Carlsbad USFWS Office that all nesting is complete); (2) no heavy construction would be permitted within 500 feet from the MAT site during the breeding season; and (3) construction greater than 500 feet from the existing MAT site that could result in noise or visual impacts to nesting California least tern (e.g., building demolition, jackhammering) would be conducted outside of the breeding season to the maximum extent practicable. Heavy construction activity is defined as activity that produces loud noises and/or utilizes heavy equipment (to include but not be limited to grading, jackhammering, excavating, and removal of large debris). All construction activities proposed during the breeding season would be reviewed on a weekly basis by the NBC Wildlife Biologist. If the NBC Wildlife Biologist determines that proposed activities have the potential to disrupt nesting California least terns, a Biological Monitor would observe California least terns at the MAT site during those activities and determine whether nesting is being disrupted. If the Biological Monitor determines that nesting is being disrupted, the Navy would stop work and coordinate with the Carlsbad USFWS Office to review additional avoidance/minimization measures that can be implemented. Upon agreement as to the necessary revisions to the avoidance/minimization approach, work may resume subject to the revisions and continued nest monitoring until California least tern nesting at the MAT site is complete. For any construction that occurs during the nesting season, all cranes or other tall construction equipment would be lowered when not in use to preclude raptor and corvid perching.

The Navy would also monitor California least tern activity in the Taxiway Juliet area. If California least terns initiate nesting at Taxiway Juliet despite the Navy's efforts to deter nesting, the Navy would implement the measures described above for the MAT site at Taxiway Juliet, or reinitiate consultation with the Carlsbad USFWS Office to address the potential effects of construction on California least tern nesting at Taxiway Juliet.

The squadron hangar and training squadron hangar, buildings, and associated facilities within the project area could result in an increase in perching opportunities for predators of the California least tern, including raptors, crows, and ravens. The potential for perching habitat and associated predation would be minimized by constructing the hangars and any other support buildings with a slanted roof, or other design that discourages perching and loafing by birds, and including anti-perch devices (e.g., Nixalite on perches) as part of the facility design. These design elements would also support the Navy's requirement to reduce BASH risk on NAS North Island (discussed under **Section 4.6.2.3** [Bird/Animal Aircraft Strike Hazards]).

In addition, to minimize potential impacts to nesting within the MAT site, the Navy would incorporate the following measures into the project design: (1) permanent outdoor lighting installed within the project area would be shielded to maximally reduce light pollution into the MAT site; (2) other methods of reducing light pollution (e.g., dusk-to-dawn sensor activation, low-lumen or limited-spectrum lighting)

would be applied wherever possible; (3) light poles and light placement would be constructed at the lowest height possible (considering security constraints) to reduce impacts to the surrounding natural resources by reducing raptor perching sites and to reduce light pollution; and (4) any trash receptacles placed around the new buildings would be designed with secure lids to reduce the potential for attracting California least tern predators (e.g., corvids). The Navy would submit a draft lighting plan to the Carlsbad USFWS Office for review at least 30 days prior to project construction. If any antennas are proposed within the project site, the NBC Wildlife Biologist would review and approve the proposed antenna locations and designs to minimize predator perching opportunities near the MAT site.

Written approval by the NBC Wildlife Biologist is required prior to finalization and implementation of construction activities. Engagement and coordination with the aforementioned subject matter expert in the Request for Proposal (RFP) and design process must occur from the beginning to ensure timely coordination so as to afford appropriate opportunities for project review and modification to comply with Federal laws and regulations, to protect endangered/threatened species and habitats in close proximity to the project area. Subject matter experts must be contacted during RFP development and prior to the kickoff-meeting of the project design.

Therefore, construction of facilities under Alternative 1 would not result in significant impacts to the California least tern.

Operations

Aircraft operations under Alternative 1 would be similar to the current C-2A airfield operations, but the quantity of operations, types of operations, and flight patterns would be slightly different. Alternative 1 would result in a 14 percent increase in total annual aircraft operations at NAS North Island.

Potential impacts to California least tern could result from increased noise during aircraft operations. A noise analysis conducted in support of this EA (refer to **Section 4.2** [Noise]) concludes that Alternative 1 does not result in a noticeable change in the DoD's primary noise metric in California, CNEL, and the results are nearly indistinguishable from either the baseline or the No Action Alternative. This indicates that the aircraft and types of events that cause the primary contribution to the CNEL are not affected by the proposed change at NAS North Island. As described in **Section 4.2** (Noise), additional aircraft operations proposed under Alternative 1 would have negligible effects on the existing the noise environment. Additionally, the noise analysis conducted at three points on the MAT site (refer to **Figure 3.2-3**) concluded that a 1 dB increase in noise levels at the MAT site under Alternative 1 would be an imperceptible change to California least terns (refer to **Section 4.2.2.4** [Supplemental Noise Analysis]). Because California least terns have established nesting and continue to nest under the existing noise environment indicates that they are not likely impacted by these existing operations and would not be expected to be adversely impacted by operations conducted under Alternative 1.

Under Alternative 1, the Navy V-22 aircraft would operate at the existing airfield (i.e., taxing along the existing taxiway and running the engines within the parking apron) within 500 feet of the MAT site in areas currently used for aircraft operations at NAS North Island. Potential issues from aircraft operations include heat effects from the aircraft engines and rotor wash (winds generated from the aircraft rotors during operations). The Navy V-22 would be operated in accordance with the Naval Air Training and Operating Procedures Standardization (NATOPS) training manual. The manual identifies measures and limitations on how the aircraft is operated, including time on the ground and requirements for nacelle rotation to reduce heat effects. During normal ground operations, the exhaust deflector system of the Navy V-22 is engaged at all times for safety purposes. While on the ground, the primary high-heat

exhaust would be directed downward close to the ground directly under the aircraft engine with temperatures dissipating to ambient outdoor temperatures within 20 feet of the engine (Aitchison, 2017). Because of this operations on the taxiway or the parking apron would not be expected to result in a change in ambient temperature at the MAT site. Operation of the Navy V-22 would result in aircraft rotor wash. Rotor wash forces are relative to the engine power settings and the aircraft's proximity to the ground. Navy V-22 aircraft on the taxiway and parking apron would be on the ground (i.e., not hovering) and operated in low-power setting. Wind velocities associated with rotor wash would diminish substantially beyond 100 feet from the aircraft. In addition, the Navy V-22 would taxi westward from the parking apron and would not taxi adjacent to the MAT site. Therefore, proposed operations would not be expected to result in a change in ambient conditions at the MAT site.

An increase in aircraft operations under Alternative 1 could result in a minor increase in BASH potential at NAS North Island and there is a potential for individual California least tern to be affected by a strike. The Airfield BO acknowledges the potential take for airfield operations. As described under **Section 4.6.2.3** (Bird/Animal Aircraft Strike Hazards), no aspect of Alternative 1 would create attractants with the potential to increase the concentration of birds at the airfield. While there is a slight increase in air operations proposed under Alternative 1, there are no proposed changes to existing flight procedures. Aircraft occasionally strike California least tern at NAS North Island airfield under baseline conditions. Based on the last 35 years of records of BASH incidents kept for NAS North Island, 7 incidents of aircraft striking California least tern have been documented at NAS North Island. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at North Island is 7 strikes per year (USDA, 2014). Given the overall very low numbers of BASH incidents compared to the number of existing aircraft operations, this increase would not be expected to cause incidental take above that already authorized in the Airfield BO.

Under the Reasonable and Prudent Measures of the Airfield BO, the Navy would continue to monitor the NAS North Island airfield for signs of collisions between least terns and aircraft, and report any strikes to the USFWS on an annual basis (USFWS, 2005). If the anticipated level of incidental take is exceeded, the Navy would reinitiate consultation and work with the USFWS to determine the best course of action to minimize future take and/or modify the level of authorized take. Under Alternative 1, the Navy would continue annual nest monitoring of the California least tern and coordination with the USFWS as part of the NBC INRMP program requirements and conditions of the various BOs.

Therefore, aircraft operations under Alternative 1 would not result in significant impacts to the California least tern.

4.6.2.5.2 Western Snowy Plover

The Navy has determined that implementing Alternative 1 *may affect, but is not likely to adversely affect* the western snowy plover; therefore, informal consultation with the USFWS was conducted, as required by Section 7 of the ESA. In a letter dated March 26, 2018, the USFWS concurred with the Navy's determination. Correspondence with the USFWS is provided in **Appendix D**.

Construction

Western snowy plovers are not known to occur within the project area; however, they are known to nest within the MAT site located adjacent to southern portion of the project area (**Figure 3.6-2**). Under Alternative 1, construction activities that occur in proximity (defined as 500 feet) from the MAT site or other nesting locations during the nesting season may disturb nesting western snowy plovers. The Navy would monitor western snowy plover activity on the airfield and coordinate with construction personnel

if western snowy plovers are detected in areas adjacent to the project site. Any western snowy plover nests initiated within or adjacent to the project construction would be marked with blue cones and construction personnel would be directed away from the area until eggs can be collected for captive-rearing in accordance with the Airfield BO. Therefore, construction activities would not impact nesting western snowy plovers.

Similar to California least tern, impacts to nesting western snowy plovers would be avoided by designing the facilities in a way that deters predator perching (see **Section 4.6.2.5.1** [California Least Tern - Construction]). These design elements would also support the Navy's requirements to reduce BASH risk on NAS North Island (see **Section 4.6.2.3** [Bird/Animal Aircraft Strike Hazards]). In addition, to minimize potential impacts to nesting within the MAT site, the Navy would incorporate the following measures into the project design: (1) permanent outdoor lighting installed within the project area would be shielded to maximally reduce light pollution into the MAT site; (2) other methods of reducing light pollution (e.g., dusk-to-dawn sensor activation, low-lumen or limited-spectrum lighting) would be applied wherever possible; and (3) light poles and light placement would be constructed at the lowest height possible (considering security constraints) to reduce impacts to the surrounding natural resources by reducing raptor perching sites and to reduce light pollution. The Navy would submit a draft lighting plan to the Carlsbad USFWS Office for review at least 30 days prior to project construction. If any new antennas are proposed within the project site, the NBC Wildlife Biologist would review and approve the proposed antenna locations and design to minimize predator perching opportunities near the MAT Site.

Written approval by the NBC Wildlife Biologist is required prior to finalization and implementation of construction activities. Engagement and coordination with the aforementioned subject matter expert in the RFP and design process must occur from the beginning to ensure timely coordination so as to afford appropriate opportunities for project review and modification to comply with Federal laws and regulations, to protect endangered/threatened species and habitats in close proximity to the project site. Subject matter experts must be contacted during RFP development and prior to the kickoff-meeting of the project design.

Therefore, construction under Alternative 1 would not result in significant impacts to the western snowy plover.

Operations

Aircraft operations under Alternative 1 would be similar to the current C-2A airfield operations, but the quantity of operations, types of operations, and flight patterns would be slightly different. Alternative 1 would result in a 14 percent increase in total annual aircraft operations at NAS North Island.

Potential impacts to western snowy plover could result from increased noise during aircraft operations. A noise analysis conducted in support of this EA (refer to **Section 4.2** [Noise]) concludes that Alternative 1 does not result in a noticeable change in the DoD's primary noise metric in California, CNEL, and the results are nearly indistinguishable from either the baseline or the No Action Alternative. This indicates that the aircraft and types of events that cause the primary contribution to the CNEL are not affected by the proposed change at NAS North Island. As described in **Section 4.2** (Noise), additional aircraft operations proposed under Alternative 1 would have negligible effects on the existing noise environment. Additionally, the noise analysis conducted at three points on the MAT site (refer to **Figure 3.2-3**) concluded that a 1 dB increase in noise levels at the MAT site under Alternative 1 would be an imperceptible change (refer to **Section 4.2.2.4** [Supplemental Noise Analysis]). Because western snowy plovers have established nesting and continue to nest under the existing noise environment indicates

that they are not likely impacted by these existing operations and would not be expected to be adversely impacted by operations conducted under Alternative 1.

Under Alternative 1, the Navy V-22 aircraft would operate at the existing airfield (i.e., taxing along the existing runway and running the engines within the parking apron) within 500 feet of the MAT site in areas currently used for aircraft operations at NAS North Island. Potential issues from aircraft operations would be similar to those described for California least tern and include heat effects from the aircraft engines and rotor wash. The Navy V-22 would be operated in accordance with the NATOPS training manual, which identifies measures and limitations on how the aircraft is operated (e.g., time on the ground and requirements for nacelle rotation to reduce heat effects). During normal ground operations, the exhaust deflector system of the Navy V-22 is engaged at all times for safety purposes. While on the ground, the primary high-heat exhaust would be directed downward close to the ground directly under the aircraft engine with temperatures dissipating to ambient outdoor temperatures within 20 feet of the engine (Aitchison, 2017). Because of this operations on the taxiway or the parking apron would not be expected to result in a change in ambient temperature at the MAT site. Operation of the Navy V-22 would result in aircraft rotor wash. As described for California least tern, wind velocities associated with rotor wash would diminish substantially beyond 100 feet from the aircraft. In addition, the Navy V-22 would taxi westward from the parking apron and would not taxi adjacent to the MAT site. Therefore, proposed operations would not be expected to result in a change in ambient conditions at the MAT site.

The increase in aircraft operations under Alternative 1 could result in a minor increase in BASH potential at NAS North Island and there is a potential for individual western snowy plover to be affected by a strike. The Airfield BO acknowledges the potential take for airfield operations. As described under **Section 4.6.2.3** (Bird/Animal Aircraft Strike Hazards), no aspect of Alternative 1 would create attractants with the potential to increase the concentration of birds at the airfield. While there is a slight increase in air operations proposed under Alternative 1, there are no proposed changes to existing flight procedures. Aircraft occasionally strike western snowy plover at NAS North Island airfield under baseline conditions. Based on the last 35 years of records of BASH incidents kept for NAS North Island, 2 incidents of aircraft striking western snowy plover have been documented at NAS North Island. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at North Island is 7 strikes per year (USDA, 2014). Given the overall very low numbers of BASH incidents compared to the number of existing aircraft operations, this increase would not be expected to cause incidental take above that already authorized in the Airfield BO.

Under the Reasonable and Prudent Measures of the Airfield BO, the Navy would continue to monitor the NAS North Island airfield for signs of collisions between western snowy plover and aircraft, and report any strikes to the USFWS on an annual basis (USFWS, 2005). If the anticipated level of incidental take is exceeded, the Navy would reinitiate consultation and work with the USFWS to determine the best course of action to minimize future take and/or modify the level of authorized take. Under Alternative 1, the Navy would continue annual nest monitoring of the western snowy plover and coordination with the USFWS as part of the NBC INRMP program requirements and conditions of the various BOs.

Therefore, aircraft operations under Alternative 1 would not result in significant impacts to western snowy plover.

4.6.2.5.3 Climate Change

NAS North Island is investigating collaborations with local universities, agencies, and non-profits and the regional Landscape Conservation Cooperative on vulnerability assessments and landscape-level conservation efforts. In 2015, *Methodology for Assessing the Impact of Sea Level Rise on Representative Military Installation in the Southwestern United States* (Space and Naval Warfare Systems Center Pacific, 2015) was prepared. The report analyzed areas that may be vulnerable to inundation and flooding at NAS North Island, including beach training areas, buildings near protected and exposed shorelines, waterfront structures, coastal structures, civil infrastructure, roads, and airfields.

Ecosystems can serve as natural buffers from extreme events such as flooding. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Climate change may influence the geographical distribution of species, bringing in additional species to the area while driving out others; however, it is not likely that additional species would be significantly impacted by Alternative 1.

4.6.3 ALTERNATIVE 2 POTENTIAL WEST COAST IMPACTS

The project area for Alternative 2 would be the same as defined for Alternative 1. There would be a slightly lesser overall increase in total aircraft flight operations at NAS North Island. Operations would increase under Alternative 2 by approximately 7 percent (approximately 8 aircraft departures and 8 aircraft arrivals per day, based on 365 days) compared to the No Action Alternative. Under Alternative 2, a negligible change in noise levels would occur compared with the baseline and No Action Alternative.

4.6.3.1 Terrestrial Vegetation

Similar to Alternative 1, the Proposed Action under Alternative 2 would occur in a developed area mainly devoid of natural habitat areas or plant communities. Therefore, no impacts to vegetation would be expected as a result of demolition, construction/renovation, or operation of Alternative 2.

To prevent the introduction and spread of invasive non-native plant species, all construction equipment, vehicles, and footwear would be cleaned of dirt, debris, seeds, mud, and visible plant material prior to being brought onto and before leaving the project area. Vehicles would also be cleaned after construction prior to being used elsewhere on NAS North Island. Any weeds removed would be placed in bags or dumpsters and hauled away. Any removed vegetation would not be dumped on-site or off-site. Adherence to these measures would prevent the introduction and spread of invasive non-native plant species.

Similar to Alterative 1, the Proposed Action under Alternative 2 would include landscaping within the developed project area. The list of plants to be incorporated into the landscaping would be submitted to the NBC Botanist, NBC Wildlife Biologist, and NAVFAC Landscape Architect for review and approval prior to planting. Eighty percent of plant material (within each stratum i.e., herbs, shrubs, trees) would be from the approved plant list of California native species (California Native Plant Society, 2017). The remaining 20 percent would consist of drought tolerant plants on the plant list. Trees and large scrubs may not be planted with in the project area because they may increase BASH risk and predation risk on endangered species nesting sites south of the project area.

Therefore, no impacts to vegetation would be expected as a result of construction and operations of Alternative 2.

4.6.3.2 Terrestrial Wildlife

The project area for Alternative 2 is located within a developed area at NAS North Island that provides little to no habitat for most wildlife species. Ground disturbing activities associated with constructing proposed facilities would not occur in any sensitive habitat areas or natural plant communities, and wildlife habitats would not be removed or modified. As described for Alternative 1, potential impacts to terrestrial wildlife could result from noise during construction of facilities and aircraft operations. Construction noise and activity would be localized, short-term, and would only occur during daylight hours. Common wildlife in or immediately adjacent to the project area is exposed to elevated noise under baseline conditions. The temporary addition of localized construction noise and activity and the increase in aircraft operations would not reduce the suitability of the project area for common wildlife. Therefore, Alternative 2 would not result in significant impact to common wildlife species.

4.6.3.3 Bird/Animal Aircraft Strike Hazards

Alternative 2 would have similar BASH impacts as described for Alternative 1. Under Alternative 2, aircraft operations would increase by approximately 7 percent, increasing the potential for BASH. However, there would be no changes to the existing flight paths or procedures. BASH incidents occasionally occur at NAS North Island airfield under baseline conditions. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at NAS North Island is seven strikes per year (USDA, 2014). Given the overall low numbers of BASH incidents compared to the number of existing aircraft operations, the proposed increase in aircraft operations would not be expected to cause a significant increase in BASH incidents. Aircraft operations would be conducted in accordance with the BASH Plan and the NBC INRMP, which has ongoing management goals to reduce the BASH potential at NAS North Island. Continued adherence to the BASH Plan would minimize the risk of collision impacts.

Additionally, no attractants would be created under Alternative 2 that would increase the concentration of birds at the airfield. Bird deterrents would be incorporated into the project design to minimize bird perching, roosting, and nesting. Therefore, Alternative 2 would not result in a significant impact from bird/animal aircraft strikes.

4.6.3.4 Migratory Birds

Impacts to California least tern and western snowy plover are described in **Section 4.6.3.5** (Federally Listed Species).

Construction

Impacts to migratory birds under Alternative 2 would be similar to those discussed for Alternative 1. Alternative 2 includes the construction of new buildings within the project area. Buildings would incorporate bird-friendly design to prevent migratory birds from colliding with buildings (primarily through consideration of glass and lighting design). Bird-friendly design features include: (1) transparent passageways, corners, atria, or courtyards so that birds do not get trapped; (2) appropriately shielded outside lighting that is directed away from habitats to minimize attraction to light-migrating songbirds; (3) interior lighting that is turned off at night or designed to minimize light escaping through windows; and (4) landscaping that is designed to keep birds away from the building's façade. Use of non-reflective or opaque glass; external shades (or other devices to reduce glare, transparency, or reflectiveness) on windows; ultraviolet patterned glass; angled glass; and/or louvers can aid in reducing bird collisions. Additionally, night-time lighting would include bird-friendly design features such as shielded lights (to reduce ambient light into nearby habitats), use of motion detectors, dusk-to-dawn sensor activation and other automatic controls, low-lumen or limited-spectrum lighting, and lighting design that uses shields

to prevent light from shining upward in the sky. The NBC Wildlife Biologist will be consulted to ensure the minimization measures are incorporated to prevent window strikes.

Alternative 2 would demolish buildings that may contain active bird nests within the buildings or on the rooftop. The executing agent/contractor would coordinate with the NBC Wildlife Biologist (619-545-3703) to ensure that construction work would avoid impacting birds protected under the MBTA (including BCC). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season (non-breeding season is September 1 to February 14). If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. The qualified biologist would be hired by the project proponent and approved by the NBC Wildlife Biologist. The qualified biologist must survey the area within 72 hours of commencing work to determine if active nests are present. If an active nest is found in the project area at any time during project work, work would be halted immediately and the NBC Wildlife Biologist would be contacted. The contractor cannot take action to remove the bird or the nest from the area that is being used. Any removal action must be overseen by the NBC Wildlife Biologist. The NBC Wildlife Biologist, in coordination with the qualified biologist, must confirm that there would be no impacts to active nests before construction work could resume. With implementation of these measures, construction activities associated with Alternative 2 would not result in a significant adverse effect on a migratory bird (including BCC) species or their active nests.

Operations

Similar to Alternative, 1, the Navy has determined that the Alternative 2 may result in potential for takes of migratory birds, including BCC, resulting from aircraft operations. BASH incidents occur at the NAS North Island airfield under baseline conditions. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at NAS North Island is seven strikes per year (USDA, 2014). Given the overall low number of BASH incidents compared to the number of existing aircraft operations, the proposed increase in aircraft operations would not be expected to cause a significant increase in BASH incidents. As previously discussed in **Section 4.6.2.4** (Migratory Birds), no aspect of Alternative 2 would create attractants with the potential to increase the concentration of birds at the airfield. While there is a slight increase in air operations proposed under Alternative 2, there are no proposed changes to existing flight procedures. Therefore, the risk of impacts to migratory birds is managed through continued application of BASH measures and the risk of impacts to MBTA species would be expected to remain similar to existing levels. Additionally, aircraft operations under the Proposed Action are a military readiness activity. Military readiness activities are exempt from the take prohibitions of the MBTA, provided they would not result in a significant adverse effect on a population of migratory bird species. As shown in **Table 3.6-2**, five BCC species (burrowing owl, western snowy plover, peregrine falcon, gull-billed tern, and California least tern), have the potential to occur within the project area. Given the San Diego County population size of the burrowing owl (46 breeding pairs; Lincer and Bloom, 2007), western snowy plover (140 breeding pairs; California Department of Fish and Wildlife, 2016); peregrine falcon (15-35 individuals; U.S. Forest Service [USFS], 2017), gull-billed tern (32-37 breeding pairs; Unitt, 2004), and California least tern (2,492 breeding pairs; USFWS, 2016), the minor potential for an aircraft strike is not likely to adversely impact the population of these species. Population sizes of most common migratory bird species would be larger; thus the potential impact on the population of most species would be even smaller. Therefore, Alternative 2 is not anticipated to have significant adverse effects on a population of migratory birds (including BCC) that would result in the need for mitigation and consultation with the USFWS.

4.6.3.5 Federally Listed Species

4.6.3.5.1 California Least Tern

The Navy has determined that implementing Alternative 2 *may affect, but is not likely to adversely affect* the California least tern; therefore, informal consultation with the USFWS was conducted, as required by Section 7 of the ESA. In a letter dated March 26, 2018, the USFWS concurred with the Navy's determination. Correspondence with the USFWS is provided in **Appendix D**.

Construction

Alternative 2 would have similar construction impacts as described for Alternative 1. In order to avoid impacts to California least terns nesting at the MAT site, construction activity will be restricted as follows: (1) no construction activity would be permitted within 300 feet of the MAT site during the California least tern breeding season; (2) no heavy construction would be permitted within 500 feet from the MAT site during the California least tern breeding season; and (3) construction greater than 500 feet from the MAT site that could result in noise or visual impacts to nesting California least tern (e.g., building demolition, jackhammering) would be conducted outside of the breeding season to the maximum extent practicable. Heavy construction activity is defined as activity that produces loud noises and/or utilizes heave equipment (to include but not be limited to grading, jackhammering, excavating, and removal of large debris). All construction activities proposed during the breeding season would be reviewed on a weekly basis by the NBC Wildlife Biologist. If the NBC Wildlife Biologist determines that proposed activities have the potential to disrupt nesting California least terns, a Biological Monitor would observe California least terns at the MAT site during those activities and determine whether nesting is being disrupted. If the Biological Monitor determines that nesting is being disrupted, the Navy would stop work and coordinate with the Carlsbad USFWS Office to review additional avoidance/minimization measures that can be implemented. Upon agreement as to the necessary revisions to the avoidance/minimization approach, work may resume subject to the revisions and continued nest monitoring until California least tern nesting at the MAT site is complete. For any construction that occurs during the nesting season, all cranes or other tall construction equipment would be lowered when not in use to preclude raptor and corvid perching.

The Navy would also monitor California least tern activity in the Taxiway Juliet area. If California least terns initiate nesting at Taxiway Juliet despite the Navy's efforts to deter nesting, the Navy would implement the measures described above for the MAT site at Taxiway Juliet, or reinitiate consultation with the Carlsbad USFWS Office to address the potential effects of construction on California least tern nesting at Taxiway Juliet.

Similar to Alternative 1, Alternative 2 would incorporate design features at the proposed facilities that deter predator perching including anti-perch devices (e.g., Nixalite on perches). These design elements would also support the Navy's requirements to reduce BASH risk on NAS North Island (discussed under **Section 4.6.2.3** [Bird/Animal Aircraft Strike Hazard]). In addition, to minimize potential impacts to nesting within the MAT site, the Navy would incorporate the following measures into the project design: (1) permanent outdoor lighting installed within the project area would be shielded to maximally reduce light pollution into the MAT site; (2) other methods of reducing light pollution (e.g., dusk-to-dawn sensor activation, low-lumen or limited-spectrum lighting) would be applied wherever possible; (3) light poles and light placement would be constructed at the lowest height possible (considering security constraints) to reduce impacts to the surrounding natural resources by reducing raptor perching sites and to reduce light pollution; and (4) any trash receptacles placed around new buildings would be

designed with secure lids to reduce the potential for attracting California least tern predators (e.g., corvids). The Navy would submit a draft lighting plan to the Carlsbad USFWS Office for review at least 30 days prior to project construction. If any antennas are proposed within the project site, the NBC Wildlife Biologist would review and approve the proposed antenna locations and designs to minimize predator perching opportunities near the MAT site.

Written approval by the NBC Wildlife Biologist is required prior to finalization and implementation of construction activities. Engagement and coordination with the aforementioned subject matter expert in the RFP and design process must occur from the beginning to ensure timely coordination so as to afford appropriate opportunities for project review and modification to comply with Federal laws and regulations, to protect endangered/threatened species and habitats in close proximity to the project site. Subject matter experts must be contacted during RFP development and prior to the kickoff-meeting of the project design.

Therefore, construction of facilities under Alternative 2 would not result in significant impacts to the California least tern.

Operations

Alternative 2 would result in a 7 percent increase in total annual aircraft operations at NAS North Island. Alternative 2 would have similar operation impacts as described for Alternative 1. As described in **Section 4.2** (Noise), additional aircraft operations proposed under Alternative 2 would have negligible effects on the existing noise environment. Additionally, the noise analysis conducted at three points on the MAT site (refer to **Figure 3.2-3**) concluded that a less than 1 dB increase in noise levels at the MAT site under Alternative 2 would be an imperceptible change to least terns (refer to **Section 4.2.3.4** [Supplemental Noise Analysis]). Because California least terns have established nesting and continue to nest under the existing noise environment indicates that they are not likely impacted by these existing operations and would not be expected to be adversely impacted by operations conducted under Alternative 2.

Under Alternative 2, operations would be conducted within the existing airfield (i.e., taxing along the existing taxiway and running engines within the parking apron) within 500 feet of the MAT site in areas currently used for aircraft operations at NAS North Island. Potential issues from aircraft operations include heat effects from the aircraft engines and rotor wash. The Navy V-22 would be operated in accordance with the with the NATOPS training manual. The manual identifies measures and limitations on how the aircraft is operated, including time on the ground and requirements for nacelle rotation to reduce heat effects. During normal ground operations, the exhaust deflector system of the Navy V-22 is engaged at all times for safety purposes. While on the ground, the primary high-heat exhaust would be directed downward close to the ground directly under the aircraft engine with temperatures dissipating to ambient outdoor temperatures within 20 feet of the engine (Aitchison, 2017). Because of this operations on the taxiway or the parking apron would not be expected to result in a change in ambient temperature at the MAT site. Operation of the Navy V-22 would result in aircraft rotor wash. Rotor wash forces are relative to the engine power settings and the aircraft's proximity to the ground. Navy V-22 aircraft on the taxiway and parking apron would be on the ground (i.e., not hovering) and operated in low-power setting. Wind velocities associated with rotor wash would diminish substantially beyond 100 feet from the aircraft. In addition, the Navy V-22 would taxi westward from the parking apron and would not taxi adjacent to the MAT site. Therefore, proposed operations would not be expected to result in a change in ambient conditions at the MAT site.

An increase in aircraft operations under Alternative 2 could result in a minor increase in BASH potential at NAS North Island and there is a potential for individual California least tern to be affected by a strike. The Airfield BO acknowledges the potential take for airfield operations. As described under **Section 4.6.2.3** (Bird/Animal Aircraft Strike Hazards), no aspect of Alternative 2 would create attractants with the potential to increase the concentration of birds at the airfield. While there is a slight increase in air operations proposed under Alternative 2, there are no proposed changes to existing flight procedures. Aircraft occasionally strike California least tern at NAS North Island under baseline conditions. Based on the last 35 years of records of BASH incidents kept for NAS North Island, 7 incidents of aircraft striking California least tern have been documented at NAS North Island. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at North Island is 7 strikes per year (USDA, 2014). Given the overall very low numbers of BASH incidents compared to the number of existing aircraft operations, this increase would not be expected to cause incidental take above that already authorized in the Airfield BO.

Under the Reasonable and Prudent Measures of the Airfield BO, the Navy would continue to monitor the NAS North Island airfield for signs of collisions between California least terns and aircraft, and report any strikes to the USFWS on an annual basis (USFWS, 2005). If the anticipated level of incidental take is exceeded, the Navy would reinitiate consultation and work with the USFWS to determine the best course of action to minimize future take and/or modify the level of authorized take. Under Alternative 2, the Navy would continue annual nest monitoring of the California least tern and coordination with the USFWS as part of the NBC INRMP program requirements and conditions of the various BOs.

Therefore, aircraft operations under Alternative 2 would not result in significant impacts to the California least tern.

4.6.3.5.2 Western Snowy Plover

Construction

Alternative 2 would have similar construction impacts as described for Alternative 1. Under Alternative 2, construction activities that occur in proximity (defined as 500 feet) from the MAT site or other nesting locations during the nesting season may disturb nesting western snowy plovers (**Figure 3.6-2**). The Navy would monitor western snowy plover activity on the airfield and coordinate with construction personnel if western snowy plovers are detected in areas adjacent to the project site. Any western snowy plover nests initiated within or adjacent to the project construction would be marked with blue cones and construction personnel would be directed away from the area until eggs can be collected for captive-rearing in accordance with the Airfield BO. Therefore, construction activities would impact nesting western snowy plovers.

Similar to California least tern, impacts to nesting western snowy plovers would be avoided by designing the facilities in a way that deters perching (see **Section 4.6.2.5.1** [California Least Tern - Construction]). These design elements would also support the Navy's requirements to reduce BASH risk on NAS North Island as discussed in **Section 4.6.2.3** (Bird/Animal Aircraft Strike Hazards). In addition, to minimize potential impacts to nesting within the MAT site, the Navy would incorporate the following measures into the project design: (1) permanent outdoor lighting installed within the project area would be shielded to maximally reduce light pollution into the MAT site; (2) other methods of reducing light pollution (e.g., dusk-to-dawn sensor activation, low-lumen or limited-spectrum lighting) would be applied wherever possible; and (3) light poles and light placement would be constructed at the lowest height possible (considering security constraints) to reduce impacts to the surrounding natural resources

by reducing raptor perching sites and to reduce light pollution. The Navy would submit a draft lighting plan to the Carlsbad USFWS Office for review at least 30 days prior to project construction. If any new antennas are proposed within the project site, the NBC Wildlife Biologist would review and approve the proposed antenna locations and design to minimize predator perching opportunities near the MAT Site.

Written approval by the NBC Wildlife Biologist is required prior to finalization and implementation of construction activities. Engagement and coordination with the aforementioned subject matter expert in the RFP and design process must occur from the beginning to ensure timely coordination so as to afford appropriate opportunities for project review and modification to comply with Federal laws and regulations, to protect endangered/threatened species and habitats in close proximity to the project site. Subject matter experts must be contacted during RFP development and prior to the kickoff-meeting of the project design.

Therefore, construction under Alternative 1 would not result in significant impacts to the western snowy plover.

Operations

Alternative 2 would result in a 7 percent increase in total annual aircraft operations at NAS North Island. Alternative 2 would have similar operation impacts as described for Alternative 1. As described in **Section 4.2** (Noise), additional aircraft operations proposed under Alternative 2 would have negligible effects on the existing noise environment. Additionally, the noise analysis conducted at three points on the MAT site (refer to **Figure 3.2-3**) concluded that a less than 1 dB increase in noise levels at the MAT site under Alternative 2 would be an imperceptible change (refer to **Section 4.2.3.4** [Supplemental Noise Analysis]). Because western snowy plovers have established nesting and continue to nest under the existing noise environment indicates that they are not likely impacted by these existing operations and would not be expected to be adversely impacted by operations conducted under Alternative 2.

Under Alternative 2, the Navy V-22 aircraft would operate at the existing airfield (i.e., taxing along the existing runway and running the engines within the parking apron) within 500 feet of the MAT site in areas currently used for aircraft operations at NAS North Island. Potential issues from aircraft operations include would be similar to those described under Alternative 1 and include heat effects from the aircraft engines and rotor wash. The Navy V-22 would be operated in accordance with the NATOPS training manual, which identifies measures and limitations on how the aircraft is operated (e.g., time on the ground and requirements for nacelle rotation to reduce heat effects). During normal ground operations, the exhaust deflector system of the Navy V-22 is engaged at all times for safety purposes. While on the ground, the primary high-heat exhaust would be directed downward close to the ground directly under the aircraft engine with temperatures dissipating to ambient outdoor temperatures within 20 feet of the engine (Aitchison, 2017). Because of this operations on the taxiway or the parking apron would not be expected to result in a change in ambient temperature at the MAT site. Operation of the Navy V-22 would result in aircraft rotor wash. As described for under Alternative 1, wind velocities associated with rotor wash would diminish substantially beyond 100 feet from the aircraft and would not be expected to result in a change in ambient conditions at the MAT site. In addition, the Navy V-22 would taxi westward from the parking apron and would not taxi adjacent to the MAT site. Therefore, proposed operations would not be expected to result in a change in ambient conditions at the MAT site.

An increase in aircraft operations under Alternative 2 could result in a minor increase in BASH potential at NAS North Island and there is a potential for individual western snowy plovers to be affected by a

strike. The Airfield BO acknowledges the potential take for airfield operations. As described under **Section 4.6.2.3** (Bird/Animal Aircraft Strike Hazards), no aspect of Alternative 2 would create attractants with the potential to increase the concentration of birds at the airfield. While there is a slight increase in air operations proposed under Alternative 2, there are no proposed changes to existing flight procedures. Aircraft occasionally strike a western snowy plover at NAS North Island airfield under baseline conditions. Based on the last 35 years of records of BASH incidents kept for NAS North Island, 2 incidents of aircraft striking western snowy plover have been documented at NAS North Island. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at North Island is 7 strikes per year (USDA, 2014). Given the overall very low numbers of BASH incidents compared to the number of existing aircraft operations, this increase would not be expected to cause incidental take above that already authorized in the Airfield BO.

Under the Reasonable and Prudent Measures of the Airfield BO, the Navy would continue to monitor the NAS North Island airfield for signs of collisions between western snowy plover and aircraft, and report any strikes to the USFWS on an annual basis (USFWS, 2005). If the anticipated level of incidental take is exceeded, the Navy would reinitiate consultation and work with the USFWS to determine the best course of action to minimize future take and/or modify the level of authorized take. Under Alternative 1, the Navy would continue annual nest monitoring of the western snowy plover and coordination with the USFWS as part of the NBC INRMP program requirements and conditions of the various BOs.

Therefore, aircraft operations under Alternative 2 would not result in significant impacts to western snowy plover.

4.6.3.5.3 Climate Change

Similar to Alternative 1, if Alternative 2 were implemented, climate change may influence the geographic distribution of species, bringing in additional species to the area while driving out others; however, it is not likely that any additional species would be significantly impacted by Alternative 2.

4.6.4 CONCLUSION

Implementation of Alternative 1 or Alternative 2 would not result in significant impacts to biological resources at NAS North Island.

4.6.4.1 Terrestrial Vegetation

Under Alternatives 1 or 2, terrestrial vegetation within the project area would not be significantly impacted by construction or operation activities.

4.6.4.2 Terrestrial Wildlife

Under Alternatives 1 or 2, terrestrial wildlife within the project area would not be significantly impacted by construction or operation activities.

4.6.4.3 Bird/Animal Aircraft Strike Hazards

Alternatives 1 and 2 would result in an increase in aircraft operations at NAS North Island that have the potential to result in BASH. BASH incidents occasionally occur at NAS North Island airfield under baseline conditions. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at NAS North Island is seven strikes per year (USDA, 2014). Given the overall low numbers of BASH incidents compared to the number of existing aircraft operations, the proposed increase in aircraft operations would not be expected to cause a significant increase in BASH incidents. Aircraft operations would be

conducted in accordance with the BASH Plan and the NBC INRMP, which would minimize the risk of collision impacts to wildlife at NAS North Island. Additionally, no attractants would be created under Alternative 1 that would increase the concentration of birds at the airfield. Therefore, Alternative 2 would not result in a significant BASH impacts.

4.6.4.4 Migratory Birds

Under Alternatives 1 and 2, construction activities would be in accordance with EO 13186. The executing agent/contractor would coordinate with the NBC Wildlife Biologist (619-545-3703) to ensure that construction work would avoid impacting birds protected under the MBTA (including BCC). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season (non-breeding season is September 1 to February 14). If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. Any removal action must be overseen by the NBC Wildlife Biologist. The NBC Wildlife Biologist, in coordination with the qualified biologist, must confirm that there would be no impacts to active nests before construction work could resume. In addition, new buildings would incorporate bird-friendly design to prevent migratory birds from colliding with buildings (primarily through consideration of glass and lighting design). Therefore, impacts to MBTA-protected bird species and their active nests would be avoided during construction.

The Navy has determined that Alternatives 1 and 2 may result in potential for takes of migratory birds, including BCC, resulting from aircraft operations. No aspect of Alternatives 1 and 2 would create attractants with the potential to increase the concentration of birds at the airfield. There are no proposed changes to existing flight procedures. BASH incidents occur at the NAS North Island airfield under baseline conditions. For all wildlife species, the 10-year average (2004-2014) of BASH incidents at NAS North Island is seven strikes per year (USDA, 2014). Given the overall low number of BASH incidents compared to the number of existing aircraft operations, the proposed increase in aircraft operations would not be expected to cause a significant increase in BASH incidents. Therefore, the risk of impacts to migratory birds is managed through continued application of BASH measures and the risk of impacts to MBTA species would be expected to remain similar to existing levels. Additionally, aircraft operations under the Proposed Action are a military readiness activity. Military readiness activities are exempt from the take prohibitions of the MBTA, provided they would not result in a significant adverse effect on a population of migratory bird species. Given the San Diego County population size of the burrowing owl (46 breeding pairs; Lincer and Bloom, 2007), western snowy plover (140 breeding pairs; California Department of Fish and Wildlife, 2016); peregrine falcon (15-35 individuals; U.S. Forest Service [USFS], 2017), gull-billed tern (32-37 breeding pairs; Unitt, 2004), and California least tern (2,492 breeding pairs; USFWS, 2016), the minor potential for an aircraft strike is not likely to adversely impact the population of these species. Population sizes of most common migratory bird species would be larger; thus the potential impact on the population of most species would be even smaller. Therefore, Alternatives 1 and 2 are not anticipated to have significant adverse effects on a population of migratory bird species (including BCC) that would result in the need for mitigation and consultation with the USFWS.

4.6.4.5 Federally Listed Species

The Navy has determined that implementing the Proposed Action *may affect, but is not likely to adversely affect* the California least tern and the western snowy plover; therefore, informal consultation with the USFWS was conducted. In a letter dated March 26, 2018, the USFWS concurred with the Navy's determination. Correspondence with the USFWS is provided in **Appendix D**. In its concurrence letter, the USFWS stated, "Based on the site and species information [described in the concurrence letter] and the

Navy's commitment to implement the proposed conservation measures, we conclude that all potential impacts of the project on the California least tern and western snowy plover will be avoided or reduced to a level of insignificance warranting our concurrence with the Navy's determination that the project is not likely to adversely affect the California least tern and western snowy plover."

For all other federally listed species identified with potential to occur within the action areas, the Navy has determined that Alternatives 1 or 2 would have *no effect*.

4.6.4.6 Climate Change

NAS North Island is investigating collaborations with local universities, agencies, and non-profits and the regional Landscape Conservation Cooperative on vulnerability assessments and landscape-level conservation efforts. In 2015, *Methodology for Assessing the Impact of Sea Level Rise on Representative Military Installation in the Southwestern United States* (Space and Naval Warfare Systems Center Pacific, 2015) was prepared. The report analyzed areas that may be vulnerable to inundation and flooding at NAS North Island, including beach training areas, buildings near protected and exposed shorelines, waterfront structures, coastal structures, civil infrastructure, roads, and airfields.

Ecosystems can serve as natural buffers from extreme events such as flooding. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Climate change may influence the geographic distribution of species, bringing in additional species to the area while driving out others. However, it is not likely that any additional species would be significantly impacted by Alternative 1 or Alternative 2.

WATER RESOURCES
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternative 1 and Alternative 2:

- Potential encounter with groundwater during construction would require dewatering. Construction contractor would comply with applicable requirements.
- Surface water quality could potentially be impacted by runoff during construction activities; minimized through implementing a SWPPP and applicable construction BMPs.
- No change in impervious surfaces within the project area and the amount of stormwater runoff would not be expected to change as a result of operations.
- Potential future sea level rise combined with a 100-year flood event, may cause small portions of the project area at lower elevations (roadways, landing areas, etc.) to be temporarily under water during flood events.

4.7 WATER RESOURCES

4.7.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline water resources. Therefore, no significant impacts to water resources would occur with the No Action Alternative.

4.7.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.7.2.1 Groundwater

Under Alternative 1, the potential impact to groundwater would be minimal and would be associated with construction and demolition activities within the project area. Construction/renovation of the squadron hangar and training squadron hangar; renovation of the aircraft parking apron, taxiways, and aircraft hover points; and construction of an aircraft wash rack, pilot training facilities, and support facilities would occur within currently developed areas. Dewatering

activities during construction may be needed because of the depth to groundwater within the project area. In the event groundwater is encountered during construction, the construction contractor would contact NAS North Island environmental staff to determine if a permit is needed and how to manage dewatering operations. Water diversion and/or dewatering activities may be subject to discharge and monitoring requirements under either National Pollutant Discharge Elimination System (NPDES) General Permit, Limited Threat Discharges to Surface Waters (Board Order R6T-200S-0023), or General Waste Discharge Requirements for Discharges to Land with a Low Threat To Water Quality (WQO-2003-0003). By adhering to these requirements, Alternative 1 would not result in significant impacts to groundwater.

4.7.2.2 Surface Water

Under Alternative 1, new support facilities, including the squadron hangar and training squadron hangar, aircraft wash rack, modified aircraft parking apron/taxiway/aircraft hover points, and pilot training facilities would be constructed at NAS North Island as well as the fleet training squadron and maintenance school facilities. Proposed facilities would be located in upland areas of the project area near existing parking aprons, hangars, and support facilities.

Surface water quality of nearby drainages and San Diego Bay could potentially be impacted by fuel spills and surface water runoff associated with ground disturbance during construction-related activities. Possible oil or other material spills from construction vehicles and equipment would be minimized by implementing appropriate construction best management practices (BMPs), such as requiring all construction equipment to be in good condition and properly maintained to avoid the potential for spills and leaks.

Construction activities under Alternative 1 would disturb more than 1 acre. Therefore, the Navy would be required to obtain authorization from the California State Water Resources Control Board under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ/NPDES No. CAS000002) before starting construction activities. The construction contractor would be required to implement all appropriate BMPs for erosion and sedimentation control, as identified in Order No. 2009-0009-DWQ, and to develop and implement a site-specific Stormwater Pollution Prevention Plan (SWPPP). In addition, BMPs such as temporary gravel construction entrances, silt fences, storm drain inlet protection, and sediment traps/basins would be implemented within the disturbance area to address erosion and sedimentation and prevent off-site transport of sediment. Applicable BMPs would be included in the preliminary engineering design and construction of facilities. With implementation of BMPs and stormwater management, construction activities associated with Alternative 1 would not result in significant impacts to surface water.

Alternative 1 would not result in a change in impervious surfaces within the project area and the amount of stormwater runoff would not be expected to change as a result of the operation of Alternative 1. Proposed facilities would comply with standards and policies for water efficiency for federal construction and renovation projects and for post-construction stormwater management, including the Energy Independence and Security Act of 2007; Navy Low Impact Development standards; Chief of Naval Operation Instruction 4100.5E; EO 13834, *Efficient Federal Operations*; and the NBC NPDES Permit. Unified Facilities Criteria (UFC) 1-200-02 High Performance and Sustainable Building Requirements and UFC 3-210-10 Low Impact Development would be used to design the facilities to ensure compliance with the above regulations and policies. UFC documents provide planning design, construction, sustainment, restoration, and modernization criteria to military departments.

Per the above requirements, the runoff reduction features for the project site would be designed and located to provide on-site stormwater retention and trap eroded soils and, to the maximum extent technically feasible, infiltrate, filter, store, evaporate, and/or retain runoff close to its source. Non-stormwater discharges from the wash rack would also be required to be diverted into the sanitary sewer systems for treatment at the NAS North Island Industrial Waste Treatment Plant. Prior to diversion to the sewer system, the rinsate would be treated with an oil/water separator. NAS North Island has several existing wash racks in operation which divert wash water to the NAS North Industrial Waste Treatment Plant. With the inclusion of post-construction stormwater management, oil/water separator, and non-storm diversion of wash rack water to the sewer system, operational activities associated with Alternative 1 would not result in significant water quality impacts.

4.7.2.3 Climate Change

The project area is located at approximately 20 feet above mean sea level (AMSL) and outside the 100-year floodplain. A 2015 sea level rise study evaluated the impacts of local mean sea level rise of 0.5 meters (2 feet), 1 meter (3 feet), 1.5 meters (5 feet), and 2 meters (7 feet) on NBC, including NAS North Island (Chadwick et al., 2015). The project area would not be subjected to flooding in most scenarios. However, under a scenario with a 7-foot sea level rise combined with a 100-year flood event, small portions of the project area at lower elevations (roadways, landing areas, etc.) could be temporarily under water during flood events (Chadwick et al., 2015).

As part of the 2014 *Climate Change Adaptation Roadmap*, the DoD is implementing a phased installation-level vulnerability assessment approach to develop methodologies for conducting consistent screening-level vulnerability assessments of military installations (starting with coastal and tidal installations), leveraging recent scientific advancements regarding coastal assessment, and providing a platform to build upon prior to conducting more comprehensive and detailed assessments. Data from these screening-level assessments will be used to identify areas and installations where more detailed vulnerability assessments may be needed. The Navy is actively participating in developing the planned installation-level vulnerability assessments. The Navy is also working at the regional level with the San Diego Region Climate Collaborative which includes the Port of San Diego and adjacent cities. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

4.7.3 Alternative 2 Potential West Coast Impacts

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Therefore, the hangar construction footprint under Alternative 2 would be less than proposed under Alternative 1.

4.7.3.1 Groundwater

Potential impacts to groundwater and applicable permit requirements under Alternative 2 would be the same as described for Alternative 1. Therefore, Alternative 2 would not result in significant impacts to groundwater.

4.7.3.2 Surface Water

Alternative 2 would include the same planning, BMP implementation, and stormwater management as described for Alternative 1. Alternative 2 would not result in significant impacts to surface water.

4.7.3.3 Climate Change

Impacts to project facilities proposed under Alternative 2 due to potential flooding, and Navy participation in installation-level vulnerability assessments and regional planning, would be the same as described for Alternative 1.

4.7.4 CONCLUSION

Implementation of Alternative 1 or Alternative 2 would not result in significant impacts to water resources at the West Coast Fleet Logistics Center, NAS North Island.

4.7.4.1 Groundwater

Both alternatives could require dewatering activities during construction because of the depth to groundwater within the project area. In the event groundwater is encountered during construction, the construction contractor would comply with applicable requirements under either NPDES General Permit, Limited Threat Discharges to Surface Waters (Board Order R6T-200S-0023), or General Waste Discharge Requirements for Discharges to Land with a Low Threat To Water Quality (WQO-2003-0003). Therefore, Alternatives 1 and 2 would not result in significant impacts to groundwater.

4.7.4.2 Surface Water

The Navy would obtain authorization from the California State Water Resources Control Board under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ/NPDES No. CAS000002) for construction activities associated with Alternatives 1 and 2. Impacts to surface water during construction would be minimized through implementing a site-specific SWPPP and applicable construction BMPs.

The operation of facilities proposed under Alternatives 1 and 2 would comply with applicable standards and policies for post-construction stormwater management under the Energy Independence and Security Act of 2007; Navy Low Impact Development standards; Chief of Naval Operation Instruction 4100.5E; EO 13834, *Efficient Federal Operations*; and the NBC NPDES Permit. Post-construction stormwater management features would be incorporated into the project planning and site design. Non-stormwater discharges from the wash rack would also be diverted to the sanitary system.

Therefore, Alternatives 1 and 2 would not result in significant impacts to surface water.

4.7.4.3 Climate Change

Project facilities proposed under Alternatives 1 and 2 would be unlikely to be impacted by flooding under current sea levels. However, if sea level rises in the future by 2 meters (7 feet), then a small portion of the project area located at lower elevations (roadways, landing areas, etc.) could be temporarily under water during flood events (Chadwick et al., 2015). As part of the 2014 *Climate Change Adaptation Roadmap*, the Navy is actively participating with the DoD in developing the planned installation-level vulnerability assessments. The Navy is also working at the regional level with the San Diego Region Climate Collaborative which includes the Port of San Diego and adjacent cities. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

4.8 INFRASTRUCTURE

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

INFRASTRUCTURE
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternative 1:

- Increase in water use 87,000 gallons per day (98 acre-feet per year) and wastewater collection 0.053 MGD.
- Would result in a 1 percent increase in water demand for California American Water San Diego County District service area; sufficient capacity would be available to accommodate this increase.
- Existing wastewater system at NAS North Island would adequately handle the increase in wastewater from additional personnel and operational activities.
- Navy V-22 wash rack use would increase wastewater sent to oil recovery plant by 3,250 gallons per day; may exceed current permitted industrial discharge (26,100 gallons per day).
- Construction and operations would increase solid waste. The waste flow would be minimized through mandatory recycling practices, and the existing landfill capacity would accommodate the waste.
- Existing electrical infrastructure and utilities have ample capacity to absorb additional demand of the minor population increase.

Alternative 2:

- Same as Alternative 1, but infrastructure demand increase would be less, approximately 50 acre-feet per year water demand and 0.025 MGD wastewater collection.

4.8.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to the existing infrastructure of NAS North Island. Therefore, no significant impacts to infrastructure would occur with the No Action Alternative.

4.8.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.8.2.1 Water Distribution

Alternative 1 would increase the water demands at NAS North Island and in the surrounding communities as a result of the proposed increase of 341 personnel compared to the existing conditions, which would result in approximately 750 people relocating to the installation, neighborhoods, and communities surrounding NAS North Island. Using a per capita demand of 116 gallons per person per day (Water Systems Consulting, Inc., 2016), this would result in an increase in water use of 87,000 gallons per day and 98 acre-feet per year. The proposed wash rack would also be used to wash approximately 2 aircraft per day (23 aircraft washed every 2 weeks). As such, Alternative 1 would result in a 1 percent increase in water demand compared to the 2015 water demands for California American Water San Diego County District service area (9,298 acre-feet in 2015). Under Alternative 1, potable water would continue to be sourced from the City of San Diego and provided by the California American Water San Diego County District. The California American Water San Diego County District has forecasted the water deliveries to increase to 11,971 acre-feet per year by 2020, which should provide a sufficient capacity to accommodate this increase in water demands

(Water Systems Consulting, Inc., 2016). Therefore, the increase in water demands associated with Alternative 1 would not have a significant impact on projected water supplies in the region.

4.8.2.2 Wastewater Collection

Alternative 1 would result in an increase in wastewater generation of approximately 0.053 million gallons per day (MGD), assuming an increase of 750 people (341 personnel plus family members) and 70 gallons of wastewater generated per person per day [Water Systems Consulting Inc., 2016]. The Point Loma Treatment Plant currently treats 175 MGD and has a capacity of 240 MGD which could absorb the increase in wastewater generation (City of San Diego, 2016). The existing wastewater system at NAS North Island would adequately handle the increase in wastewater that would result from additional personnel and operational activities from implementing Alternative 1.

Alternative 1 would result in an increased use of wash racks by approximately 0.9 aircraft per day (13 aircraft washed every 2 weeks) from baseline. Assuming it would take approximately 3,500 gallons to wash each aircraft (Navy, 2009a), this would result in an increase in the industrial discharge of wastewater of 3,250 gallons per day. The proposed aircraft wash rack would be equipped with an oil/water separator and wash water would be diverted to the oil recovery plant. Oil recovery plant operators would ensure that the permitted daily wastewater discharge to the San Diego Metropolitan Sewerage System (SDMSS) is not exceeded. If necessary, the Navy would obtain an increase in the permitted discharge, currently 26,100 gallons per day, of treated oil recovery plant water to the SDMSS under Alternative 1.

Alternative 1 would not result in the use of a substantial portion of or cause an exceedance of wastewater collection capacity at NAS North Island. Therefore, Alternative 1 would not result in significant impacts to wastewater infrastructure.

4.8.2.3 Solid Waste Management

Demolition, construction, and renovation of facilities at NAS North Island proposed under Alternative 1 would result in the generation of solid waste (construction and demolition debris). The primary solid wastes generated from demolition activities would consist mainly of building materials such as asphalt, concrete, metals (conduit, piping, and wiring), lumber, and soil piles. Area landfills that accept solid waste have capacity to accept construction and demolition debris resulting from Alternative 1. Furthermore, in accordance with Navy goals, construction and demolition debris would be recycled to the greatest extent possible, thereby diverting it from landfills.

Solid waste generation during operations would be increased over existing conditions because of the increase in facilities and personnel at NAS North Island. However, the amount of municipal solid waste generated would be minimized through the required recycling efforts per Commander, Navy Region Southwest Instruction 5090.2. Disposing of solid waste at the Miramar Landfill would not be a significant impact because of existing landfill capacity, and the waste flow resulting from Alternative 1 would be minimized through mandatory recycling practices.

Alternative 1 would not result in a significant impact to local landfills as the quantity of waste requiring disposal would be accommodated by the existing capacity and would be minimized to the greatest extent feasible.

4.8.2.4 Energy

The facilities proposed under Alternative 1 would comply with standards and policies for energy and water efficiency for federal construction and renovation projects under EO 13834, *Efficient Federal*

Operations. UFC 1-200-02 High Performance and Sustainable Building Requirements would be used to design the facilities (Department of Defense, 2016a; Department of Defense, 2016b). UFC documents provide planning design, construction, sustainment, restoration, and modernization criteria to military departments. Proposed facilities would be constructed within areas previously developed. The existing electrical infrastructure and services that currently serve the project area would adequately handle the demand of project facilities.

This increase in population under Alternative 1 would represent a minor fraction of both the approximately 35,000-person NAS North Island population and 1.3-million-person San Diego population. NAS North Island and San Diego electrical infrastructure and utilities have ample capacity to absorb the population increase. Therefore, Alternative 1 would not result in the use of a substantial portion of or cause an exceedance of energy infrastructure capacity at NAS North Island.

4.8.3 ALTERNATIVE 2 POTENTIAL WEST COAST IMPACTS

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Therefore, the hangar construction footprint under Alternative 2 would be less than proposed under Alternative 1.

Under Alternative 2, the total number of aircraft would decrease by two when compared to the No Action Alternative. In addition, Alternative 2 would result in an overall increase of 161 personnel at NAS North Island when compared to the No Action Alternative, with approximately 354 people relocating to the installation, neighborhoods, and communities surrounding NAS North Island. This would be a smaller increase in personnel as associated family members (approximately 354 people) at NAS North Island when compared to Alternative 1 (approximately 750 people).

4.8.3.1 Water Distribution

Under Alternative 2 water demand at NAS North Island would increase by approximately 45,000 gallons per day and 50 acre-feet per year. Alternative 2 would result in less water demand compared to Alternative 1. Water supply planning by a NAS North Island water supply provider has projected that there are sufficient supplies to meet this increase in potential water demands (Water Systems Consulting, Inc., 2016). Therefore, the increase in water demands associated with Alternative 2 would not have a significant impact on projected water supplies in the region.

4.8.3.2 Wastewater Collection

The hangar construction footprint under Alternative 2 would be less than proposed under Alternative 1 (102,200 versus 156,000 square feet). Impacts from the construction, renovation**,** and operation of Navy V-22 facilities and infrastructure would be similar to but slightly less than those described for Alternative 1.

Alternative 2 would result in an increase in wastewater generation of approximately 0.025 MGD (assuming an increase of 354 personnel and family members and 70 gallons of wastewater generated per person per day [Water Systems Consulting, Inc.2016]). The Point Loma Treatment Plant currently treats 175 MGD and has a capacity of 240 MGD which could absorb the increase in wastewater generation (City of San Diego, 2016). As described for Alternative 1, the existing wastewater system at NAS North Island would adequately handle the increase in wastewater that would result from additional personnel and operational activities from implementing Alternative 2.

Because there would be eight additional aircraft at NAS North Island when compared to the No Action Alternative, Alternative 2 would result in an increased use of wash racks from baseline. Assuming it takes 3,500 gallons to wash each aircraft (Navy, 2009a) and each aircraft is washed every two weeks, this would result in an increase of approximately 2,000 gallons per day flowing to the oil recovery plant. The proposed aircraft wash rack would be equipped with an oil/water separator and wash water would be diverted to the oil recovery plant. Oil recovery plant operators would ensure that the permitted daily wastewater discharge to the SDMSS is not exceeded. If necessary, the Navy would obtain an increase in the permitted discharge, currently 26,100 gallons per day, of treated oil recovery plant water to the SDMSS under Alternative 2. Alternative 2 would not result in the use of a substantial portion of or cause an exceedance of wastewater collection capacity at NAS North Island. Therefore, Alternative 2 would not result in significant impacts to wastewater infrastructure.

4.8.3.3 Solid Waste Management

Solid waste generation during operations would be increased over existing conditions because of the increase in facilities and personnel at NAS North Island. However, solid waste generation under Alternative 2 would be less than proposed under Alternative 1 during construction due to less hangar construction (102,200 versus 156,000 square feet) and during operations due to a smaller increase in personnel. Similar to Alternative 1, the amount of municipal solid waste generated under Alternative 2 would be minimized through requiring recycling efforts per Commander, Navy Region Southwest Instruction 5090.2. Alternative 2 would not result in a significant impact to local landfills as the quantity of waste requiring disposal would be accommodated by the existing capacity and would be minimized to the greatest extent feasible.

4.8.3.4 Energy

NAS North Island and San Diego electrical infrastructure and utilities have ample capacity to absorb the population increase associated with Alternative 2. Therefore, Alternative 2 would not result in the use of a substantial portion of or cause an exceedance of energy infrastructure capacity at NAS North Island.

4.8.4 CONCLUSION

Alternative 1 and Alternative 2 would not result in significant impacts to infrastructure at NAS North Island. Under the No Action Alternative, the Proposed Action would not occur and there would be no change to the existing infrastructure of NAS North Island.

Alternative 1 would result in an increase of 341 personnel at NAS North Island compared to the existing conditions, resulting in approximately 750 people relocating to the installation, neighborhoods, and communities surrounding NAS North Island.

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Therefore, the hangar construction footprint under Alternative 2 would be less than proposed under Alternative 1. Under Alternative 2, the total number of aircraft would decrease by two when compared to the No Action Alternative. In addition, Alternative 2 would result in an increase of only 161 personnel at NAS North Island when compared to the No Action Alternative, with approximately 354 people relocating to the installation, neighborhoods, and communities surrounding NAS North Island. This would be a smaller increase in personnel and associated family members (total of approximately 354 people) at NAS North Island when compared to Alternative 1 (approximately 750 people).

Alternative 1 and 2 would not result in the use of a substantial portion of, or cause an exceedance of, infrastructure capacity at NAS North Island. Therefore, Alternatives 1 and 2 would not result in significant impacts to infrastructure at NAS North Island.

4.9 CULTURAL RESOURCES

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

CULTURAL RESOURCES
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternative 1 and Alternative 2:

- There are no NRHP-listed or NRHP-eligible archaeological resources or TCPs within the APE; no historic properties would be affected by implementation of any of the alternatives.
- Although unlikely, it is possible that the remains of an unrecorded archaeological resource, such as one of the prehistoric middens originally mapped in the early 1900s, may be uncovered during construction activities, and archaeological monitoring of ground disturbing activities would be required.

4.9.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline cultural resources. Therefore, no significant impacts to cultural resources would occur with the No Action Alternative.

4.9.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.9.2.1 Construction

Under Alternative 1, total fleet logistics support squadron aircraft and training squadron aircraft at NAS North Island would increase from 10 to 23 when compared to the No Action Alternative. Construction/renovation of facilities to support this increase in aircraft would include a squadron hangar facility, training squadron hangar, a Type A wash rack, pilot training facilities, maintenance training facilities, and full-depth replacement of the existing parking apron/taxiway/helipad, as described in **Section 2.3.2.2** (Facilities and Infrastructure under Alternative 1).

Preparation of the construction site for Alternative 1 would require demolition of 26 existing facilities (**Section 2.3.2.2**; **Figure 2.1-1**).

4.9.2.1.1 Architectural Resources

As described in **Section 3.9.2.1 (**Architectural Resources), there are two historic districts and the National Register of Historic Places (NRHP)-eligible Seaplane Hangar 340 at NAS North Island (NAVFAC, 2012). The Rockwell Field Historic District and Seaplane Hangar 340 are not within the project area. The NAS San Diego Historic District is located within the area of potential effect (APE), where 14 existing facilities would be demolished, the interiors of 3 buildings would be renovated, and the new hangar facilities would be constructed. However, no facilities that are contributing elements to the NAS San Diego Historic District would be modified or demolished, and no new facilities construction would occur within the district boundary. Additionally, design and construction of the new hangars would take into

account the architectural style of NAS North Island, in accordance with the NBC Installation Appearance Plan for the Airfield Functional District, which would result in no effect on the viewshed of the NAS San Diego Historic District, as well as the other historic properties at NAS North Island. Therefore, no historic properties would be affected by facility construction/renovation or demolition under Alternative 1.

4.9.2.1.2 Archaeological Resources

There are no known NRHP-eligible or NRHP-listed archaeological resources within the APE, which includes a 98-foot buffer surrounding the construction and demolition disturbance areas.

Although unlikely, it is possible that the remains of an unrecorded archaeological resource, such as one of the prehistoric middens originally mapped in the early 1900s, may be uncovered during ground disturbing activities associated with facility construction and demolition. Due to this potential archaeological sensitivity, the Commanding Officer, NBC would provide for archaeological monitoring of ground disturbing activities associated with facility construction and demolition, in accordance with Stipulation IX of the NBC PA. In the unlikely event of an inadvertent discovery during ground disturbing activities, NAS North Island and its contractor would cease work immediately and notify the Commanding Officer, NBC and Navy Region Southwest Cultural Resources Manager, who would implement the procedures for unanticipated discoveries stipulated in the NBC PA in accordance with National Historic Preservation Act (NHPA) and the further guidance contained in the Integrated Cultural Resource Management Plan (ICRMP) for NBC (NAVFAC, 2012).

Therefore, no archaeological resources would be affected by facility construction and demolition under Alternative 1.

4.9.2.1.3 Traditional Cultural Properties

There are no TCPs at NAS North Island that are listed in the NRHP and no known sites that are considered potentially eligible for listing. Therefore, facility construction and demolition under Alternative 1 would have no impacts on TCPs.

4.9.2.2 Operations

Under Alternative 1, the Navy anticipates 16,000 annual airfield operations by Navy V-22 aircraft at NAS North Island, which represents an increase of 11,500 from the No Action Alternative operations.

No NRHP-eligible or NRHP-listed architectural and archaeological resources would be affected by the proposed increase in annual airfield operations by Navy V-22 aircraft at NAS North Island. Scientific studies of the effects of noise and vibration on historic properties have considered potential impacts on historic buildings, prehistoric structures, water tanks, archaeological cave/shelter sites, and rock art. These studies have concluded that overpressures generated by supersonic overflight were well below established damage thresholds and that subsonic operations would be even less likely to cause damage (Sutherland, 1990; Sutherland et al. 1990; Committee on Hearing and Bio Acoustics, 1977). Therefore, the slight increase in subsonic noise under Alternative 1 would not damage historic properties under the installation airspace.

No impacts to the setting of the NRHP-eligible or NRHP-listed architectural and archaeological resources are expected to result from the proposed increase in annual airfield operations by Navy V-22 aircraft at NAS North Island. While these training activities may be audibly and/or visibly noticeable, the resulting discernible effect would not be so great as to impair the integrity of the potentially affected resources such that they would no longer meet the NRHP criteria for listing.

Therefore, no cultural resources would be affected and no significant impacts to cultural resources would occur with implementation of Alternative 1.

4.9.3 ALTERNATIVE 2 POTENTIAL WEST COAST IMPACTS

4.9.3.1 Construction

Under Alternative 2, total fleet logistics support squadron aircraft at NAS North Island would increase from 10 to 18 when compared to the No Action Alternative. Similar to Alternative 1, construction to support this increase in aircraft would include a squadron hangar facility, a Type A wash rack, and full-depth replacement of the existing parking apron, as described in **Section 2.3.3.2** (Facilities and Infrastructure under Alternative 2). Under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Only 17 of the 26 facilities that would be demolished at NAS North Island under Alternative 1 would be demolished under Alternative 2 (refer to **Section 2.3.3.2**). Therefore, the construction area under Alternative 2 would be less than proposed under Alternative 1.

4.9.3.1.1 Architectural Resources

Impacts to historic architectural resources would be the same as for Alternative 1. Additionally, design and construction of the new squadron hangar would take into account the architectural style of NAS North Island, in accordance with the NBC Installation Appearance Plan for the Airfield Functional District. Therefore, no NRHP-eligible or NRHP-listed architectural resources would be affected by facility construction and demolition under Alternative 2.

4.9.3.1.2 Archaeological Resources

Impacts to archaeological resources would be the same as for Alternative 1. There are no known NRHP-eligible or NRHP-listed archaeological resources within the APE, which includes a 98-foot buffer surrounding the construction disturbance area. Although unlikely, it is possible that the remains of an unrecorded archaeological resource, such as one of the prehistoric middens originally mapped in the early 1900s, may be uncovered during construction activities.

Due to the potential archaeological sensitivity of the APE, the Commanding Officer, NBC would provide for archaeological monitoring of ground disturbing activities associated with facility construction, in accordance with Stipulation IX of the NBC Programmatic Agreement (PA). In the unlikely event of an inadvertent discovery during ground disturbing construction, NAS North Island and its contractor would cease work immediately and notify the appropriate Commanding Officer, NBC and Navy Region Southwest Cultural Resources Manager, who would implement the procedures for unanticipated discoveries stipulated in the NBC PA in accordance with NHPA and the further guidance contained in the ICRMP for NBC (NAVFAC, 2012).

Therefore, no archaeological resources would be affected by facility construction and demolition under Alternative 2.

4.9.3.1.3 Traditional Cultural Properties

There are no TCPs at NAS North Island that are listed in the NRHP and no known sites that are considered potentially eligible for listing. Therefore, facility construction and demolition under Alternative 2 would have no impacts on TCPs.

4.9.3.2 Operations

Under Alternative 2, the Navy anticipates approximately 10,300 annual airfield operations by Navy V-22 aircraft at NAS North Island, which represents an increase of 5,800 from the No Action Alternative operations.

As discussed under Alternative 1, no impacts on the NRHP-eligible architectural and archaeological resources are expected to result from the proposed increase in annual airfield operations by Navy V-22 aircraft at NAS North Island.

Therefore, no cultural resources would be affected and no significant impacts to cultural resources would occur with implementation of Alternative 2.

4.9.4 CONCLUSION

There are no NRHP-listed or NRHP-eligible architectural or archaeological resources or TCPs within the APE for both alternatives. No NRHP-listed or NRHP-eligible architectural resources within the APE would be affected. Therefore, there would be no significant impact on cultural resources with implementation of Alternative 1 or Alternative 2. Although unlikely, it is possible that the remains of an unrecorded archaeological resource, such as one of the prehistoric middens originally mapped in the early 1900s, may be uncovered during construction activities. Due to the potential archaeological sensitivity of the APE, the Commanding Officer, NBC would provide for archaeological monitoring of ground disturbing activities associated with facility construction, in accordance with Stipulation IX of the NBC PA. In the unlikely event of an inadvertent discovery during ground disturbing construction, NAS North Island and its contractor would cease work immediately and notify the appropriate Commanding Officer, NBC and Navy Region Southwest Cultural Resources Manager, who would implement the procedures for unanticipated discoveries stipulated in the San Diego Metropolitan Area PA in accordance with NHPA and the further guidance contained in the ICRMP for NBC (NAVFAC, 2012). Design and construction of the new hangar(s) would take into account the architectural style of NAS North Island, in accordance with the NBC Installation Appearance Plan for the Airfield Functional District. Therefore, no impacts to the setting of architectural resources would occur from facilities construction and demolition with implementation of Alternative1 or Alternative 2.

There would be no substantive change to the visual and noise setting at NAS North Island, and thus no impacts on the NRHP-eligible or NRHP-listed historic properties, with the changes in aircraft and in annual airfield operations with implementation of Alternatives 1 or 2.

Therefore, Alternatives 1 and 2 would not result in significant impacts to cultural resources at NAS North Island.

Pursuant to NHPA Section 106 implementing regulations 36 CFR 800.4, the Navy has determined that no historic properties would be affected by implementation of any of the alternatives. Therefore, in accordance with Stipulation VIII-B of the NBC PA, NBC has satisfied its Section 106 responsibilities for the Proposed Action, and no further NHPA Section 106 review is required.

4.10 HAZARDOUS MATERIALS AND WASTE

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes as well as the presence and management of specific cleanup sites at NAS North Island.

HAZARDOUS MATERIALS AND WASTE POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternative 1 and Alternative 2:

- Minor hazardous materials and wastes generated from demolition, construction, operations, and maintenance.
- Any identified ACM, LBP-, or PCB-containing materials would be removed before demolition or construction/renovation activities, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements.
- AFFF would be handled, stored, and disposed of in accordance with all applicable federal, state, and local requirements.

4.10.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline hazardous materials and wastes. Therefore, no significant impacts would occur with the No Action Alternative.

4.10.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

4.10.2.1 Hazardous Materials and Hazardous Waste

Construction activities proposed under Alternative 1 would require the use of certain hazardous materials (e.g., paints, welding gasses, solvents, preservatives, sealants). Hazardous materials and waste management for construction and renovation activities would be the responsibility of the construction contractor and requirements for the proper handling and disposal would be specified in the applicable contracts. It is anticipated that the quantity of products containing hazardous materials used during construction activities would be minimal and their use would be of short duration. The quantity of hazardous wastes generated from renovation activities would be minor and would not be expected to exceed the capacities of existing hazardous waste disposal facilities. The installation has established measures and programs for managing construction activities to ensure they are conducted in compliance with federal and state environmental laws and regulations.

Maintaining and operating Navy V-22s would require using hazardous materials and would generate hazardous wastes. These materials and wastes would be similar to those currently generated at NAS North Island during fixed-wing and rotary-wing aircraft maintenance and operation, including for C-2A aircraft that the Navy V-22 would replace. There are approximately 220 aircraft currently home based at NAS North Island. Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous materials at NAS North Island. Operation and maintenance of aircraft and facilities associated with Alternative 1 would not result in a significant increase in hazardous materials and wastes at NAS North Island and would not impact the generator status of the installation.

4.10.2.2 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyfluoroalkyl Substances)

Alternative 1 would require demolishing existing buildings and constructing and/or renovating facilities, including a squadron hangar facility, training squadron hangar, and renovating parking aprons. Given the age of the existing buildings within the project area, asbestos-containing materials (ACMs) and materials containing regulated levels of lead and polychlorinated biphenyls (PCBs) are assumed to be present. These hazardous materials would be characterized before starting.

Any identified ACM and lead-based paint (LBP)- and PCB-containing materials would be removed before initiation of demolition or construction/renovation activities, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements. Where LBP is present, reasonable precautions would be taken to prevent particulate matter, such as fugitive dust, from becoming airborne during demolition and construction/renovation activities. In accordance with Occupational Safety and Health Administration requirements, construction contractors should assess the potential for employee exposure to lead during demolition and construction/renovation activities and implement necessary engineering controls and use of personal protective equipment.

The new hangar's AFFF fire-fighting system would conform to specifications found in Unified Facilities Criteria 4-211-01, *Aircraft Maintenance Hangars*. This would include an underground containment system for spent AFFF. The spent AFFF would be disposed of in accordance with applicable Navy, federal, state, and local laws and regulations. In addition, the Navy is switching over to non-PFOS and low PFOA formulations because Navy policy does not allow non-emergency use of AFFF. Therefore, impacts from AFFF releases would not be expected.

With the incorporation of the appropriate procedures for handling special hazards during demolition and construction/renovation, Alternative 1 would not result in significant impacts related to special hazards.

4.10.3 Alternative 2 Potential West Coast Impacts

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than NAS North Island. Therefore, the hangar construction footprint at NAS North Island under Alternative 2 would be less than proposed under Alternative 1 (102,200 versus 156,000 square feet) and pavement renovation would be 24 versus 35 acres. Alternative 2 would also result in an increase of 8 additional aircraft, approximately 5,800 additional aircraft operations, and additional maintenance activities compared to the No Action Alternative. However, Alternative 2 would result in 5,700 fewer operations compared to Alternative 1.

4.10.3.1 Hazardous Materials and Hazardous Waste

Impacts from hazardous materials and wastes resulting from the construction/renovation and operation of proposed facilities and infrastructure and operation and maintenance of the Navy V-22 at NAS North Island would be similar but less than those described for Alternative 1. Operation and maintenance of aircraft and facilities associated with Alternative 1 would not result in a significant increase in hazardous materials and wastes at NAS North Island and would not impact the generator status of the installation. Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous materials at NAS North Island. Therefore, Alternative 2 would not result in significant impacts related to hazardous materials and wastes.

4.10.3.2 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyflouroalkyls Substances)

Alternative 2 would require demolishing existing buildings and constructing and/or renovating facilities, including a squadron hangar facility, and renovating parking aprons. As described for Alternative 1, ACMs and materials containing regulated levels of LBP and PCBs are assumed to be present and would be removed before starting demolition and construction/renovation activities. These activities would be conducted by a licensed contractor and disposed of in accordance with all applicable federal, state, and local requirements. In accordance with Occupational Safety and Health Administration requirements, construction contractors would assess the potential for employee exposure to lead during demolition and construction/renovation activities and implement necessary engineering controls and use of personal protective equipment.

Similar to Alternative 1, the new hangar's AFFF fire-fighting system would conform to specifications found in Unified Facilities Criteria 4-211-01, *Aircraft Maintenance Hangars*. This would include an underground containment system for spent AFFF. The spent AFFF would be disposed of in accordance with applicable Navy, federal, state, and local laws and regulations. In addition, the Navy is switching over to non-PFOS and low PFOA formulations because Navy policy does not allow non-emergency use of AFFF. Therefore, impacts from AFFF releases would not be expected.

With the incorporation of the appropriate procedures for handling special hazardous during demolition and construction/renovation, Alternative 2 would not result in significant impacts related to special hazards.

4.10.4 CONCLUSION

Alternatives 1 and 2 would not result in significant impacts associated with hazardous materials and waste at NAS North Island.

4.10.4.1 Hazardous Materials and Hazardous Waste

The quantity of hazardous wastes generated from demolishing existing buildings and construction/renovation activities associated with Alternatives 1 and 2 would be minor and would not be expected to exceed the capacities of existing hazardous waste disposal facilities. The installation has established measures and programs for managing construction activities to ensure they are conducted in compliance with federal and state environmental laws and regulations.

Maintaining and operating Navy V-22s under both alternatives would require using hazardous materials and would also generate hazardous wastes. These materials and wastes would be similar to those currently generated at NAS North Island during fixed-wing and rotary-wing aircraft maintenance and operations, including for C-2A aircraft that the Navy V-22 would replace. Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous materials at NAS North Island. Alternatives 1 and 2 would not result in a significant increase in hazardous materials and wastes at NAS North Island and would not impact the generator status of the installation.

4.10.4.2 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyfluoroalkyl Substances)

Alternatives 1 and 2 would require constructing and/or renovating facilities, including a hangar facilities, and renovating parking aprons. ACMs and materials containing regulated levels of LBP and PCBs are assumed to be present and must be removed before starting demolition and construction/renovation activities. These activities would be conducted by a licensed contractor and disposed of in accordance with all applicable federal, state, and local requirements. In accordance with Occupational Safety and Health Administration requirements, construction contractors would assess the potential for employee exposure to lead during construction/renovation activities and implement necessary engineering controls and use of personal protective equipment. With the incorporation of the appropriate procedures for handling special hazardous during construction/renovation, Alternatives 1 and 2 would not result in significant impacts related to special hazards.

The new hangar's AFFF fire-fighting system would conform to specifications found in Unified Facilities Criteria 4-211-01, *Aircraft Maintenance Hangars*. This would include an underground containment system for spent AFFF. The spent AFFF would be disposed of in accordance with applicable Navy, federal, state, and local laws and regulations. In addition, the Navy is switching over to non-PFOS and low PFOA formulations because Navy policy does not allow non-emergency use of AFFF. Therefore, impacts from AFFF releases would not be expected.

4.11 SOCIOECONOMICS

Analysis of impacts to socioeconomics is focused on the issues of the effects of the alternatives on population, employment, housing, childcare, and environmental justice.

SOCIOECONOMICS
POTENTIAL IMPACTS AT NAS NORTH ISLAND

Alternative 1 and Alternative 2:

- Short- and long-term minor beneficial economic impacts from construction activities and employment/population increases.
- Minor impacts to population with minor increase in demand for housing, child care, and schools in San Diego County.
- Ample housing and child care capacity in the Central MSA 0 and San Diego County region.
- No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

4.11.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline socioeconomics of the local area or region. Therefore, no significant impacts would occur with the No Action Alternative.

4.11.2 ALTERNATIVE 1 POTENTIAL WEST COAST IMPACTS

Under Alternative 1, Navy V-22 aircraft would replace existing C-2A aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established at NAS North Island. The transition at NAS North Island would be completed by 2028.

Alternative 1 would require construction and/or renovation of facilities at NAS North Island totaling approximately $130.88 million. The proposed construction activities would have a minor, temporary benefit to the regional economy.

Under Alternative 1, there would be an increase of 341 personnel at NAS North Island. The 341 personnel represent approximately 1.5 percent of the jobs at NAS North Island. Given the scale of the regional economy, the gain of these jobs would not have a significant direct or indirect impact on local economic resources.

It is estimated that each of these new personnel would be accompanied by an average of 1.2 family members. This planning factor is applied based on a DoD demographic survey and profile of the military community (DoD, 2014). Therefore, an estimated 750 people would relocate to the base, neighborhoods, and communities near NAS North Island. This would represent about 3 percent of the population of Coronado and less than 1 percent of the population of the Central major statistical area (MSA) 0 and San Diego County and would not be significant.

It is anticipated that all unaccompanied personnel would be housed in Navy facilities (Borja, 2016). Wait lists may preclude new accompanied personnel associated with this alternative from being accommodated in Navy housing. Given the high housing values and rents associated with Coronado's beach resort status, most of the new personnel would be expected to purchase or rent homes in the Central MSA 0 or county of San Diego. However, even under a worst case scenario, assuming that all 341 new personnel seek community housing at the same time in 2020, this would represent less than 1 percent of the Central MSA 0 total housing units (264,516) and 2 percent of vacant housing units (5.7 percent or 15,100) and would not result in a significant direct or indirect impact.

Under Alternative 1, there would be an increase of 341 personnel at NAS North Island that would be accompanied by an estimated 150 school-aged children. This would represent less than 1 percent of the current public school enrollment in the Coronado Unified School District and a negligible percent in San Diego County. Because most of the new personnel would be expected to purchase or rent homes throughout San Diego County, this increase would not adversely impact schools in any one area of the City of Coronado or San Diego County and would not be a significant impact.

The 341 new personnel would be accompanied by an estimated 88 preschool-aged children. Given the wait list at Navy provided Child Development Centers, it is anticipated that personnel would need to utilize community child care facilities. While data on available capacity was not available, with over 1,000 child care centers in San Diego County, including 37 within a 5-mile radius of NAS North Island with total capacity for 1,877 children (Child Care Center US, 2017), there appears to be ample child care facility capacity in the Central MSA 0 and San Diego County for the 88 preschool-aged children. Therefore, the new personnel under Alternative 1 would not result in a significant direct or indirect impact to child care providers in the Central MSA 0 or county.

The environmental justice analysis considers minority and low-income populations in the City of San Diego that have the potential to be affected by any safety, noise, socioeconomic, or air emissions effects of Alternative 1 at NAS North Island. The affected area is defined as the area encompassed by the 65 dB CNEL noise contours (shown in **Figure 4.2-2**). There are no minority or low-income populations present in Coronado. Alternative 1 would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield (**Section 4.3.2** [Public Health and Safety]), and would not require any change to the APZs. As discussed in **Section 4.2.2** (Noise), noise zones defined in the AICUZ Program would not be affected; therefore, home values would be unaffected as a result of Alternative 1. Likewise, no perceptible change to the existing noise environment at any off-base area would occur under Alternative 1. Air emissions would be below the applicable General Conformity *de minimis* thresholds (**Section 4.4.2** [Air Quality]).

Therefore, implementation of Alternative 1 would be seamless to the community and would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

4.11.3 Alternative 2 Potential West Coast Impacts

Under Alternative 2, Navy V-22 aircraft would replace existing C-2A aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established on the East Coast at NS Norfolk under Alternative 2. The transition at NAS North Island would be completed by 2028.

Alternative 2 would require construction and/or renovation of facilities at NAS North Island totaling approximately $105.55 million. The proposed construction activities would have a minor, temporary benefit to the regional economy.

Under Alternative 2, there would be an increase of 161 personnel at NAS North Island. The 161 personnel represent approximately 1 percent of the jobs at NAS North Island. Given the scale of the regional economy, the gain of these jobs would not have a significant direct or indirect impact on local economic resources.

It is estimated that each of these new personnel would be accompanied by an average of 1.2 family members. Therefore, an estimated 354 people would relocate to the base, neighborhoods, and communities near NAS North Island. This would represent about 1 percent of the population of Coronado and less than 1 percent of the population of the Central MSA 0 and San Diego County and would not be significant.

It is anticipated that all unaccompanied personnel would be housed in Navy facilities (Borja, 2016). Wait lists may preclude new accompanied personnel associated with this alternative from being accommodated in Navy housing. Given the high housing values and rents associated with Coronado's beach resort status, most of the new personnel would be expected to purchase or rent homes in the Central MSA 0 or San Diego County. However, even under a worst case scenario, assuming that all 161 new personnel seek community housing at the same time in 2020, this would represent less than 1 percent of the Central MSA 0 total housing units(264,516) and 1 percent of vacant housing units (5.7 percent or 15,100) and would not result in a significant direct or indirect impact.

Alternative 2 would have the same impacts to schools as described under Alternative 1; however, there would only be an increase of 161 personnel at NAS North Island that would be accompanied by an estimated 74 school-aged children. This increase would not adversely impact schools in Coronado or San Diego County and would not be a significant impact.

The 161 new personnel would be accompanied by an estimated 44 preschool-aged children. Given the wait list at Navy provided Child Development Centers, it is anticipated that personnel would need to utilize community child care facilities. Based on the number of facilities and capacity of child care centers in proximity to NAS North Island, there is assumed to be ample child care facility capacity in the Central MSA 0 and San Diego County region; therefore, this would not result in a significant direct or indirect impact to child care providers in the Central MSA 0 or county.

This environmental justice analysis considers minority and low-income populations in the City of San Diego that have the potential to be affected by any safety, noise, socioeconomic, or air emissions effects of Alternative 2 at NAS North Island. The affected area is defined as the area encompassed by the 65 dB CNEL noise contours (shown in **Figure 4.2-3**). There are no minority or low-income populations present

in the immediate project area in Coronado. Alternative 2 would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield (**Section 4.3.3** [Public Health and Safety]), and would not require any change to the APZs. As discussed in **Section 4.2.3** (Noise), noise zones defined in the AICUZ Study would not be affected; therefore, home values would be unaffected as a result of Alternative 2. Likewise, no perceptible change to the existing noise environment at any off-base area would occur under Alternative 2. Air emissions would be below the applicable General Conformity *de minimis* thresholds (**Section 4.4.2 [**Air Quality]). Therefore, implementation of Alternative 2 would be seamless to the community and would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

4.11.4 Conclusion

It is anticipated that there would be both short- and long-term minor beneficial economic impacts from construction activities and employment/population increases under both Alternatives 1 and 2. No significant impacts are anticipated due to the minor population increases. While new Navy personnel may have to find housing and child care in the community, based on the number of facilities and capacity of child care centers in proximity to NAS North Island, there is assumed to be ample capacity in the Central MSA 0 and San Diego County region.

The analysis determined that potential environmental impacts would be negligible. Therefore, Alternatives 1 and 2 would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

4.12 Summary of Potential West Coast Impacts to Resources and Impact Avoidance and Minimization

A summary of the potential impacts associated with each of the action alternatives and impact avoidance and minimization measures are presented in **Table 4.12-1** and **Table 4.12-2**, respectively. The No Action Alternative does not meet the purpose of and need for the action and is not a viable alternative; however, as described in **Section 2.3.1** (No Action Alternative), it serves as reference point for describing and quantifying the potential impacts of Alternatives 1 and 2.

Table 4.12-1: Summary of Potential Impacts to Resource Areas at NAS North Island

Resource Area	*Alternative 1*	*Alternative 2*
Airfields and Airspace	Negligible impact from 14% increase in operations. Would not adversely affect airspace management, local air traffic, or noise contours.	Negligible impact from 7% increase in operations. Would not adversely affect airspace management, local air traffic, or noise contours.
Noise	No perceptible impact to CNEL noise contours, sound exposure, or vibration effects at POIs.	Impacts would be the same as, but slightly less than, Alternative 1.
Public Health and Safety	Negligible impact to safety with minor increase in operations and potential BASH events. All regulations and plans that pertain to airfield and other flight safety considerations would continue to be followed. Existing management strategies would continue to minimize risk. No change to AICUZ Program. No change to environmental health risks or safety risks that may disproportionately affect children.	Impacts would be the same as, but slightly less than, Alternative 1.
Air Quality	Emissions would be below the applicable General Conformity *de minimis* or PSD thresholds.	Impacts would be the same as, but slightly less than, Alternative 1.
Transportation	Minor direct impact from additional 340 ADT (less than 1% of total ADT). Previously accounted for in 2008 SEIS and traffic study.	Minor direct impact from additional 160 ADT (less than 1% of total ADT). Previously accounted for in 2008 SEIS and traffic study.
Biological Resources	Minor increase in potential BASH. Existing management strategies would continue to minimize risk. Impacts to MBTA-protected bird species and their active nests would be avoided during construction. Potential for takes of migratory birds during operations would not result in a significant adverse effect on a population of migratory birds and would continue to be in compliance with the MBTA as military readiness activity. *May affect, not likely to adversely affect* the California least tern and western snowy plover; informal consultation with the USFWS was conducted, and the USFWS concurred with the determination. Correspondence with the USFWS is provided in **Appendix D**.	Impacts would be the same as, but slightly less than, Alternative 1.
Water Resources	Minimal impacts to groundwater and surface water with implementation of construction best management practices, and facility design in accordance with Navy and federal regulations and policies for post-construction stormwater management. Potential for future sea level rise to contribute to 100-year event flooding in a portion of the project area (roadways, landing areas, etc.)	Impacts would be the same as, but slightly less than, Alternative 1.

Table 4.12-1: Summary of Potential Impacts to Resource Areas at NAS North Island (cont.)

Resource Area	*Alternative 1*	*Alternative 2*
Infrastructure	Increases in water demand/wastewater of 87,000 gallons per day (98 acre-feet per year). Increase in industrial discharge of wastewater of 3,250 gallons per day, which would result in an increase in the permitted discharge of industrial wastewater. Additional solid waste and energy demand from construction, demolition and operations. Water, wastewater, solid waste, and energy capacities sufficient to meet additional demand.	Increases in water demand/wastewater of 45,000 gallons per day (50 acre-feet per year). Increase in industrial discharge of wastewater of 2,000 gallons per day, which would result in an increase in the permitted discharge of industrial wastewater. Additional solid waste and energy demand from construction, demolition and operations. Water, wastewater, solid waste, and energy capacities sufficient to meet additional demand.
Cultural Resources	No historic properties affected.	No historic properties affected.
Hazardous Materials and Wastes	Minor hazardous materials and wastes generated from demolition, construction, operations, and maintenance. Potential ACM, LBP, and PCB generated during demolition. Potential PFAS/PFC generated from AFF during operations. Impacts would be minimized with implementation of appropriate and established handling procedures.	Impacts would be the same as, but slightly less than, Alternative 1.
Socioeconomics	Minor beneficial economic impacts. Minor impacts to population (750 personnel and family) with minor associated impacts to housing, child care, and schools in San Diego County. No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.	Impacts would be the same as, but slightly less than (354 personnel and family), Alternative 1.
Other considerations- Coastal Consistency	Coastal Consistency Negative Determination based on alternatives being consistent with enforceable policies of California Coastal Management Program. During consultation with the Commission, the Navy reiterated its commitment to continued cooperation with the City of Coronado on planning efforts to monitor and, where feasible and practicable, examine ways to reduce effects of aircraft and traffic on residents, recreation, and wildlife. A copy of the Negative Determination and concurrence from the California Coastal Commission is provided in **Appendix F**.	Same as Alternative 1.

Note: The No Action Alternative does not meet the purpose and need for the action and is not a viable alternative; however, it serves as reference point for describing and quantifying the potential impacts of Alternatives 1 and 2.

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Airfields and Airspace	Navy V-22 operations would be managed in accordance with existing procedures and established local approach and departure patterns.	Avoid conflicts.	NAS North Island Air Operations	During operations	NAS North Island Air Operations
Noise	Continue to implement noise abatement procedures published in Naval NBC Instruction 3710.7V.	Minimize community noise impact.	NAS North Island Air Operations	During operations	NAS North Island Air Operations
Public Health and Safety	Compliance with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield.	Minimize safety risks.	NAS North Island Air Operations	During operations	NAS North Island Air Operations
Transportation	Consider establishment of construction truck routes and construction worker carpooling.	Minimize construction truck and construction worker vehicle traffic.	NAS North Island	During construction	NAS North Island
Transportation	NBC would continue to enhance the NBC Transportation Improvement Program and to work with SANDAG and the City of Coronado to plan for the improvement of the local and regional transportation system to provide residents and military personnel with increased options for transportation.	Reduce commuter traffic on City of Coronado and NAS North Island roadways.	NBC Transportation Improvement Program	During operations	NBC Transportation Improvement Program
Biological Resources	All vehicles, equipment, and footwear would be cleaned of dirt, debris, seeds, mud, and visible plant material prior to being brought onto and before leaving the project area. Vehicles would also be cleaned after construction prior to being used elsewhere on NAS North Island. Any weeds removed would be placed in bags or dumpsters and hauled away.	Prevent the introduction and spread of invasive non-native species.	Construction contractor	During construction	NAVFAC SW Capital Improvements, Facilities Engineering Command, NBC Environmental

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	The list of plants to be incorporated into the landscaping would be submitted to the NBC Botanist (Bryan Munson, 619-545-7185, bryan.munson@navy.mil), NBC Wildlife Biologist (Tiffany Shepherd, 619-545-3703, tiffany.shepherd@navy.mil), and NAVFAC Landscape Architect (Bruce Rudd, 619-532-4079, bruce.rudd@navy.mil) for review and approval prior to planting. Eighty percent of plant material (within each stratum i.e., herbs, shrubs, trees) will be from the approved plant list of California native species (California Native Plant Society, 2017). The remaining 20 percent would consist of drought tolerant plants on the plant list. Trees and large shrubs may not be planted within the project area because they may increase BASH risk and predation risk on endangered species nesting sites south of the project area.	Native plant species for landscaping.	Project proponent/ construction contractor	During construction	NAS North Island Natural Resources
Biological Resources	Written approval by the NBC Wildlife Biologist is required prior to finalization and implementation. Engagement and coordination with the aforementioned subject matter expert in the Request for Proposal (RFP) and design process must occur from the beginning to ensure timely coordination so as to afford appropriate opportunities for project review and modification to comply with Federal laws and regulations, to protect endangered/threatened species and habitats in close proximity to the project site. Subject matter experts must be contacted during RFP development and prior to the kickoff-meeting of the project design.	Protection of wildlife habitat.	Project proponent/ construction contractor	During facility design	NAS North Island Natural Resources

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	The executing agent/contractor would coordinate with the NBC Wildlife Biologist to ensure that work would avoid impacting birds protected under the MBTA (including BCC). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season (non-breeding season is September 1 to February 14). If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. The qualified biologist would be hired by the project proponent and approved by the NBC Wildlife Biologist. The qualified biologist must survey the area within 72 hours of commencing work to determine if active nests are present. If an active nest is found in the project area at any time during project work, work would be halted immediately and the NBC Wildlife Biologist would be contacted. The contractor cannot take action to remove the bird or the nest from the area that is being used. Any removal action must be overseen by the NBC Wildlife Biologist. The NBC Wildlife Biologist, in coordination with the qualified biologist, must confirm that there would be no impacts to active nests before construction work could resume.	Minimize impacts to migratory birds during construction activities.	Construction contractor	During construction	NAS North Island Natural Resources

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	New buildings and structures within the project area would incorporate a bird-friendly design to reduce and prevent birds from colliding with buildings. Bird-friendly design features include: (1) transparent passageways, corners, atria, or courtyards so that birds do not get trapped; (2) appropriately shielded outside lighting that is directed away from habitats to minimize attraction to light-migrating songbirds; (3) interior lighting that is turned off at night or designed to minimize light escaping through windows; and (4) landscaping that is designed to keep birds away from the building's façade. Use of non-reflective or opaque glass; external shades (or other devices to reduce glare, transparency, or reflectiveness) on windows; ultraviolet patterned glass; angled glass; and/or louvers can aid in reducing bird collisions. Additionally, night-time lighting will include bird-friendly design features such as shielded lights (to reduce ambient light into nearby habitats), use of motion detectors, dusk-to-dawn sensor activation and other automatic controls, low-lumen or limited-spectrum lighting, and lighting design that uses shields to prevent light from shining upward in the sky. The NBC Wildlife Biologist will be consulted to ensure the minimization measures are incorporated to prevent window strikes.	Minimize impacts to migratory birds from facilities.	Project proponent/ construction contractor	During facility design, construction, and operations	NAVFAC SW Capital Improvements, Facilities Engineering Command, NBC Environmental

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	The Navy would submit a draft lighting plan to the Carlsbad USFWS Office for review at least 30 days prior to project construction. New buildings within the project area would incorporate the following bird-friendly design: (1) permanent outdoor lighting installed within the project area would be shielded to maximally reduce light pollution into the MAT site; (2) other methods of reducing light pollution (e.g., dusk-to-dawn-sensor activation, low-lumen or limited-spectrum lighting) would be applied wherever possible; (3) light poles and light placement would be constructed at the lowest height possible (considering security constraints); (4) any trash receptacles placed around the new buildings would be designed with secure lids to reduce the potential for attracting California least tern predators (e.g., corvids). If any new antennas are proposed within the project site, the NBC Wildlife Biologist would review and approve proposed antenna locations and designs to minimize predator perching opportunities near the MAT site.	Minimize impacts to migratory birds and listed species, including nesting California least tern and western snowy plover.	Project proponent	During facility design, construction, and operations	NAVFAC SW Capital Improvements, Facilities Engineering Command, NBC Environmental
Biological Resources	Manage and monitor the take of migratory birds under the existing BASH Plan (Navy, 2013c).	Minimize impacts to migratory birds from BASH strikes.	NAS North Island Natural Resources	During operations	NAS North Island Natural Resources

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	Construction activities would be restricted as follows: (1) no construction activity would be permitted within 300 feet of the MAT site during the California least tern breeding season (April 1 to August 30, or sooner if a Biological Monitor demonstrates to the satisfaction of the Carlsbad USFWS Office that all nesting is complete); (2) no heavy construction (e.g., use of heavy equipment, jackhammering, grading, excavating) would occur within 500 feet from the MAT site during the breeding season; and (3) greater than 500 feet from the MAT site, construction that may result in noise or visual impacts to nesting California least terns (e.g., building demolition, jackhammering) would be conducted outside of the breeding season to the maximum extent practicable. All activities proposed during the breeding season would be reviewed on a weekly basis by the NBC Wildlife Biologist. If the NBC Wildlife Biologist determines that activities have the potential to disrupt nesting terns, a Biological Monitor would observe California least tern nesting at the MAT site during those activities and determine whether nesting is being disrupted. If the Biological Monitor determines that nesting is being disrupted, the Navy would stop work and coordinate with the Carlsbad USFWS Office to review additional avoidance/minimization measures that can be implemented. Upon agreement as to the necessary revisions to the avoidance/minimization approach, work may resume subject to the revisions and continued nest monitoring until California least tern nesting at the MAT site is complete. During the nesting season, all cranes or other tall construction equipment would be lowered when not in use to preclude raptor and corvid perching.	Avoid impacts to nesting California least terns at the MAT site.	Construction contractor	During construction	NAS North Island Natural Resources

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
	The Biological Monitor will be familiar with California least tern behavior and ecology and have documented experience locating and monitoring California least tern nests. If necessary, more than one biologist may be used.				
Biological Resources	The Navy would monitor California least tern activity in the Taxiway Juliet area. If California least terns initiate nesting at Taxiway Juliet despite the Navy's efforts to deter nesting, the Navy would implement the above measure at Taxiway Juliet in addition to the MAT site or reinitiate consultation with the Carlsbad USFWS Office to address the potential effects of construction on California least tern nesting at Taxiway Juliet.	Avoid impacts to nesting California least terns at the Taxiway Juliet.	Construction contractor	During construction	NAS North Island Natural Resources
Biological Resources	The Navy would monitor western snowy plover activity on the airfield and coordinate with construction personnel if western snowy plovers are detected in areas adjacent to the project site. Any western snowy plover nests initiated within or adjacent to project construction would be marked with blue cones and construction personnel will be directed away from the area until eggs can be collected.	Avoid impacts to nesting western snowy plovers on the airfield.	Construction contractor	During construction	NAS North Island Natural Resources

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	Design and construct hangars to deter birds from nesting/perching within the project area. Hangars and any other support buildings would be designed and constructed with a slanted roof, or other design that discourages perching, roosting, nesting, and loafing by birds. Bird deterrent devices (e.g., Nixalite on perches) would be installed on all hangars, support buildings, antennas, light poles, and other perching surfaces. Any trash receptacles placed around the new buildings would be designed with secure lids to reduce the potential for attracting California least tern and western snowy plover predators (e.g., corvids). If revegetation or landscaping would occur within the areas of new construction, trees and large shrubs would not be considered for planting because they may increase avian usage of the site and predation risk. If any new antennas are proposed within the project site, the NBC Wildlife Biologist would review and approve proposed antenna locations and designs to minimize predator perching opportunities near the MAT site.	Minimize birds nesting/perching habitat and associated BASH risk and opportunities for predators of the California least tern, including herons, egrets, and ravens.	Project proponent	During facility design, construction, and operations	NAS North Island Natural Resources
Biological Resources	Annual monitoring of the California least tern and coordination with the USFWS would continue as part of the installation's INRMP program requirements and conditions of the BOs.	Minimize potential impacts to California least tern from operations.	NAS North Island Natural Resources	Annually during operations	NAS North Island Natural Resources
Biological Resources	Annual monitoring of the western snowy plover and coordination with the USFWS would continue as part of the installation's INRMP program requirements.	Minimize potential impacts to western snowy plover from operations.	NAS North Island Natural Resources	Annually during operations	NAS North Island Natural Resources

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Water Resources	In the event groundwater is encountered during construction, the construction contractor would contact NAS North Island environmental staff to determine if a permit is needed and how to manage dewatering operations. Water diversion and/or dewatering activities may be subject to discharge and monitoring requirements under either NPDES General Permit, Limited Threat Discharges to Surface Waters (Board Order R6T-200S-0023), or General Waste Discharge Requirements for Discharges to Land with a Low Threat To Water Quality (WQO-2003-0003).	Minimize impacts to groundwater, if encountered during construction.	Construction contractor	During construction	NAS North Island Environmental
Water Resources	Obtain authorization from the California State Water Resources Control Board under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ/NPDES No. CAS000002) before starting construction activities. The construction contractor would be required to implement all appropriate BMPs for erosion and sedimentation control, as identified in Order No. 2009-0009-DWQ, and to develop and implement a site-specific SWPPP. In addition, BMPs such as temporary gravel construction entrances, silt fences, storm drain inlet protection, and sediment traps/basins would be implemented within the disturbance area to address erosion and sedimentation and prevent off-site transport of sediment. Applicable BMPs would be included in the preliminary engineering design and construction of facilities.	Minimize impacts to surface water during construction.	Construction contractor	Before the start of construction	NAS North Island Environmental

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Water Resources	In accordance with applicable federal, state, and local regulations, runoff reduction features for the project area would be designed and located to provide on-site stormwater retention and trap eroded soils and, to the maximum extent technically feasible, infiltrate, filter, store, evaporate, and/or retain runoff close to its source. Non-stormwater discharges from the wash rack would also be required to be diverted into the sanitary sewer systems for treatment at the NAS North Island Industrial Waste Treatment Plant.	Minimize impacts to surface water from facility operations.	Project proponent	During facility design, construction, and operations	NAS North Island Environmental
Water Resources	Implement appropriate construction management BMPs, such as requiring all construction equipment to be in good condition and properly maintained to avoid the potential for spills and leaks.	Minimize potential impacts to surface water quality form inadvertent spills and leaks from equipment during construction.	Construction contractor	During construction	NAS North Island Environmental
Infrastructure	The Navy would obtain an increase in the permitted discharge of industrial wastewater to SDMSS.	Comply with wastewater discharge permit.	NAS North Island Environmental	Before the start of project operations	NAS North Island Environmental
Cultural Resources	Design and construction of the new hangars would take into account the architectural style of NAS North Island, in accordance with the NBC Installation Appearance Plan for the Airfield Functional District.	Avoid adverse effects to architectural resources.	Project proponent	During facility design and construction	NAS North Island Cultural Resources Manager

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Cultural Resources	The Commanding Officer, NBC would provide for archaeological monitoring of ground disturbing activities associated with facility construction and demolition, in accordance with Stipulation IX of the NBC PA. In the unlikely event of an inadvertent discovery during ground disturbing activities, NAS North Island and its contractor would cease work immediately and notify the Commanding Officer, NBC and Navy Region Southwest Cultural Resources Manager, who would implement the procedures for unanticipated discoveries stipulated in the NBC PA in accordance with NHPA and the further guidance contained in the ICRMP for NBC (NAVFAC, 2012).	Minimize adverse effects on archaeological resources due to inadvertent discovery during ground disturbing activities.	Construction contractor	During ground disturbing activities associated with facility construction	NAS North Island Environmental/ Navy Region Southwest Cultural Resources Manager

Table 4.12-2: Summary of Impacts Avoidance and Minimization Measures at NAS North Island (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsible Organization*	*Compliance Schedule*	*Verification of Compliance*
Hazardous Materials and Waste	ACM and LBP materials would be characterized before starting construction/demolition and would require specialized techniques for their abatement, including recycling, separation, or removal before starting construction activities. Disturbing these materials would require engineering controls and other procedures required to comply with applicable regulatory requirements and to protect human health and the environment. Any identified ACM and LBP- and PCB-containing materials would be removed before initiation of demolition or construction/renovation activities, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements. Where LBP is present, reasonable precautions would be taken to prevent particulate matter, such as fugitive dust, from becoming airborne during demolition and construction/renovation activities. In accordance with Occupational Safety and Health Administration requirements, construction contractors should assess the potential for employee exposure to lead during demolition and construction/renovation activities and implement necessary engineering controls and use of personal protective equipment.	Minimize impacts from special hazards during construction.	Construction contractor	Before and during construction/demolition	NAS North Island Environmental

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5 CUMULATIVE IMPACTS AT WEST COAST FLEET LOGISTICS CENTER

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

5.1 DEFINITION OF CUMULATIVE IMPACTS

The approach taken in the analysis of cumulative impacts follows the objectives of National Environmental Protection Act (NEPA), Council on Environmental Quality (CEQ) regulations, and CEQ guidance. Cumulative impacts are defined in 40 Code of Federal Regulations (CFR) section 1508.7.

The impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

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

In addition, CEQ and United States (U.S.) Environmental Protection Agency (USEPA) have published guidance addressing implementation of cumulative impact analyses—Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) and Consideration of Cumulative Impacts in EPA Review of NEPA Documents (USEPA, 1999b). CEQ guidance entitled Considering Cumulative Impacts Under NEPA (1997) states that cumulative impact analyses should

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

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

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

5.2 SCOPE OF CUMULATIVE IMPACTS ANALYSIS

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this Environmental Assessment (EA), the study area delimits the geographic extent of the cumulative impacts analysis. In general, the study area will include those areas previously identified in **Chapter 4** for the respective resource areas. The time frame for cumulative impacts centers on the timing of the Proposed Action.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the Proposed Action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for Environmental Impact Statements (EISs) and EAs, management plans, land use plans, and other planning related studies. Additionally, NAS North Island staff provided information on local and regional actions, as well as previously completed, currently ongoing, and reasonably foreseeable future actions. Finally, websites for state, city, county, and other local agencies were searched for information pertaining to actions that would need to be included in this analysis.

Multiple Navy actions are ongoing within the Pacific Northwest Region; however, each NEPA document addresses a specific Proposed Action, separated from other actions by its purpose and need, independent utility, timing, and geographic location. Some NEPA documents are stand-alone documents; others tier off of and/or expand the analyses of other existing NEPA documents. NEPA documents for at-sea training (e.g., the Hawaii-Southern California Training and Testing EIS/Overseas EIS [OEIS]) focus on training activities occurring within a range complex or Military Operations Area (MOA) and involve different types of aircraft, ships, and range complex enhancements. However, NEPA documents that analyze a specific type of aircraft operation at a military airfield (in this case, the Navy V-22) are focused in and around that airfield and its facility needs. While the Navy has analyzed, and is currently analyzing, various Proposed Actions in the area, those Proposed Actions are not preconditions for Navy V-22 operations at NAS North Island. Navy V-22 operations at NAS North Island are not a precondition for larger military readiness activities on range complexes in the Pacific Southwest. Even in the absence of this Proposed Action, military training in the Pacific Southwest would continue independently from this Proposed Action, as analyzed in the documents referenced in **Section 1.6** (Key Documents).

5.3 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

This section will focus on past, present, and reasonably foreseeable future projects at and near Naval Air Station (NAS) North Island. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in **Section 5.1** (Definition of Cumulative Impacts), it was determined if a relationship exist such that the affected resource areas of the Proposed Action (included in this EA) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance (CEQ, 2005), these actions considered but excluded from further cumulative effects analysis are not catalogued here as the intent is to focus the analysis on the meaningful actions relevant to inform decision-making. Projects

included in this cumulative impacts analysis are listed in **Table 5.3-1** and briefly described in the following subsections.

Table 5.3-1: Cumulative Action Evaluation

Action	*Level of Environmental Analysis Completed*
Past Actions	
Military	
Current, Emerging, and Future Training Operations in the Southern California Range Complex	EIS
Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet	SEIS
NBC Lodge Expansion	
Three NIMITZ-Class Aircraft Carriers: Development of Home Port Facilities in Support of the Pacific Fleet	EIS
Bachelor Quarters, NAS North Island (MILCON P-730)	EA
Non-Military	
Hotel del Coronado Master Plan – Additional Rooms	EIR
Transbay Sanitary Sewer Replacement	MND
Wastewater Master Plan	Planning document
Present and Reasonably Foreseeable Future Actions	
Military	
Coastal Campus Infrastructure (MILCONS P-991, P-947, P-998, P-1015)	EIS
Hawaii-Southern California Training and Testing EIS/OEIS	EIS
Helicopter Wings Realignment and MH-60R/S Helicopter Transition	EA
Repair Taxiway, NAS North Island	CATEX
Steam Decentralization Project, NAS North Island	EA
Club Coronado	CATEX
Grace Hopper Data Center (MILCON P-963)	CATEX
Lock and Leave Facility, NAS North Island	CATEX
URC Storage and Mission Support (MILCON P-988)	CATEX
USM MV-22 B-333 (MILCON P-1017)	CATEX
Energy Security and Resilience Project	EA
Paint Booth (MILCON P-1022)	EA
Non-Military	
Coronado Gateway Project	In the planning process
Hotel del Coronado Master Plan	EIR

Notes: CATEX=Categorical Exclusion; DEIS=Draft Environmental Impact Statement; EIR=Environmental Impact Report; MILCON=Military Construction; NAB=Naval Air Base; NB=Naval Base; NBC=Naval Base Coronado

5.3.1 PAST ACTIONS

5.3.1.1 Military

5.3.1.1.1 Current, Emerging, and Future Training Operations in the Southern California Range Complex

This action included the continuation of training, an increase in training activities, force structure changes associated with introduction of new weapons systems, new classes of ships, and the introduction of new types of aircraft into the Fleet within the Southern California Range Complex. This action was evaluated in an EIS and a Record of Decision (ROD) was signed on January 30, 2009. This action has been completed.

5.3.1.1.2 Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet

This action included replacement of the P-3C aircraft with the P-8A multi-mission maritime aircraft. Home basing of P-8A aircraft would occur at NAS Jacksonville and NAS Whidbey Island with a permanent, rotating squadron detachment at MCB Hawaii Kaneohe Bay and periodic squadron detachments at NAS North Island. No new construction would be required to accommodate the P-8A aircraft at NAS North Island, and the two to nine P-3C aircraft that are typically present at NAS North Island at any given time would be replaced by two to six P-8A aircraft. The existing P-3C squadrons (and the P-8A multi-mission maritime aircraft replacement squadrons) are not permanently stationed at NAS North Island, but are present only periodically. Annual flight operations conducted by the P-8A aircraft will be less than the P-3C aircraft. The transition of P-3C to P-8A is anticipated to be completed by 2020 and aircraft operations are ongoing (Navy, 2008b).

5.3.1.1.3 Naval Base Coronado Lodge Expansion

This action included the demolition of four existing Navy lodge buildings and several smaller structures, and construction of a lodge building and cottages to increase room capacity; and construction of recreation facilities, parking lots, road upgrades, retail shops, a restaurant, landscaping and utility upgrades. This action was evaluated in an EA. This action has been completed.

5.3.1.1.4 Three NIMITZ-Class Aircraft Carriers: Development of Home Port Facilities in Support of the Pacific

This action included construction and operation of facilities and infrastructure needed to support the capacity to homeport three NIMITZ class nuclear-powered aircraft nuclear-powered aircraft carriers (CVNs) within the U.S. Pacific Fleet. Construction of facilities has been completed. Operations associated with homeporting of the aircraft carriers are ongoing.

5.3.1.1.5 Bachelor Quarters, NAS North Island (MILCON P-730)

This action will construct a multi-story, bachelors quarters (221,650 square feet) at NBC to meet the Navy's policy to house single sailors on shore vice onboard ship or off-base. The building will provide approximately 936 beds for Homeport Ashore Sailors (CVN Sailors) with less than 4 years of service and include lounge/game room, vending areas, sports court, and parking for 570 vehicles. Construction is in progress and anticipated for completion in August 2017. Operation will be ongoing.

5.3.1.2 Non-Military – City of Coronado

5.3.1.2.1 Hotel del Coronado Master Plan – Phase I

This action includes a master plan for the multi-phased development plan for the Hotel del Coronado. Phase I of the development plan that constructed new Beach village cottages and villas has been completed. Phase II is ongoing (and is discussed under present and reasonably foreseeable actions).

5.3.1.2.2 Transbay Sanitary Sewer Replacement

This action replaced an existing ductile iron sewer force main that had been in service for over 30 years and was nearing the end of its useful life. The new line has an expected 75-year lifespan and allows the old line to serve as a redundant backup force main. A California mitigated negative declaration was adopted for this action by the City of Coronado. This action was completed in 2008.

5.3.1.2.3 Wastewater Master Plan

This action included a City of Coronado plan for sewer main replacement, rehabilitation of the Cays main pump station, and Margarita Avenue sewer main replacement.

5.3.2 PRESENT AND REASONABLY FORESEEABLE ACTIONS

5.3.2.1 Military

5.3.2.1.1 Coastal Campus Infrastructure (MILCON P-991, P-947, P-998, P-1015)

This action will consolidate NSWC facilities to one location on Silver Strand Training Complex-South and includes the construction of a 1.5-milion square foot campus. Facilities include logistical support buildings, equipment use and maintenance training facilities, classroom and tactical skills instruction buildings, storage and administrative facilities, utilities, fencing, roads, and parking. A new controlled entry point will be provided for immediate access to/from State Route 75 and a historic bunker would be demolished to facilitate campus construction. Construction began in 2015 and is expected to last up to approximately 10 years.

5.3.2.1.2 Hawaii-Southern California Training and Testing EIS/OEIS

This action includes training and testing activities to be conducted within existing range complexes and operating areas located along the southern California coast (Southern California Range Complex) and around the Hawaiian Islands. The Navy proposes to conduct training and testing activities within the Hawaii-Southern California Training and Testing Study Area, including activities that involve the use of active sonar and explosives. The action is anticipated to begin in 2018. Operations will be ongoing.

5.3.2.1.3 Helicopter Wings Realignment and MH-60R/S Helicopter Transition

This action included facilities and functions to support an increase in the number of fleet helicopter squadrons on the West Coast to support the Navy's re-emphasized operational focus and force structure in the Pacific Command Area of Responsibility. The action added four helicopter squadrons and increased the number of helicopters home based at NAS North Island by 52. In addition, most existing and future helicopter squadrons were transitioned to the MH-60R/S helicopter replacing older type, model, series H-60 helicopters. Eighteen older HH-60H and SH-60F helicopters would remain in use by Reserve Squadron HSC-85. This action was planned to increase the helicopter loading at NAS North Island from 151 to 203 home based helicopters and an additional 800 personnel by 2016, but full completion is now anticipated in 2018.

5.3.2.1.4 Repair Taxiway, NAS North Island

This action includes repair and maintenance of taxiway pavements (525,000 square feet) on NAS North Island to accommodate the increased load associated with the addition of H-60 squadrons. Two areas on Taxiway India have reached failure and require complete replacement. Two areas of Taxiway Lima have surface deficiencies that require crack repair and joint sealing. Multiple other areas that connect the taxiways to the runways require a mill and overlay repair. Construction is ongoing.

5.3.2.1.5 Steam Decentralization Project, NAS North Island

This action is the decentralization of the steam distribution system throughout NAS North Island to provide the installation with more efficient heat and electricity, reduce greenhouse gas emissions by lowering fuel usage, and reduce operation and maintenance and annual recapitalization costs. The action will include: demolishing the existing cogeneration plant and removing or abandoning the associated centralized steam distribution system; installing local heating systems to provide for specific

building requirements; installing single boiler systems where groups of buildings are clustered together or space restrictions prevent separate systems for each building; construction of new nodal decentralized boilers for select piers; upgrading and expanding the existing natural gas distribution piping system; and establishing a bridge contract for existing cogeneration plan to continue operating in event the action is not completed on schedule. Construction is underway with completion anticipated in 2019.

5.3.2.1.6 Club Coronado

This action will include demolition of the old Club Coronado Catering Facility (Building 4) and construct a smaller facility (14,000 square feet) at NAB Coronado to improve service, lower maintenance and operating costs with a more energy efficient building, and increase profitability with the new and more scenic building location. Construction is anticipated to begin in 2018 and last up to approximately 18 months.

5.3.2.1.7 Grace Hopper Data Center (MILCON P-963)

This action includes the replacement of the existing 650 kilowatt power generation system and associated electrical distribution system at the Grace Hopper Data Center (Building 1482) at NAS North Island with an upgraded system. The new system will produce 4.5 megawatts of power generation and consist of multiple natural gas-fired generators with liquefied petroleum gas, or propane, back-up fuel, new integrated paralleling synchronization switchgear, electrical distribution switchboard, relays, programmable logic controls and supervisory controls and an upgraded data acquisition system. The new system will restore the required level of power generation redundancy and ensure the continued reliability of the facility. Construction is anticipated to begin in 2017 and last up to approximately 18 months.

5.3.2.1.8 Lock and Leave Facility, NAS North Island

This action includes the redevelopment of a 75,000-square-foot area to construct a Lock and Leave Storage Facility at NAS North Island. The facility will include a new building (25,000 square feet) capable of containing 1,200 storage units. Three existing buildings (Building C-1, C-34, and 286) will be demolished to accommodate the new facility. Construction is anticipated to begin in 2019 and last approximately 18 months.

5.3.2.1.9 URC Storage and Mission Support (MILCON P-988)

This action includes constructing a storage and operation facility (24,000 square feet) for the Undersea Rescue Command; repairing and upgrading the existing waterfront operations Building 492, and demolition of 9 buildings. The action will enhance the Undersea Rescue Command storage and operations area at NAS North Island. Currently the Undersea Rescue Command rescue and administrative functions are spread amongst three buildings and several trailers. Construction is underway with completion anticipated in 2018.

5.3.2.1.10 USM MV-22 B-333 (P-1017)

This action includes facility upgrades to Building 333 to accommodate four MV-22 aircraft. Upgrades would include demolition of the existing mezzanine structure; upgrading the existing fire alarm system to add mass notification, horns, and strobes; demolition of existing natural gas heaters and fire suppression; addition of two compressed air service points; upgrade power to support new equipment; upgrade run up and taxi way; and modification of existing concrete aircraft parking area to create an aircraft hover point. Construction is anticipated to begin in 2018 with completion anticipated in 2019.

5.3.2.1.11 Energy Security and Resilience Project

This action includes the development and operation of an energy security and resilience project at NAS North Island. The project may include a natural gas peaker plant, installation of large grid-integrated batteries, and/or other energy assets. An EA is in preparation. Construction is anticipated to begin in 2018 and with completion anticipated in 2020.

5.3.2.1.12 Paint Booth (MILCON P-1022)

This action includes the construction of Paint and Corrosion Control facilities to include the expansion of the existing wash rack and aircraft parking apron. High bay areas are to be sized to handle the aircraft requirements at Fleet Readiness Center Southwest North Island. Construction is anticipated to begin in 2018 and with completion anticipated in 2020.

5.3.2.2 Non-Military – City of Coronado

5.3.2.2.1 Coronado Gateway Project

This action includes a vision plan for the area around the tollbooth plaza to understand the community's preference and to guide future development of the defunct SR 75 tollbooth plaza. The plan provides conceptual design recommendations. The action is in the planning stages and funds have been appropriated in the City of Coronado's Fiscal Year (FY) 2016/2017 budget for the next stage.

5.3.2.2.2 Hotel del Coronado Master Plan

This action includes a master plan for the Hotel del Coronado, identifying all desired facilities and improvements including the addition of 144 new guest rooms, Conference Center, main hotel improvements, a history gallery, landscaping, pedestrian, traffic, and parking improvements including relocating the main driveways.

5.4 CUMULATIVE IMPACT ANALYSIS

Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data is not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative impacts related to this EA where possible. The analytical methodology presented in **Chapter 4**, which was used to determine potential impacts to the various resources analyzed in this document, was also used to determine cumulative impacts.

It is important to note that this analysis presents and discusses the impacts individually for each cumulative impact project for those resources where the potential impacts are more appreciable or where quantitative data are known (as it pertains to the projects identified in **Table 5.3-1**). Conversely, the cumulative impacts to those resources with less appreciable potential impacts are presented in a more qualitative analysis.

5.4.1 AIRFIELDS AND AIRSPACE

The Proposed Action would not result in adverse impacts to airfields or airspace; operations levels would be within historical averages, and current management and safety procedures would continue to be emphasized. Therefore, there would be no cumulative impacts to airfields and airspace.

5.4.2 NOISE

5.4.2.1 Description of Geographic Study Area

The ROI for noise cumulative impacts includes areas in proximity to the proposed hangar construction site and the area affected by the Community Noise Equivalent Level (CNEL) noise contours for proposed aircraft operations. Aircraft operations, commuter traffic, and construction contribute to the noise environment at NAS North Island.

5.4.2.2 Relevant Past, Present, and Future Actions

Past, present, or reasonably foreseeable actions that might interact with the affected resource areas of the Proposed Action include the numerous construction projects listed in **Table 5.3-1** and projects that involve aircraft operations at NAS North Island (Introduction of the P-8A and Helicopter Wings Realignment and MH-60R/S Transition). There are no other identified future actions that would contribute to aircraft operations. Construction and demolition activities associated with the Proposed Action and programmed installation improvement projects could result in cumulative noise within ROI if they occur at the same time as the Proposed Action. Past and present use of the NAS North Island airfield has generated a noise environment surrounding NAS North Island that is represented by noise contours last published in the 2011 Air Installations Compatible Use Zones (AICUZ) Study Update (Navy, 2011a). Introduction of the P-8A and the Helicopter Wings Realignment and MH-60R/S Transition were largely aircraft replacement actions and had no or negligible impacts on the noise contours.

5.4.2.3 Cumulative Impact Analysis

Cumulative noise impacts associated with past, present, and future aircraft operations actions within the ROI would be less than significant because the noise impacts of the Proposed Action would be negligible and imperceptible in the ROI. Operations associated with the Introduction of the P-8A and the Helicopter Wings Realignment and MH-60R/S Transition are analyzed as part of the No Action Alternative in this EA. The analysis determined the cumulative impact would be negligible. Therefore, noise impacts would not be additive with noise impacts from past, present, and future actions, and would not result in cumulative operations noise impacts within the ROI.

In addition, cumulative noise from construction and demolition projects would likely attenuate to within the range of the urban environment at sensitive receptors located in the vicinity of NAS North Island, and cumulative construction noise impacts would not be significant.

Cumulative noise may be generated by trucks delivering materials to multiple construction sites when construction schedules are concurrent, such as, the NBC Coastal Campus. These noise impacts would be temporary and would be consistent with traffic noise in an urban environment; therefore, the impact would not be significant. Minimization measures, such as limiting truck traffic to regular daytime working hours and managing delivery routes, would reduce these impacts.

Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant noise impacts within the ROI.

5.4.3 PUBLIC HEALTH AND SAFETY

The Proposed Action would have negligible impacts to public health and safety in the vicinity of NAS North Island; therefore, there would be no cumulative impact to public health and safety.

5.4.4 AIR QUALITY

5.4.4.1 Description of Geographic Study Area

The ROI for assessing cumulative air quality impacts of criteria pollutants is primarily the San Diego Air Basin (SDAB), and more specifically, in proximity to NAS North Island. This region is in attainment of all criteria pollutants regulated under the National Ambient Air Quality Standards (NAAQS) except ozone. While the region also is a NAAQS maintenance area for carbon monoxide, it has attained this standard since 1998. Additionally, the SDAB does not attain the California Ambient Air Quality Standards (CAAQS) for ozone, particulate matter 10 microns (PM_{10}), and particulate matter 2.5 microns $PM_{2.5}$. Since NAS North Island is separated from the greater San Diego metropolitan area by San Diego Bay, air emission sources on NAS North Island would have the greatest potential to combine with emissions from the Proposed Action and to contribute to project cumulative air quality impacts.

5.4.4.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact air quality primarily include existing and future sources of emissions at NAS North Island and to a lesser extent, sources within the greater San Diego metropolitan area. Some of the more relevant existing and future actions at NAS North Island include the actions, Current, Emerging, and Future Training Operations in the Southern California Range Complex, Hawaii-Southern California Training and Testing EIS/OEIS, and Helicopter Wings Realignment and MH-60R/S Helicopter Transition (see **Section 5.3**).

In addition, the SDAB has the potential for future development and growth. This future growth, combined with the addition of the cumulative projects identified above in **Section 5.3**, could contribute to a net increase in overall cumulative emissions in the project region compared to existing conditions. However, the San Diego Regional Air Quality Strategy implemented by the San Diego County Air Pollution Control District (APCD) includes emission reduction strategies that would further progress towards attainment and maintenance of the ambient air quality standards in the region.

5.4.4.3 Cumulative Impact Analysis

5.4.4.3.1 Criteria Pollutants

Cumulative air quality impacts from past, present, and future actions within the ROI would be less than significant because cumulative air emissions would not be substantial enough to contribute to an exceedance of an ambient air quality standard. Proposed construction and operational activities under Alternatives 1 and 2 at NAS North Island would produce emissions that would remain below all conformity and Prevention of Significant Deterioration emission thresholds (see **Section 4.4** Air Quality**, Tables 4.4-1** through **4.4-4**). Emissions from these activities mainly would originate from mobile and intermittent sources within the site of the proposed aircraft hangar(s), parking areas, and taxiways, in addition to the NAS North Island runway. Release of these proposed emissions over such a large area would result in dispersed ambient impacts, including emissions of ozone precursors. Emissions from cumulative projects would potentially contribute to ambient pollutant impacts generated from proposed activities. However, these emissions would occur far enough away from the locations of proposed construction and operational activities that they would produce low ambient pollutant impacts in proximity to proposed sources. Therefore, air quality impacts from proposed construction and operational emissions, in combination with emissions from cumulative projects, would not be substantial enough to contribute to an exceedance of an ambient air quality standard. As a result,

proposed construction and operational activities under Alternatives 1 and 2 at NAS North Island would not result in cumulatively significant impacts on criteria pollutant levels.

5.4.5 TRANSPORTATION

5.4.5.1 Description of Geographic Study Area

The ROI for cumulative impacts to transportation is the City of Coronado street network discussed in **Section 3.5** and the routes of access to NAS North Island from San Diego via the San Diego-Coronado Bridge (SR-75).

5.4.5.2 Relevant Past, Present, and Future Actions

Past dense development, tourism, the San Diego-Coronado Bridge, and Navy bases have all contributed cumulatively to transportation challenges in the City of Coronado. Traffic conditions in Coronado became more congested after the removal of toll booths on the Coronado Bridge in 2002 (Navy 2008a; City of Coronado, 2016).

In addition to these factors, the past, present, and reasonably foreseeable actions in **Table 5.3-1** with potential to interact with traffic of the Proposed Action include: Developing Homeport Facilities for Three Nimitz-Class Aircraft Carriers in Support of the U.S. Pacific Fleet (2008 SEIS [Navy, 2008a]), Helicopter Wings Realignment and MH-60R/S Helicopter Transition (Navy, 2011a), NBC Coastal Campus (Navy, 2015a), NBC Lodge Expansion, Hotel del Coronado Master Plan, and other not yet identified actions. The City of Coronado has accomplished several street improvement projects focused on bicycle transportation, drainage, streetscape, and traffic calming. These projects would not contribute to traffic volumes or cumulative transportation impacts in the ROI.

The Proposed Action would result in the addition of 340 average daily traffic (ADT) in the ROI under Alternative 1 and 160 ADT under Alternative 2.

5.4.5.3 Cumulative Impact Analysis

5.4.5.3.1 Construction

Cumulative construction transportation impacts from past, present, and future actions within the ROI have the potential to be significant. Present and reasonably foreseeable future construction projects with potential interact with the Proposed Action include the Coastal Campus, and the Hotel Del Coronado Master Plan.

Construction of the Coastal Campus began in 2015 and has a 10-year construction period. Construction traffic for that project is projected to be at its peak in 2017, prior to the start of construction of the Proposed Action (Navy, 2015a). However, it is foreseeable that construction traffic associated with that project would overlap and be additive with the Proposed Action construction traffic. Significant cumulative traffic impacts of the Coastal Campus would mainly occur on Silver Strand Boulevard. Mitigation proposed includes establishment of truck routes and construction worker carpooling. Additive construction traffic from the Proposed Action would be minor by comparison.

Construction of future phases of the Hotel Del Coronado Master Plan would not likely occur at the same time as the Proposed Action and therefore would not be cumulative.

During construction of Alternative 1 or 2, an average of 4 to 5 delivery trucks and construction worker vehicles would travel to and from NAS North Island each work day (Monday through Friday) for two

years. This would result in temporary construction traffic on the main access routes in Coronado and Silver Strand Boulevard.

While construction transportation impacts of the Proposed Action would be minor and last less than two years, cumulative construction transportation impacts from other present and future actions within the ROI may be significant. Minimization measures, such as limiting truck traffic to regular daytime working hours and coordinating delivery routes with other construction projects, would reduce these impacts.

5.4.5.3.2 Operations

Transportation impacts from past, present, and future actions within the ROI have contributed collectively to congested traffic conditions in Coronado.

As discussed in **Section 3.5** (Transportation), the 2008 SEIS and traffic study analyzed direct project impacts – projected traffic growth from the addition of two homeported aircraft carriers at NAS North Island, and cumulative impacts – traffic growth from annual traffic growth forecasts provided by SANDAG, future projects in the City of Coronado, and future planned and not yet identified projects at NAS North Island. Cumulative actions analyzed for NAS North Island in 2008 included: future planned projects noted above: Helicopter Wings Realignment and MH-60R/S Helicopter Transition, NBC Lodge Expansion, Hotel del Coronado Master Plan, and estimated additional traffic that might occur in future years as a result of other not yet identified projects at NAS North Island, such as the Proposed Action. The NAS North Island cumulative projects totaled an estimated 4,000 ADT and represented the maximum scenario (Navy, 2008a).

Table 5.4-1 provides a summary of 2008 traffic study assumptions of the cumulative traffic growth at NAS North Island through 2030.

Table 5.4-1: Traffic Growth Assumed for Future Projects at NAS North Island from 2008 Traffic Study

2008 Assumed Cumulative Project	*Traffic Generator*	*Projected 2015-2030 Traffic Growth (ADT)*
NBC Lodge Expansion	220 rooms (10 trips per room[1])	2,200
Helicopter Wings Realignment (MH-60)	200 personnel	500
Other unidentified projects	conservative estimate	1,300
Total	**Future ADT Assumed**	**4,000**

Source: Navy, 2008a
Note: [1] Lodges and hotels/motels are estimated at 8 to 10 trips per day per room (San Diego Association of Governments [SANDAG], 2002).

The projected 4,000 ADT in cumulative NAS North Island traffic growth included in the 2008 traffic study was evaluated to determine whether or not additional projects have been planned since the 2008 SEIS that might contribute to cumulative traffic growth that would exceed 4,000 ADT. The evaluation also determined if the proposed traffic growth with Alternative 1 has already been accounted for in the 2008 traffic study.

Table 5.4-2 presents the current status of cumulative traffic projects at NAS North Island along with proposed traffic under Alternative 1.

Table 5.4-2: Cumulative Traffic Volume Growth at NAS North Island

Cumulative Project	*Cumulative Projects Status*	
	Project Developments	***Projected 2015-2030 Growth Updated 2017 (ADT)***
Future cumulative projects assumed in 2008	--	4,000
NBC Lodge Expansion	170 rooms (10 trips per room[1]	(1,700)
Helicopter Wings Realignment (MH-60)	800 personnel	(860 [2])
Proposed Action Alternative 1 (2028)	341 personnel	(340)
TOTAL Current Status of Uncommitted ADT	**No additional additive projects identified**	**1,100[3]**

Notes:

[1] Project was later revised to net total of 170 new rooms with no future phases planned.

[2] 800 personnel adjusted for on duty, vacation, temporary or active duty, training, non-commuting, and carpools = 345 at 2.5 trips/day. Does not include reductions for personnel deployed (Navy, 2011a).

[3] With Alternative 1, there would be a balance of 1,100 ADT remaining of the 4,000 ADT growth assumption that has not yet been committed to a planned project. With Alternative 2, the balance would be 1,280.

The table shows that traffic growth that would result from operation of Alternative 1 or Alternative 2 at full implementation in 2028 was captured in the 2008 SEIS traffic study. Since 2008, projects implemented at NAS North Island have accounted for approximately 2,560 ADT of that future growth, leaving an uncommitted balance of 1,440 ADT under the maximum traffic volume scenario. Additional personnel under Alternative 1 would generate and use approximately 340 ADT of the remaining assumed traffic growth at NAS North Island, leaving an uncommitted balance of 1,100 ADT. Under Alternative 2, the uncommitted balance would be 1,280 ADT.

The Hotel del Coronado Master Plan includes projects for room expansion and other improvements. The expansion project was anticipated in the 2008 study and projected ADT from that project was included in the cumulative growth traffic volumes (Navy, 2008a). No other past, present, or reasonably foreseeable future projects have been identified that would increase ADT in the ROI. The total NAS North Island and City of Coronado cumulative traffic assumed in projections of the 2008 traffic study for year 2030 traffic volumes was 6,872 ADT (Navy, 2008a).

One present project, NBC Coastal Campus, is projected to result in a decrease in ADT at several Coronado intersections because approximately 1,600 personnel are scheduled to transfer from NAB to the Coastal Campus (Navy, 2015a). These personnel now travel through Coronado and after construction of the Coastal Campus are expected to travel through Imperial Beach to the Coastal Campus. This change would be expected to offset a portion of the cumulative traffic volume growth and provide some reduction in delay times at three Fourth Street intersections also used by traffic to/from NAS North Island: Glorietta Boulevard, Pomona Avenue, and Orange Avenue.

Therefore, while the Proposed Action would contribute a minor amount to cumulative traffic when considered with past, present, and reasonably foreseeable future projects, the cumulative traffic impacts have already been evaluated in the 2008 SEIS.

The 2008 study analyzed the cumulative traffic impacts projected for future year 2030 at the same 25 intersections analyzed for 2015 (refer to **Section 3.5** [Transportation]; **Figure 3.5-1**). **Table 5.4-3** shows the LOS forecast projected in the 2008 traffic study for 2030 assuming the scenario of three aircraft carriers in port with staggered work hours.

Table 5.4-3: Future Year (2030) Projected Cumulative Peak-Hour Intersection Level of Service from 2008 Traffic Study

Intersection	*Traffic Control*	*Peak Hour*	*Three Aircraft Carriers (Staggered Work Hours)*	
			Delay[1]	*LOS*
Alameda Boulevard/First Street	All-way stop	a.m.	245.9	F
		p.m.	102.1	F
Alameda Boulevard/Third Street	Two-way stop	a.m.	45.5	D
		p.m.	10.6	B
Alameda Boulevard/Fourth Street	All-way stop	a.m.	6.6	A
		p.m.	99.7	F
Alameda Boulevard/Ocean Boulevard	One-way stop	a.m.	40.7	E
		p.m.	270.8	F
D Avenue/First Street	Two-way stop	a.m.	29.1	D
		p.m.	161.7	F
D Avenue/Third Street	Two-way stop	a.m.	ECL	F
		p.m.	76.5	F
D Avenue/Fourth Street	Two-way stop	a.m.	58.4	F
		p.m.	ECL	F
D Avenue/Sixth Street	All-way stop	a.m.	8.3	A
		p.m.	10.9	B
Orange Avenue/First Street	Signalized	a.m.	11.2	B
		p.m.	203.7	F
Orange Avenue/Third Street	Signalized	a.m.	145.3	F
		p.m.	48.2	D
Orange Avenue/Fourth Street	Signalized	a.m.	20.1	C
		p.m.	192.2	F
Orange Avenue/Fifth Street	Two-way stop	a.m.	165.2	F
		p.m.	ECL	F
Orange Avenue/Sixth Street	Signalized	a.m.	17.0	B
		p.m.	20.8	C
Orange Avenue/Eighth Street	Signalized	a.m.	14.9	B
		p.m.	25.2	C
Orange Avenue/Tenth Street	Signalized	a.m.	21.7	C
		p.m.	30.3	C
Pomona Avenue/Third Street	One-way stop	a.m.	135.4	F
		p.m.	30.6	D
Orange Avenue/R.H. Dana Place	Signalized	a.m.	155.3	F
		p.m.	49.1	D
Pomona Avenue/Fourth Street	One-way stop	a.m.	28.2	D
		p.m.	856.4	F
Pomona Avenue/Glorietta Boulevard	Two-way stop	a.m.	10.9	B
		p.m.	20.9	C
Pomona Avenue/Silver Strand Boulevard	Signalized	a.m.	50.0	D
		p.m.	52.8	D
Glorietta Boulevard/Fourth Street	One-way stop	a.m.	165.7	F
		p.m.	31.0	D
Silver Strand Boulevard/Tarawa Road	Signalized	a.m.	325.4	F
		p.m.	112.9	F

Table 5.4-3: Future Year (2030) Projected Cumulative Peak-Hour Intersection Level of Service from 2008 Traffic Study (cont.)

Intersection	*Traffic Control*	*Peak Hour*	*Three Aircraft Carriers (Staggered Work Hours)*	
			Delay[1]	*LOS*
Silver Strand Boulevard/Tulagi Road	Signalized	a.m. p.m.	3.9 13.9	A B
Cesar E Chavez Parkway/Logan Avenue	Signalized	a.m. p.m.	19.2 153.0	B F
National Avenue/SR-75 Off-Ramp	One-way stop	a.m. p.m.	10.1 11.6	B B

Source: Navy 2008a
Notes: (1) Delay measured in seconds per vehicle
ECL = Exceeds Calculable Limit, reported when delay exceeds 180 seconds. LOS E or F are indicated in red.

The 2008 traffic impact study estimated that by 2030, delay times were projected to be greater than the 2015 delay times. In either forecasted year, the traffic operations at the 16 referenced intersections would continue to be functioning at unacceptable delays greater than 55 seconds (LOS E or F).

The 2008 SEIS acknowledged that, as a whole, NAS North Island is a major contributor to average traffic volumes in the area. However, NAS North Island-related traffic exists within the context of failed traffic operating conditions within the local road network, conditions that collectively are the result of growth in population, development, and tourism within the City of Coronado. To reduce the level of traffic, the Navy committed to stagger work times when three aircraft carriers are simultaneously in port on an average of 29 non-consecutive days per year. The Navy also reduces congestion by using personnel to control exiting NAS North Island traffic, implementing adjustments based on daily traffic monitoring, managing truck access and delivery routes, encouraging carpools and vanpools, and subsidizing public transportation.

The 2008 SEIS analyzed several proposed traffic improvement measures at intersections projected to be LOS E or F and that are primarily impacted by NAS North Island traffic. Such measures would potentially reduce cumulative NAS North Island and City of Coronado traffic impacts substantially, at all but one intersection (Fourth Street and Alameda Boulevard), to a level below applicable significance thresholds (LOS D or better). The following intersection upgrades were suggested for five congested intersections in Coronado that are impacted by NAS North Island traffic and offer the most practicable application of possible mitigation strategies for the impact of NAS North Island commuters on local roads.

- Alameda Boulevard/First Street– Navy traffic guard manages four in-bound traffic lanes in a.m. peak period.
- Alameda Boulevard/Fourth Street– Navy to add a separate right-turn lane; City of Coronado would install a traffic signal.
- Orange Avenue/First Street – City of Coronado would re-stripe to add a shared right-turn/bike lane, restrict parking and loading during p.m. peak, or relocate by narrowing median on Orange.
- Orange Avenue/Third Street – City of Coronado would widen Third Street to add second left-turn lane.
- Orange Avenue/Fourth Street – Add third left-turn lane on Orange or re-stripe Orange Avenue to add fourth travel lane and relocate 12 on-street parking spaces and bus stop. Neither option

improves operation of the intersection above significance thresholds during the p.m. peak period.

The Navy has implemented on-base mitigation actions. The City of Coronado is moving forward with plans to install a new traffic signal at Alameda Boulevard/Fourth Street by February 2018. The signal would generate platooning of vehicles within NAS North Island, which would improve northbound and southbound connectivity across McCain Boulevard/Fourth Street for all users (vehicles, bicyclists and pedestrians).

NBC continues to study measures to improve traffic operations, both on NAS North Island and on the streets of Coronado. The Proposed Action contributes minor additive traffic impacts to existing significant cumulative traffic impacts, for which mitigation measures have already been analyzed. The Navy continues to work with the City of Coronado and California Department of Transportation on viable solutions to mutual traffic concerns. The Navy also works with SANDAG on a regular basis to improve the Transportation Incentive Program at NAS North Island.

5.4.5.3.3 Alternative Transportation

Through the NBC Transportation Improvement Program and roadway improvement planning for access routes to NAS North Island, the Navy continues to work with SANDAG and the City of Coronado to plan for the enhancement of the local and regional transportation system to provide military personnel and residents with increased options for transportation.

5.4.6 Biological Resources

5.4.6.1 Description of Geographic Study Area

The ROI for cumulative biological resource impacts consists of the areas surrounding the construction project area and NAS North Island.

5.4.6.2 Relevant Past, Present, and Future Actions

The past, present, and reasonably foreseeable projects that have the greatest potential to interact with the Proposed Action and cumulatively impact biological resources include actions that involve ongoing or future aircraft operations: the Hawaii-Southern California Training and Testing EIS/OEIS, Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet, and Helicopter Wings Realignment and MH-60R/S Helicopter Transition. In addition, one construction project, Paint Booth (MILCON P-1022), would be located in close proximity to the MAT site at NAS North Island.

5.4.6.3 Cumulative Impact Analysis

The Proposed Action, when taken into consideration with currently ongoing and reasonably foreseeable future actions that would result in an increase of aircraft operations at NAS North Island, or in the surrounding regional airspace, could result in cumulative effects to wildlife including migratory birds, Birds of Conservation Concern, and federally listed species due to noise and Bird/Animal Aircraft Strike Hazard (BASH) effects. The potential exists for additive effects when the Proposed Action is taken into consideration with the aforementioned actions that would result in increased operations. As discussed in **Section 5.4.2**, noise impacts associated the Proposed Action combined with past, present, and future aircraft operations within the ROI would not be cumulatively significant because the noise study results show a negligible cumulative impact on the noise environment. The Proposed Action would result in an increase in aircraft operations within the ROI by 14 percent under Alternative 1, and 7 percent under Alternative 2. However, there would be no change to the existing flight path or procedures.

Cumulatively, there would be a net increase in aircraft operations at NAS North Island and within the region and there is a potential for individual California least tern or western snowy plover to be affected by a strike. No attractants would be created under that would increase the concentration of birds at the airfield. In addition, current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. Aircraft occasionally strike California least tern and western snowy plover at NAS North Island under baseline conditions. Based on the last 35 years of records of BASH incidents kept for NAS North Island, 7 incidents of aircraft striking California least tern and 2 incidents of aircraft striking western snowy plover have been documented at NAS North Island. Given the overall very low numbers of BASH incidents compared to the number of existing aircraft operations, this increase would not be expected to cause an increase in take above that already authorized in the Airfield BO. Therefore, the Proposed Action would not result in a significant cumulative impact to federally listed species (California least tern and western snowy plover) and bird species protected under the Migratory Bird Treaty Act (MBTA) as a result of BASH.

The Proposed Action would not conduct construction activities within 300 feet of the MAT site during the California least tern breeding season. No heavy construction would occur within 500 feet from the MAT site during the California least tern breeding season. Construction greater than 500 feet from the existing MAT site that may result in noise or visual impacts to nesting California least terns (e.g., building demolition, jackhammering) would be conducted outside of the breeding season to the maximum extent practicable. All construction activities proposed during the breeding season would be reviewed on a weekly basis by the NBC Wildlife Biologist. If the NBC Wildlife Biologist determines that proposed activities have the potential to disrupt nesting terns, a Biological Monitor would observe California least tern nesting at the MAT site during those activities to determine whether nesting is being disrupted. If the Biological Monitor determines that nesting is being disrupted, the Navy would stop work and coordinate with the Carlsbad USFWS Office to review additional avoidance/minimization measures that can be implemented. Upon agreement as to the necessary revisions to the avoidance/minimization approach, work may resume subject to the revisions and continued nest monitoring until California least tern nesting at the MAT site is complete. All cranes or other tall equipment would be lowered when not in use to preclude raptor and corvid perching. As such, the Navy concluded that these activities *may affect but are not likely to adversely affect* and are not likely to jeopardize the continued existence of the California least tern. Therefore, the Proposed Action, when taken into consideration with currently ongoing and reasonably foreseeable future actions would not be expected to have a significant cumulative impact to the California least tern.

The Proposed Action would have no effect on aquatic resources or marine mammals, and minor impacts to terrestrial species would not be additive with those of the current and foreseeable future projects; therefore, no cumulative construction-related effects would occur. In addition, the Proposed Action would have no effect on threatened and endangered species habitat (including nesting areas), vegetation, terrestrial wildlife, marine wildlife, or aquatic biological resources.

Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects would not result in significant biological resources impacts within the ROI.

5.4.7 WATER RESOURCES

5.4.7.1 Description of Geographic Study Area

The ROI for water resources cumulative impacts includes NAS North Island and adjacent San Diego Bay.

5.4.7.2 Relevant Past, Present, and Future Actions

NAS North Island was acquired by the U.S Government in 1917 to develop a permanent military base. Over time the land surrounding San Diego bay has become highly urbanized. There are numerous relevant past, present, or reasonably foreseeable future actions listed in **Table 5.3-1** that involve construction and redevelopment and have the potential to impact surface water quality. The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the Proposed Action and cumulatively impact water resources include 14 MILCON projects and other demolition, repair, and renovation projects. Non-military projects include planning projects, traffic improvements, and stormwater improvements. Soil disturbance associated with construction, demolition, or renovation activities associated with the military and non-military projects could result in impacts to surface water quality.

5.4.7.3 Cumulative Impact Analysis

The Proposed Action combined with past, present, and reasonably foreseeable would not impact groundwater aquifers in the vicinity of NAS North Island.

The Proposed Action, when taken into consideration with present and reasonably foreseeable future actions within the ROI would not be anticipated to have a significant cumulative impact to surface water from an increase in turbidity because construction and demolition activities would be minimized with the adherence to erosion and stormwater management practices and implementation of best management practices (BMPs) according the site-specific SWPPPs developed as required by state and federal statutes and guidelines. The Navy would obtain authorization from the California State Water Resources Control Board under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ/NPDES No. CAS000002) for construction activities conducted under the Proposed Action. In addition, infrastructure improvements would be required to follow post-construction state and federal guidelines to ensure water quality is protected and potential increases in runoff are minimized including the Energy Independence and Security Act of 2007; Navy Low Impact Development standards; Chief of Naval Operation Instruction 4100.5E; Executive Order (EO) 13834, *Efficient Federal Operations*; and the NBC NPDES Permit. Construction and operations activities are not anticipated to degrade the water quality or affect beneficial uses of surface water resources. Therefore, the Proposed Action combined with the past, present, and reasonably foreseeable future projects would not result in significant cumulative impact to water resources.

The Proposed Action would not affect existing wetlands and floodplains. Other projects impacting water resources, floodplains, or wetlands would implement regulatory required mitigation.

5.4.8 INFRASTRUCTURE

5.4.8.1 Description of Geographic Study Area

The ROI for cumulative infrastructure impacts consists of NAS North Island.

5.4.8.2 Relevant Past, Present, and Future Actions

The majority of the identified projects in **Table 5.3-1** consist of various improvements throughout the ROI including the updating of facilities and infrastructure. These improvements generally improve the condition and lifespan of infrastructure as well as potentially reduce energy and water consumption because they would comply with the Energy Independence and Security Act of 2007, Navy Low Impact Development standards, Chief of Naval Operation Instruction 4100.5E, and EO 13834, *Efficient Federal*

Operations, all of which set standards and goals for energy and water efficiency for federal construction and renovation projects.

Relevant actions include those that would increase the population or mission at NAS North Island and thereby affect the capacity of available infrastructure as well as those that would result in the generation of construction and demolition debris. One action was identified that would increase the population and mission at NAS North Island, the Helicopter Wings Realignment and MH-60R/S Helicopter Transition. This action, nearing completion by 2018, will increase the number of helicopters based at NAS North Island by 52 and result in an increase of 800 personnel. The majority of the identified actions entail construction, renovation, or demolition, all of which would result in the generation of construction and demolition debris.

5.4.8.3 Cumulative Impact Analysis

When past, present, and reasonably foreseeable projects are analyzed together with the Proposed Action, there would be an overall increase to the demand on utilities that service NAS North Island and the surrounding communities. Cumulative infrastructure impacts that would occur with implementation of the Proposed Action would include potential increases in energy use, water consumption, and wastewater generation from the added population as well as generation of construction and demolition debris from the numerous construction and demolition actions. The Proposed Action would result in an increase in water use (87,000 gallons per day and 98 acre-feet per year) and wastewater (0.053 million gallons per day [MGD]). Navy V-22 wash rack use would potentially increase discharge of oil recovery plant wastewater by 3,250 gallons per day. Construction and operations would increase solid waste. The waste flow would be minimized through mandatory recycling practices, and the existing landfill capacity would accommodate the waste. However, there remains ample capacity to absorb the cumulative increases in utility consumption and generation of construction and demolition debris. In addition, based on improvements planned for these utilities, it is anticipated that these utilities would continue to expand and be upgraded as needed to accommodate the future growth and development of the region. None of the proposed projects involve excessive construction/paving activities that would drastically increase impervious surface at NAS North Island. Therefore, based on the planned utility improvements likely to be implemented along with the future projects, there would be no significant cumulative impact to utilities.

5.4.9 CULTURAL RESOURCES

No cultural resources would be affected by the Proposed Action; therefore, there would be no cumulative impacts to cultural resources.

5.4.10 HAZARDOUS MATERIALS AND WASTES

5.4.10.1 Description of Geographic Study Area

The ROI for cumulative impacts to hazardous materials and waste consists of NAS North Island.

5.4.10.2 Relevant Past, Present, and Future Actions

The past, present, and reasonably foreseeable future actions that have a potential to use hazardous materials or generate hazardous waste at NAS North Island include building demolition/modification projects that may require the disposal of small quantities of asbestos containing materials or lead-based paint. Projects with the potential for cumulative impacts to hazardous materials and waste include those with ground disturbance and demolition/modification. The majority of projects identified in **Table 5.3-1**

consist of various improvements throughout the ROI including the updating of facilities and infrastructure and introduction of new aircraft.

5.4.10.3 Cumulative Impact Analysis

When past, present, and reasonably foreseeable future projects are analyzed together, there may be an overall increase of the amount of hazardous materials handled and amounts of hazardous wastes generated from the construction, renovation, and demolition of facilities, and the operation and maintenance of new aircraft. The Proposed Action would result in minor hazardous materials and wastes generated from demolition, construction, operations, and maintenance. Any identified asbestos-containing material (ACM), lead-based paint (LBP)-, or PCB-containing materials would be removed before demolition or construction/renovation activities, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements. However, the Proposed Action would not result in a significant impact to the hazardous materials and waste management program at NAS North Island and would not require new EPCRA reporting requirements. Similarly, any hazardous materials and wastes associated with other construction and demolition projects planned would continue to be collected and managed on site in accordance with the installation's Hazardous Waste Management Plan. In addition, existing procedures for the safe handling, use, and disposal of hazardous substances and waste would be followed. Therefore, there would be no significant cumulative impact to hazardous wastes and materials.

5.4.11 SOCIOECONOMICS

5.4.11.1 Description of Geographic Study Area

The ROI for cumulative socioeconomic impacts is the City of Coronado and San Diego County.

5.4.11.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that might interact with the socioeconomic impacts of the Proposed Action include all the projects listed in **Table 5.3-1**. The Navy's total contribution to the San Diego region includes approximately 34,600 military and civilian positions and associated direct and indirect spending in the economy (Bourbeau, 2016).

Relevant actions that increase personnel and therefore have socioeconomic impacts are the Three NIMITZ-Class Aircraft Carriers and the Helicopter Wings Realignment and MH-60R/S Helicopter Transition.

5.4.11.3 Cumulative Impact Analysis

The Proposed Action construction activities would have a minor, temporary benefit to the economy of San Diego County that would be cumulative with beneficial economic impacts of the past, present, and reasonably foreseeable construction projects.

Cumulative long-term socioeconomic impacts from past, present, and future actions within the ROI would be less than significant because the combined actions do not represent any major shift in population or associated socioeconomic effects in the ROI.

The Proposed Action would have a minor increase to population, employment, housing, schools, and child care of San Diego County. The homeporting of the third CVN and the Helicopter Wings Realignment combined with the Proposed Action do not significantly change personnel levels and associated family populations at NAS North Island and in San Diego County compared with past levels.

Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant socioeconomic impacts within the ROI.

5.5 CONCLUSION

Based on the preceding analysis of each resource potentially impacted by the Proposed Action, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant cumulative impacts within the ROI.

6 EAST COAST FLEET LOGISTICS CENTER AFFECTED ENVIRONMENT

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives.

All potentially relevant environmental resource areas were initially considered for analysis in this Environmental Assessment (EA). In compliance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ), and 32 Code of Federal Regulations (CFR) part 775 guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. This section includes airfields and airspace, noise, public health and safety, air quality, transportation, biological resources, water resources, infrastructure, cultural resources, hazardous materials and waste, and socioeconomics.

The potential impacts to the following resource areas are considered to be negligible or non-existent (refer to **Section 1.5** [Scope of Environmental Analysis]), so they were not analyzed in detail in this EA: land use compatibility, community/emergency services, parks, and recreation.

6.1 AIRFIELDS AND AIRSPACE

This discussion of airspace includes current uses and controls of the airspace. The Federal Aviation Administration (FAA) manages all airspace within the U.S. and its territories. Airspace, which is defined in vertical and horizontal dimensions and by time, is considered a finite resource that must be managed for the benefit of all aviation sectors, including commercial, general, and military aviation (FAA, 2017a).

This section describes the existing airfield operations at Naval Station (NS) Norfolk and airspace in which the Navy V-22 would operate in the vicinity of their home base location.

6.1.1 REGULATORY SETTING

Specific aviation and airspace management procedures and policies to be used by the Navy are provided by Office of the Chief of Naval Operations Instruction (OPNAVINST) 3710.7V *Naval Aviation Training and Operating Procedure Standardization General Flight and Operating Instructions* and OPNAVINST 3770.2L, *Airspace Procedures and Planning Manual*. The Navy also follows all FAA procedures and policies found in FAA Order JO 7110.65W, *Air Traffic Control*, and FAA Order JO 7110.10Y, *Flight Services*.

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the U.S. and its territories. Navigable airspace is considered to be airspace above the minimum altitudes of flight, typically 500 feet or greater, prescribed by regulations under United States Code (U.S.C.) Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the take-off and landing of aircraft (49 U.S.C. § 40102).

Congress has charged the FAA with responsibility for developing plans and policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of the airspace (49 U.S.C. § 40103[b]; FAA Order JO 7400.2L [FAA, 2017b]). The FAA considers multiple and sometimes competing demands for airspace in relation to commercial, general, and military aviation. Specific rules and regulations concerning airspace designation and management are listed in FAA Order JO 7400.2L (FAA, 2017b). Special Use Airspace (SUA) is airspace of defined dimensions wherein activities must be confined because of their nature or wherein limitations may be imposed upon aircraft operations that are not a part of those activities (FAA, 2017a). The types of

SUA areas are prohibited areas, restricted areas, military operations areas (MOAs), warning areas, alert areas, controlled firing areas, and National Security Areas.

SUA relevant to the Proposed Action are defined below.

- **Restricted Area.** Airspace designated to support ground or flight activities that could be hazardous to non-participating aircraft. Entry into restricted areas without approval from the using or controlling agency is prohibited.
- **Military Operations Area.** A MOA is established to separate certain non-hazardous military activities from Instrument Flight Rules (IFR)[6] aircraft traffic and to identify for Visual Flight Rules (VFR) aircraft traffic where military activities are conducted. MOAs exist at altitudes up to, but not including, 18,000 feet mean sea level (MSL). Air Traffic Control Assigned Airspace is an extension of the MOA above 18,000 feet. Civilian VFR traffic is allowed in MOAs, in which case both civilian and military aircraft use "see-and-avoid" procedures. Generally, civilian pilots avoid flying through MOAs because of the likelihood of encountering a fast-moving military jet.
- **Warning Area**. A warning area is airspace of defined dimensions, extending from three nautical miles outward from the coast of the United States, that contains activity that may be hazardous to non-participating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

6.1.2 AFFECTED ENVIRONMENT

The affected environment is the airfield at NS Norfolk and airspace in which the Navy V-22 would operate in the vicinity. The airfield at NS Norfolk is called Chambers Field. The airfield consists of parking apron space and aircraft hangars, along with a variety of weapons storage facilities, fuel storage areas, and general maintenance/storage warehouses. The airfield elevation is 14 feet MSL and there are taxiways throughout the airfield of varying widths.

Chambers Field has a single Class B runway configuration for fixed-wing operations, Runway 10/28. It is 8,371 feet long and 200 feet wide. Runways are numbered according to their magnetic heading for aircraft on approach or departure. For example, on Runway 10/28, the numbers 10 and 28 signify this runway is most closely aligned with compass headings of 100 and 280 degrees, respectively. An additional Class A runway, Runway 09/27, is used for helicopter take-off and landing only and is located on Willoughby Bay, north of the main runway. It is 1,600 feet long and 150 feet wide.

Fixed-wing and rotary-wing aircraft utilize Chambers Field. Fixed-wing aircraft using Chambers Field include the E-2, C-2A, C-9, C-130, C-5, and F/A-18. Rotary-wing aircraft include the MH-60, SH-60/HH-60, MH-53, CH-46E, and MV-22B. Eleven rotary-wing squadrons of 137 aircraft and seven fixed-wing squadrons of 53 aircraft are home based at Chambers Field, plus three tenant commands hosting transient aircraft.

The basic flight operations at Chambers Field are departures, straight in/full-stop arrivals, overhead arrivals, touch-and-go operations, low approaches, and ground-controlled approaches. The airfield is operational 24 hours a day, 365 days a year. Current C-2A annual airfield operations total approximately 7,000.

[6] The Federal Aviation Regulations define IFR as "rules and regulations established by the FAA to govern flight under conditions in which flight by outside visual reference is not safe."

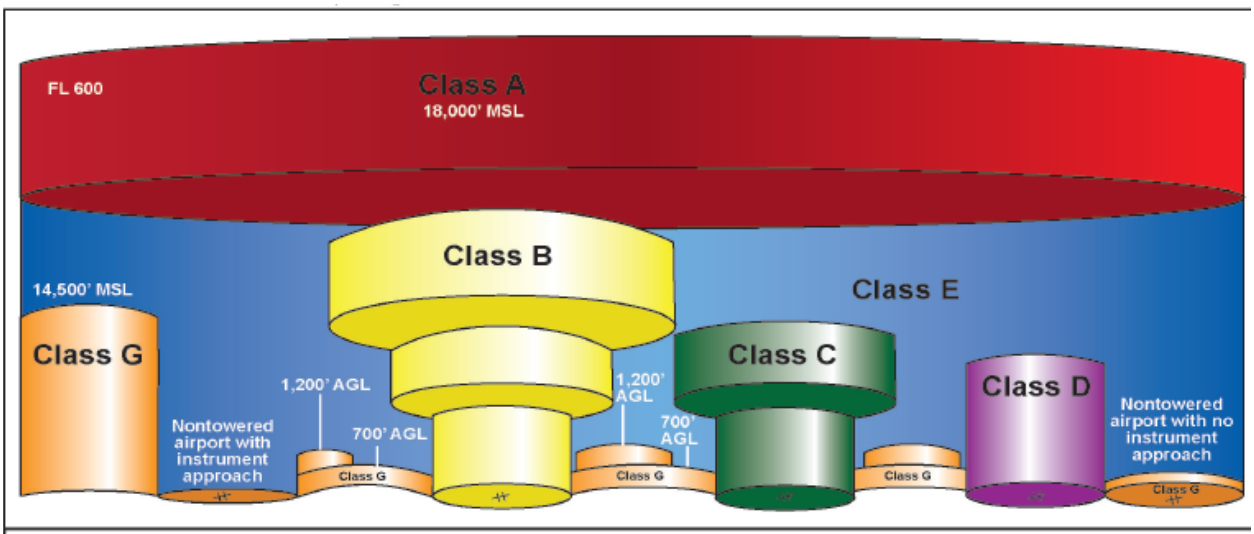
The use of airspace over NS Norfolk is dictated by the FAA National Airspace System. This system is designed to ensure the safe, orderly, and efficient flow of commercial, private, and military aircraft. Chambers Field is located within Class D controlled airspace, which roughly encompasses an area within a 4.3-nautical mile radius of the center of NS Norfolk that extends upward to, but not including, 2,000 feet MSL. Norfolk International Airport's Class C controlled airspace overlies all of Chambers Field's Class D Airspace (**Figure 6.1-1** and **Figure 6.1-2**).

The main Air Traffic Control tower located to the south of Runway 10/28 at Chambers Field directs traffic within the Class D airspace entering, exiting, or taxiing at the airfield. In addition, a separate air traffic control tower is located near Runway 09/27 specifically for helicopter operations.

Chambers Field's operational areas include several SUA areas. SUA in the region primarily includes Restricted Areas and Warning Areas. SUA proximate to Chambers Field include:

- **Restricted Area R-6606.** Located off shore to the east of Chambers Field.
- **Warning Areas W-50A/B/C, W-72A/B, and W-386.** Located off shore to the east of Chambers Field.

Aircraft flying patterns at, arriving at, or departing from Chambers Field normally fly routes called flight tracks. Flight tracks were developed to aid in the safe and efficient flow of air traffic and were established based on community impact, obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as current operational characteristics of the aircraft operating at both airfields. Although flight tracks are represented as single lines on maps, they actually depict the predominant path of the aircraft over the ground. The actual path of an aircraft over the ground is affected by aircraft performance, pilot technique, other air traffic, and weather conditions.



Controlled Airspace

Class A airspace is from 18,000 ft MSL up to and including FL 600. Unless otherwise authorized, all operation conducted under IFR.	**Class B** airspace is from the surface to 10,000 ft MSL surrounding major airports. Individually tailored to each airport and consisting of a surface area and two or more layers. ATC clearance is required for all aircraft to operate in the area.	**Class C** airspace is from the surface to 4,000 ft above the airport elevation surrounding airports that have an operational control tower, serviced by radar approach control, and certain number of IFR operations.Usually consists of a 5 NM radius surface area with an outer circle with a 10 NM radius that extends from 1,200 to 4,000 ft above the airport elevation. Aircraft must maintain communications with the ATC.	**Class D** airspace is from the surface to 2,500 ft above the airport elevation surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored. Unless otherwise authorized, aircraft must maintain communications with the ATC.	**Class E** airspace is the portion of the controlled airspace that has not been designated as Class A - D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace.

Uncontrolled Airspace

Class G airspace is the portion of the airspace that has not been designated as Class A - E. It is therefore designated uncontrolled airspace and extends from the surface to the base of the overlying Class E airspace. VFR minimums apply.

Figure 6.1-1: Schematic Diagram of Airspace Classes

Figure 6.1-2: Aeronautical Chart NS Norfolk, Chambers Field

6.2 NOISE

This discussion of noise includes the types or sources of noise and the associated sensitive receptors in the human environment. Noise in relation to biological resources and wildlife species is discussed in **Section 6.6** (Biological Resources).

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

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

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. While aircraft are not the only sources of noise in an urban or suburban environment, they are readily identified by their noise output and are given special attention in this EA.

6.2.1 BASICS OF SOUND AND A-WEIGHTED SOUND LEVEL

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The dB is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or hertz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" to the measurement unit in order to identify that the measurement has been made with this filtering process A-weighted sound levels (dBA). In this document, the dB unit refers to dBA. **Table 6.2-1** provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

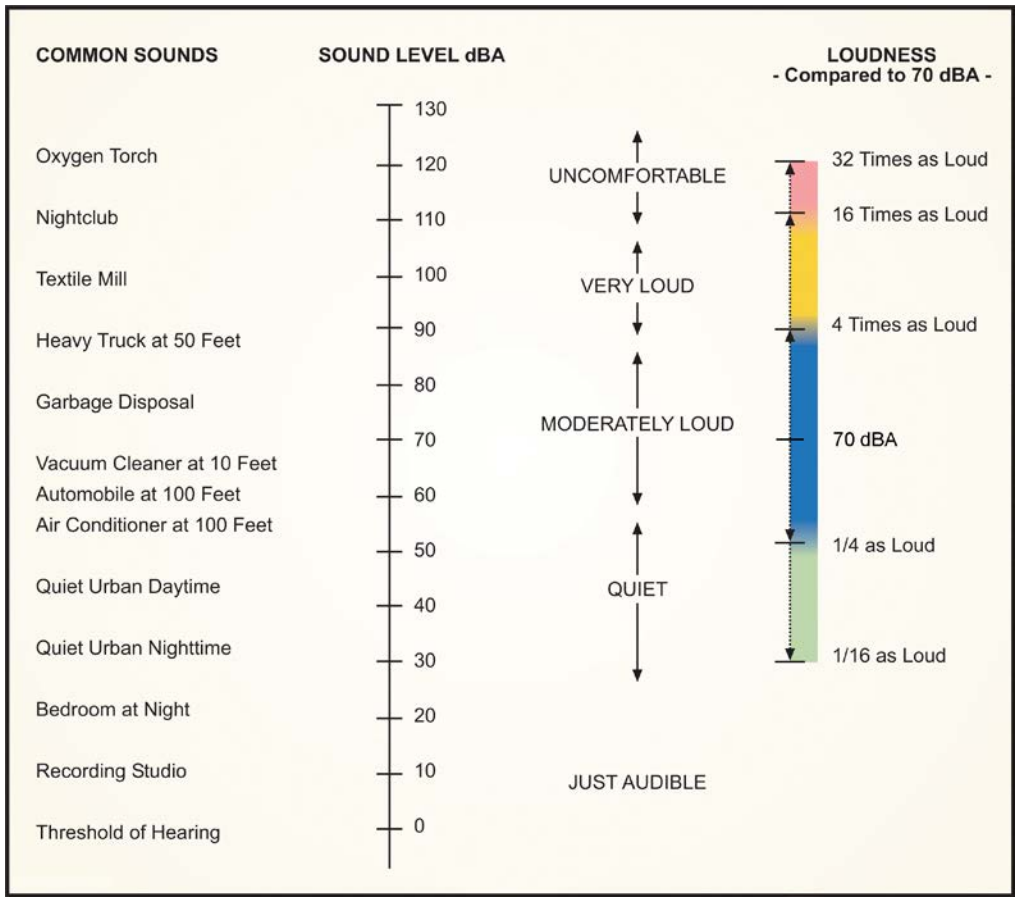
Table 6.2-1: Subjective Responses to Changes in A-Weighted Decibels

Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Figure 6.2-1 provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., automobile, heavy truck) are the maximum sound produced

during an event like a vehicle pass-by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

Noise levels from aircraft operations that exceed background noise levels at an airfield typically occur beneath main approach and departure corridors, in local air traffic patterns around the airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft in flight gain altitude, their noise contributions drop to lower levels, often becoming indistinguishable from the background noise.



Sources: Derived from Harris (1979) and Federal Interagency Committee on Aviation Noise (1997).

Figure 6.2-1: A-Weighted Sound Levels from Typical Sources

6.2.2 NOISE METRICS

A metric is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. The noise metrics used in this EA are described in summary format below and in a more detailed manner in **Appendix B**. While the Day-Night Average Sound Level (DNL) and Community Noise Equivalent Level (CNEL) noise metrics are the most commonly used tools for analyzing noise generated at an airfield, the Department of Defense (DoD) has been developing additional metrics (and analysis techniques). These supplemental metrics and analysis tools provide more detailed noise exposure information for the decision process and improve the discussion regarding noise exposure. The DoD Noise Working Group product, *Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental*

Metrics (DoD Noise Working Group, 2009) was used to determine the appropriate metrics and analysis tools for this EA.

6.2.2.1 Day-Night Average Sound Level

The DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10-dB adjustment assigned to noise events occurring between 10 p.m. and 7 a.m. (acoustic night). DNL values are average quantities, mathematically representing the continuous sound level that would be present if all of the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy received and is therefore a cumulative measure, but it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour day. DNL is the standard noise metric used by the United States (U.S.) Department of Housing and Urban Development, FAA, U.S. Environmental Protection Agency (USEPA), and DoD. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments; there is a consistent relationship between DNL and the level of annoyance. Most people are exposed to sound levels of 50 to 55 DNL or higher on a daily basis.

Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Urban Noise, 1980). Therefore, the 65 dB DNL noise contour is used to help determine compatibility of military aircraft operations with local land use, particularly for land use associated with airfields.

6.2.2.2 Community Noise Equivalent Level

CNEL is a noise metric adopted as a standard by the state of California and was used in **Section 4.2** for the noise analysis at Naval Air Station North Island. The CNEL metric is similar to the DNL metric and is also an energy-averaged sound level measurement. DNL and CNEL provide average noise levels taking into consideration and applying penalties for annoyance from intrusive events that occur during evening and nighttime hours. Both DNL and CNEL are measures of cumulative noise exposure over a 24-hour period, with adjustments to reflect the added intrusiveness of noise during certain times of the day. However, while DNL considers one adjustment period, CNEL reflects two adjustment periods. DNL includes a single adjustment period for night, in which each aircraft noise event at night (defined as 10 p.m. to 7 a.m.) is counted 10 times. CNEL adds a second adjustment period where each aircraft noise event in the evening (defined as 7 p.m. to 10 p.m.) is counted three times. The nighttime adjustment is equivalent to increasing the noise levels during that time interval by 10 dB. Similarly, the evening adjustment increases the noise levels by approximately 5 dB.

6.2.2.3 Sound Exposure Level

The Sound Exposure Level (SEL) metric is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of total sound energy of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL captures the total sound energy from the beginning of the acoustic event to the point when the receiver no longer hears the sound. It then condenses that energy into a 1-second period of time and the metric represents the total sound exposure received. The SEL has proven to be a good metric to compare the relative exposure of transient sounds, such as aircraft overflights, and is the recommended metric for

sleep disturbance analysis (DoD Noise Working Group, 2009). In this EA, SEL is used in aircraft comparison and sleep disturbance analyses.

6.2.2.4 Maximum Sound Level

The highest A-weighted sound level measured during a single event where the sound level changes value with time (e.g., an aircraft overflight) is called the maximum A-weighted sound level (L_{max}). During an aircraft overflight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. L_{max} defines the maximum sound level occurring for a fraction of a second. For aircraft noise, the "fraction of a second" over which the maximum level is defined is generally 1/8 second (American National Standards Institute, 2005). For sound from aircraft overflights, the SEL is usually greater than the L_{max} because an individual overflight takes seconds and the L_{max} occurs instantaneously. In this EA, L_{max} is used in the analysis of aircraft comparison and speech interference.

6.2.3 NOISE EFFECTS

An extensive amount of research has been conducted regarding noise effects including annoyance, speech interference, sleep disturbance, noise-induced hearing impairment, nonauditory health effects, performance effects, noise effects on children, effects on domestic animals and wildlife, property values, structures, terrain, and archaeological sites. These effects are summarized below. Environmental health and safety risks to children are also addressed in **Section 6.3** (Public Health and Safety).

6.2.3.1 Annoyance

As previously noted, the primary effect of aircraft noise on exposed communities is long-term annoyance, defined by USEPA as any negative subjective reaction on the part of an individual or group. The scientific community has adopted the use of long-term annoyance as a primary indicator of community response and there is a consistent relationship between DNL/CNEL and the level of community annoyance (Federal Interagency Committee on Noise, 1992).

DoD policy directive requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to DNL greater than or equal to 80 dB (DoD, 2009). Because the Proposed Action would not expose population to DNL/CNEL greater than or equal to 80 dB (refer to **Section 7.2** Noise), potential hearing loss is not analyzed in this EA.

6.2.3.2 Sleep Disturbance

The disturbance of sleep is a major concern for communities exposed to nighttime aircraft noise. In this EA, sleep disturbance uses the SEL noise metric and calculates the probability of awakening from single aircraft overflights. These are based upon the particular type of aircraft, flight profile, power setting, speed, and altitude relative to the receptor. The results are then presented as a percent probability of people awakening (USEPA, 1974).

6.2.3.3 Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 dBA as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss. Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document in 1998, which reaffirmed the 85 dB recommended exposure limit (National Institute for Occupational Health and Safety, 1998).

6.2.3.4 Vibration

Noise-induced structural vibration may cause annoyance to occupants because of induced secondary vibrations, or "rattle", of objects within the building. In general, rattling occurs at peak unweighted sound levels that last for several seconds at levels above 110 dB, which is well above that considered normally compatible with residential land use. Thus, assessments of noise exposure levels for compatible land use will also be protective of noise-induced rattle. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (Wyle, 2014).

6.2.4 NONAUDITORY HEALTH EFFECTS

Studies have been conducted to examine the nonauditory health effects of aircraft noise exposure, focusing primarily on stress response, blood pressure, birth weight, mortality rates, and cardiovascular health. Exposure to noise levels higher than those normally produced by aircraft in the community can elevate blood pressure and also stress hormone levels. However, the response to such loud noise is typically short in duration: after the noise goes away, the physiological effects reverse and levels return to normal. In the case of repeated exposure to aircraft noise, the connection is not as clear. The results of most cited studies are inconclusive, and it cannot be conclusively stated that a causal link exists between aircraft noise exposure and the various type of nonauditory health effects that were studied (DoD Noise Working Group, 2009).

6.2.4.1 Noise Effects on Children

A review of the scientific literature indicated that there has not been a tremendous amount of research in the area of aircraft noise effects on children. The research reviewed does suggest that environments with sustained high background noise can have variable effects, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of schoolchildren. Physiological effects in children exposed to aircraft noise and the potential for health effects have been the focus of limited investigation (DoD Noise Working Group, 2009).

6.2.5 NOISE MODELING

Computer modeling provides a tool to assess potential noise impacts. DNL/CNEL noise contours are generated by a computer model that draws from a library of actual aircraft noise measurements. Noise contours produced by the model allow a comparison of existing conditions and proposed changes or alternative actions, even when the aircraft studied are not currently operating from the installation. For these reasons, on-site noise monitoring is seldom used at military air installations, especially when the aircraft mix and operational tempo are not uniform. The Proposed Action would occur in Virginia and California; therefore, both DNL and CNEL standards are used for noise calculations in this EA.

The noise environment for this EA was modeled using NOISEMAP. NOISEMAP analyzes all the operational data (types of aircraft, number of operations, flight tracks, altitude, speed of aircraft, engine power settings, and engine maintenance run-ups), environmental data (average humidity and temperature), and surface hardness and terrain. The noise model assumes a mix of aircraft operating in both airplane mode (rotors horizontal) and conversion mode (rotors vertical), as discussed in **Section 2.1.4** (Aircraft Operations). For the noise analysis at NS Norfolk, the results of the modeling are DNL

noise contours, or lines connecting points of equal value, usually in 5-dB increments (e.g., 65 dB DNL and 70 dB DNL). The modeled DNL contours are depicted on noise contour maps, which provide a visual depiction of the overall geographic area covered by the different levels of noise. The DNL noise contour ranges used in this analysis include the following:

- 65 to less than 70 dB DNL
- 70 to less than 75 dB DNL
- Greater than or equal to 75 dB DNL

A newer model, called the Advanced Acoustic Model, has not yet been approved for use by the DoD. Per OPNAVINST 11010.36C, *Air Installations Compatible Use Zones (AICUZ) Program,* NOISEMAP is to be used for developing noise contours and is the best noise modeling science available today for fixed-wing aircraft until the Advanced Acoustic Model is approved.

6.2.6 REGULATORY SETTING

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

The joint instruction, OPNAVINST 11010.36C and Marine Corps Order 11010.16, provides guidance administering the AICUZ Program which recommends land uses that are compatible with aircraft noise levels.

6.2.7 AFFECTED ENVIRONMENT

The affected environment is the area surrounding NS Norfolk that experiences noise exposure of 65 dB or greater and any sensitive receptors in proximity to proposed construction. NS Norfolk's main source of noise is from aircraft operations. Chambers Field is the airfield associated with NS Norfolk. Major sources of noise at Chambers Field result from flight operations and maintenance or pre-flight engine run-ups of both fixed- and rotary-wing aircraft (Naval Facilities Engineering Command [NAVFAC], 2009). Other sources of noise at NS Norfolk stem from various industrial activities throughout the installation. These include steam and power generation, equipment maintenance, and operation and vehicle maintenance and operation. Areas of the installation adjacent to Interstate (I)-564 are subjected to traffic noise.

The federal government supports conditions free from noise that threaten human health and welfare and the environment. Response to noise varies, depending on the type and characteristics of the noise, distance between the noise source and whoever hears it (the receptor), receptor sensitivity, and time of day. A noise sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors may also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species. The nearest sensitive receptors are approximately 1 mile from the project site in the City of Norfolk. Potentially noise-sensitive wildlife species are discussed in **Section 6.6** (Biological) Resources.

6.2.7.1 Air Installations Compatible Use Zones Program

NS Norfolk has an active AICUZ Program that informs the public and local government about its aircraft noise environment and recommends specific actions for the local jurisdictions with planning and zoning authority that can enhance the health, safety, and welfare of those living near NS Norfolk. The current version of the AICUZ for NS Norfolk was published in the 2009 AICUZ Study for NS Norfolk Chambers Field (NAVFAC, 2009). The AICUZ area covers NS Norfolk and 3,400 acres in the Hampton Roads region of southeastern Virginia.

Three noise zones are identified in the NS Norfolk AICUZ Study (NAVFAC, 2009) as follows:

- Noise Zone 1: areas exposed to noise levels less than 65 DNL
- Noise Zone 2: areas exposed to noise levels of 65 to 75 DNL
- Noise Zone 3: areas exposed to noise levels greater than 75 DNL

OPNAVINST 11010.36C provides compatible land use recommendations for land uses within the noise contours and Accident Potential Zones (APZs) (NAVFAC, 2009). APZs are discussed in **Section 6.3** (Public Health and Safety). In general, the greatest potential for incompatible land use in the noise contours is residential development and other noise sensitive land uses, such as churches and schools. The Navy recommends such land uses be prohibited within Noise Zone 3 and discouraged within Noise Zone 2.

6.2.7.2 Noise Abatement Procedures

The following are operational noise abatement procedures that have been adopted at NS Norfolk Chambers Field:

- Pilots following approved and published flight patterns consistently and without deviation, provides the best possible solution for noise abatement.
- All aircraft personnel at NS Norfolk Chambers Field will comply with these procedures whenever possible, consistent with safety of flight.

6.2.7.2.1 Noise Abatement Hours

- Established from 11:00 p.m. to 7:00 a.m. Sunday night through Saturday morning and from 11:00 p.m. Saturday night until 1:00 p.m. Sunday afternoon. During these times, the following restrictions apply:
    (1) Landings and take-offs at the airfield are restricted to those necessary for operational or training flights.
    (2) Touch-and-go landings and low approaches are prohibited.
    (3) Maintenance engine/aircraft turn-ups (run-ups) are prohibited unless necessary for operational or training flights.
    (4) Afterburner take-offs are prohibited unless necessary for operational or training flights.

6.2.7.2.2 Engine Run-up/Turn-up Areas

- When Runway 28 is in use at NS Norfolk Chambers Field, pilots will perform run-ups on the northeast taxiway prior to taxiing to Runway 28. This will mitigate noise impacts from run-ups at the end of Runway 28 (near Merrimack Park) prior to take-off.
- When performing engine run-ups at the approach end of Runway 28, pilots should exercise caution in directing the prop or jet blast due to the close proximity of Patrol Road.

NS Norfolk Chambers Field is continuously evaluating noise abatement procedures and implements any changes as part of the ongoing process. For example, to reduce noise impacts to areas south of the airfield, when E-2s are operating on Runway 28 using left-hand traffic flow, they are required to climb to 500 feet prior to initiating their crossing turn (NAVFAC, 2009).

6.2.7.3 Aircraft Noise

For this EA, "baseline" conditions for aircraft operations take into account five full years (2011-2015) of air traffic control reports for Chambers Field. The baseline aircraft operations numbers were derived from taking the average of the operations over this five-year period. This allows a more accurate picture of current, ongoing operations at NS Norfolk. Operations vary from year to year due to global events. Some individual years are higher than the average, and some are lower than the average. **Table 6.2-2** shows the summary breakdown of baseline conditions for total aircraft operations, general type of operations, as well as the day/night breakdown of operations at NS Norfolk. For a more in-depth breakdown of aircraft operations at Norfolk, see **Appendix B**.

Table 6.2-2: Aircraft Operations under Baseline Conditions[1] at NS Norfolk

Operation Type[2]	*Acoustic Day (7:00 a.m. – 10:00 p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrival	12,700	4,500	17,200
Departure	12,700	4,500	17,200
Closed Pattern	21,900	7,500	29,400
Total	**47,300**	**16,500**	**63,800**

Notes:
[1]Baseline operations numbers are based on an average of five years of operations. As such, some individual years are higher than the average, and some are lower than the average.
[2]An operation is one take-off or one landing; numbers are rounded to the nearest 100.

Under baseline conditions, there are a total of approximately 63,800 annual operations on average at NS Norfolk. The majority of the operations occur during the day, with 47,300 total operations (approximately 74 percent), while 16,500 operations (approximately 26 percent) occur at night.

6.2.7.3.1 Noise Exposure

NS Norfolk baseline noise exposure expressed in DNL noise contours were calculated using NoiseMap 7.2 and plotted in 5-dB increments from 65 dB DNL to 85 dB DNL; the noise contours are shown on **Figure 6.2-2**. The 65 dB DNL and greater contours are elongated in an east–west direction due to the orientation of the runways at NS Norfolk. To the west of the runway, the 65 dB and greater DNL contours are contained on-base or extend over water. To the east, the 65 dB and greater contours create narrow bands that cover populated areas. However, much of the noise exposure is contained within NS Norfolk boundaries, or is over water.

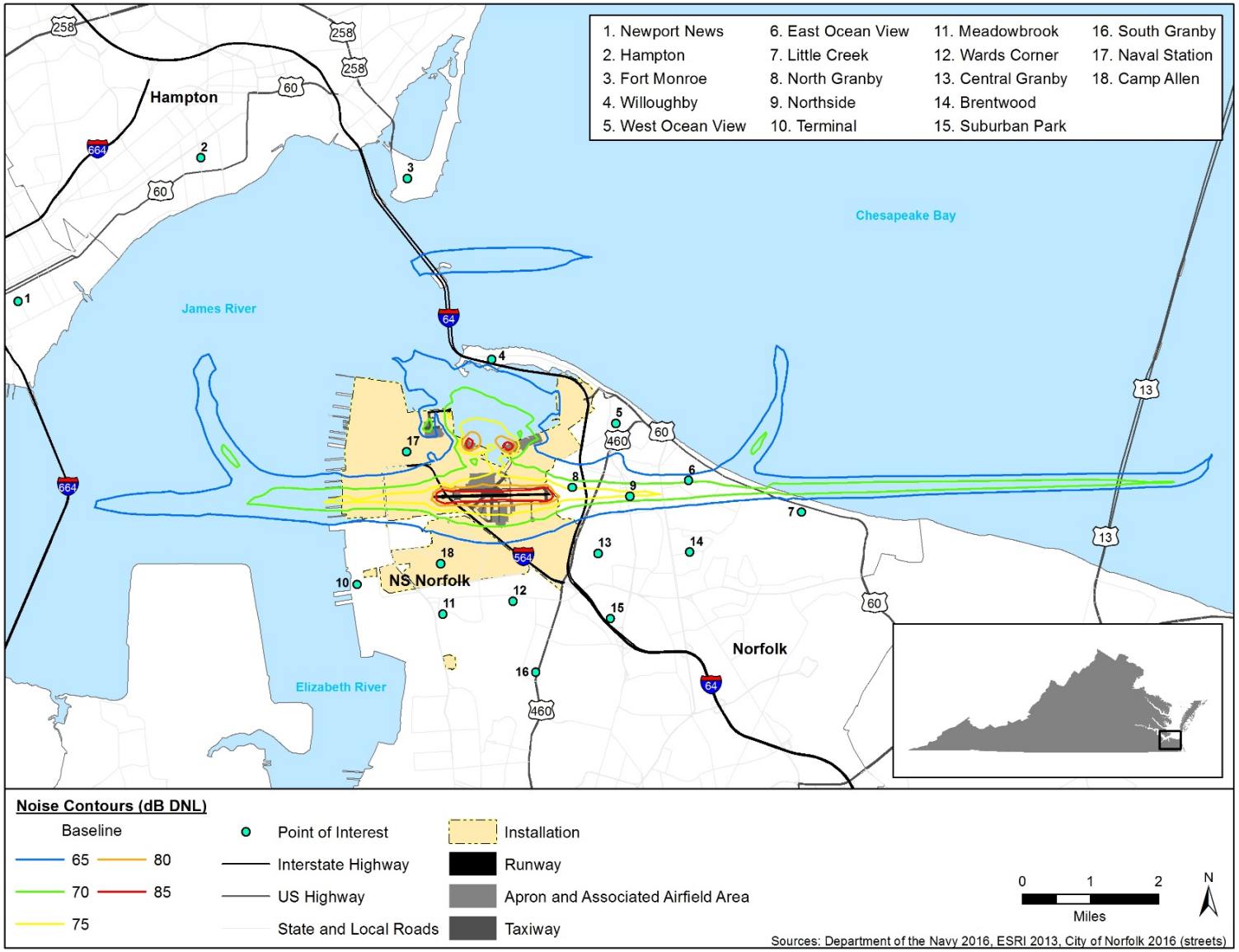


Figure 6.2-2: Baseline Conditions DNL Noise Contours and Point of Interest Locations at NS Norfolk

Table 6.2-3 presents total noise exposure in terms of estimated acreage and population under baseline conditions. Population estimates were calculated using census block group data from the 2015 U.S. Census Bureau (USCB) American Community Survey five-year estimates. Geographic Information Systems software was used to determine the area of each census block that was affected by the noise contours shown in **Figure 6.2-2,** and then used to estimate population affected within each block. Noise exposure is calculated by multiplying the total population by the ratio of areas affected by noise. This methodology assumes an evenly distributed population throughout the census block. Note that acreages reported and used for calculations exclude water bodies.

Table 6.2-3: Acreage and Estimated Population Impacts under Baseline Conditions

DNL (dBA)	*Total Acres[1]*	*Off-Base Acres[2]*	*Estimated Population[2, 3]*
85 or greater	174	0	0
80 or greater	340	4	0
75 or greater	809	124	1,053
70 or greater	1,828	539	5,382
65 or greater	3,432	1,312	13,382

Source: USCB, 2017

Notes:

[1]Acreages exclusive of water bodies.

[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 DNL or greater" means all acreage and population exposed to DNL at or greater than 65 dBA and includes the acres/population in the rows above.

[3]Population is based on even distribution of 2015 census block population data.

As shown in **Table 6.2-3**, no off-base exposure to DNL levels greater than 80 dB occur at NS Norfolk. It is estimated that 13,382 people are exposed to noise levels greater than 65 dB DNL; however, only 1,053 people are estimated to be exposed to levels of 75 dB or greater. The populations exposed to these levels are all located directly to the east of the runway at NS Norfolk.

6.2.7.3.2 Supplemental Noise Metrics Analysis

Several locations in the vicinity of NS Norfolk that may be sensitive to noise were selected as points of interest (POIs) for supplemental noise analysis. Because of the large number of possible POIs, which might include individual schools, hospitals, churches, etc., the surrounding area was broken into U.S. Census tracts, and smaller tracts combined into representative geographic areas. This allows for a diverse sample of points that are spread out relatively evenly by population such that they are a good surrogate for having hundreds of closely-spaced points representing individual churches, hospitals, schools, and neighborhoods. This process was coordinated with the NS Norfolk Community Plans and Liaison Officer and is consistent with past noise studies at NS Norfolk. The selected 18 POI locations are depicted in **Figure 6.2-2** and listed in **Table 6.2-4** along with the existing baseline DNL. DNL values range from a high of 75 dB DNL to a low of 44 dB DNL.

Table 6.2-4: Baseline Conditions DNL Values at Point of Interest Locations

POI Identification	*POI Name*	*DNL (dBA)*
1	Newport News	50
2	Hampton	44
3	Fort Monroe	51
4	Willoughby	62
5	West Ocean View	61
6	East Ocean View	69
7	Little Creek	57
8	North Granby	74
9	Northside	75
10	Terminal	55
11	Meadowbrook	53
12	Wards Corner	55
13	Central Granby	57
14	Brentwood	52
15	Suburban Park	48
16	South Granby	46
17	Naval Station	62
18	Camp Allen	59

Maximum Sound Level and Sound Exposure Level

While a cumulative metric such as DNL is excellent for showing the overall noise environment, it can also be of interest to know how loud the loudest events are at a particular location. To help answer these questions about the loudest events, calculations were made for each of the POIs to find the loudest events at each of them under baseline conditions. **Table 6.2-5** shows, for each POI, the aircraft and profile for the three events producing the highest SEL, and lists the SEL and the L_{max} for each. It also lists the number of daytime and nighttime events per day for each, and the total events per week. It allows for a demonstration that some "loud" events may occur in an area of a lower DNL. For instance, at POI #1 (Newport News), the point has a DNL value of 50 dB, and has about two weekly events of MH-53E flight operations with an L_{max} of 82.6 dB. This shows that even while the overall noise (represented by DNL) is considered low, there are some events that would be more noticeable.

A comparison of **Table 6.2-5** with **Figure 6.2-2**, which shows the locations of the POIs, reveals that the loudest events tend to occur closest to the airfield and nearest the flight tracks that align with the runways at NS Norfolk.

Table 6.2-5: SEL and L_{max} Values for Loudest Single Events at each POI at NS Norfolk

POI Identification	*POI Name*	*DNL (dBA)*	*Aircraft*	*Profile ID*	*Daily Events*		*Total Per Week*	*SEL (dBA)*	*L_{max} (dBA)*
					Day	*Night*			
1	Newport News	50	MH-53E	717	0.16	0.09	1.8	93.1	82.6
			F-18E/F	609	0.052	0.008	0.4	85.8	72.9
			MH-53E	701_5	1.08	0.58	11.6	84.1	66.0
2	Hampton	44	F-18E/F	609	0.052	0.008	0.4	91.9	82.3
			MH-53E	717	0.16	0.09	1.8	84.9	70.2
			F-18E/F	605	0.333	0.051	2.7	83.3	71.7
3	Fort Monroe	51	F-18E/F	609	0.052	0.008	0.4	97.5	89.1
			F-18E/F	610	0.05	0.008	0.4	96.9	88.5
			F-18E/F	605	0.333	0.051	2.7	92.8	82.7
4	Willoughby	62	F-18E/F	601	0.666	0.102	5.4	94.1	87.0
			F-18E/F	602	0.64	0.098	5.2	94.0	87.0
			F-18E/F	609	0.052	0.008	0.4	92.3	82.1
5	West Ocean View	61	C-5A	201	0.237	0.036	1.9	105.4	95.3
			F-18E/F	601	0.666	0.102	5.4	102.7	95.1
			F-18E/F	609	0.052	0.008	0.4	98.4	90.9
6	East Ocean View	69	F-18E/F	606	0.32	0.049	2.6	115.9	111.0
			F-18E/F	604	0.32	0.049	2.6	113.2	107.3
			F-18E/F	610	0.05	0.008	0.4	109.3	104.8
7	Little Creek	57	F-18E/F	610	0.05	0.008	0.4	109.2	102.6
			F-18E/F	604	0.32	0.049	2.6	103.3	96.5
			C-5A	204	0.228	0.035	1.8	101.1	94.9
8	North Granby	74	F-18E/F	610	0.05	0.008	0.4	121.3	118.2
			F-18E/F	604	0.32	0.049	2.6	118.2	114.9
			F-18E/F	606	0.32	0.049	2.6	117.6	114.0
9	Northside	75	F-18E/F	610	0.05	0.008	0.4	124.5	122.6
			F-18E/F	606	0.32	0.049	2.6	120.1	116.7
			F-18E/F	604	0.32	0.049	2.6	118.9	115.1
10	Terminal	55	F-18E/F	609	0.052	0.008	0.4	97.9	87.9
			F-18E/F	602	0.64	0.098	5.2	96.1	87.1
			F-18E/F	610	0.05	0.008	0.4	94.5	87.8
11	Meadowbrook	53	F-18E/F	602	0.64	0.098	5.2	94.9	88.2
			F-18E/F	601	0.666	0.102	5.4	94.0	87.8
			F-18E/F	609	0.052	0.008	0.4	93.6	83.6
12	Wards Corner	55	F-18E/F	601	0.666	0.102	5.4	97.3	89.6
			F-18E/F	602	0.64	0.098	5.2	96.5	89.6
			F-18E/F	609	0.052	0.008	0.4	95.2	85.0
13	Central Granby	57	F-18E/F	609	0.052	0.008	0.4	100.7	92.7
			F-18E/F	601	0.666	0.102	5.4	100.2	93.6
			F-18E/F	602	0.64	0.098	5.2	97.2	91.5
14	Brentwood	52	F-18E/F	604	0.32	0.049	2.6	97.5	88.3
			F-18E/F	606	0.32	0.049	2.6	95.4	85.5
			F-18E/F	610	0.05	0.008	0.4	93.5	82.9

Table 6.2-5: SEL and L_{max} Values for Loudest Single Events at each POI at NS Norfolk (cont.)

POI Identification	*POI Name*	*DNL (dBA)*	*Aircraft*	*Profile ID*	*Daily Events*		*Total Per Week*	*SEL (dBA)*	*L_{max} (dBA)*
					Day	*Night*			
15	Suburban Park	48	F-18E/F	601	0.666	0.102	5.4	92.0	85.3
			F-18E/F	609	0.052	0.008	0.4	90.5	81.9
			F-18E/F	602	0.64	0.098	5.2	89.9	84.1
16	South Granby	46	F-18E/F	601	0.666	0.102	5.4	89.0	81.4
			F-18E/F	602	0.64	0.098	5.2	87.8	81.4
			F-18E/F	609	0.052	0.008	0.4	86.8	76.4
17	Naval Station	62	F-18E/F	609	0.052	0.008	0.4	104.8	96.1
			F-18E/F	610	0.05	0.008	0.4	104.4	96.4
			F-18E/F	602	0.64	0.098	5.2	104.2	97.8
18	Camp Allen	59	F-18E/F	602	0.64	0.098	5.2	102.5	96.1
			F-18E/F	609	0.052	0.008	0.4	100.9	92.1
			F-18E/F	610	0.05	0.008	0.4	100.9	91.9

***Note**:*
L_{max} is the loudest sound level experienced for a fraction of a second. This table includes the number of each of these events that would occur in an average day and average week. On a given single day or week, there could be more or fewer of these events, depending on operational tempo, weather, and other factors.

Sleep Disturbance

Sleep disturbance can result from aircraft overflight. The significance of this potential impact can be assessed by determining the probabilities of awakenings. To determine the probabilities of awakening, the SELs of the representative aircraft over representative locations are calculated and then used in the equations provided in the ANSI/ASA standard. Indoor probability of awakening uses 15 dB and 25 dB noise attenuation (lessening) from the outdoor noise levels for windows open and closed, respectively. Indoor awakening is used to distinguish average night sleeping from awakenings during the day or outdoor activities (i.e., naps in a hammock or tent camping).

Table 6.2-6 lists the probabilities of awakening during aircraft overflight at least once in a night between the hours of 10:00 p.m. and 7:00 a.m. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 10 to 11 percent at the North Granby location, with windows open. Of the 18 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed.

Table 6.2-6: Probability of Awakening at Point of Interest Locations Near NS Norfolk under Baseline Conditions

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
1 – Newport News	0.09	<1%	<1%
2 – Hampton	0.008	<1%	<1%
3 – Fort Monroe	0.237	<1%	<1%
4 – Willoughby	0.316	<1%	1-2%
5 – West Ocean View	0.775	1-2%	2-3%
6 – East Ocean View	0.765	2-3%	3-4%
7 – Little Creek	0.431	<1%	1-2%
8 – North Granby	2.454	7-8%	10-11%
9 – Northside	2.601	6-7%	9-10%
10 – Terminal	0.393	<1%	1-2%
11 – Meadowbrook	0.216	<1%	<1%
12 – Wards Corner	0.216	<1%	<1%
13 – Central Granby	0.350	<1%	1-2%
14 – Brentwood	0.216	<1%	<1%
15 – Suburban Park	0.11	<1%	<1%
16 – South Granby	0	NA	NA
17 – Naval Station	0.353	1-2%	1-2%
18 – Camp Allen	0.353	<1%	1-2%

Notes:
[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.
[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.
[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.

6.3 PUBLIC HEALTH AND SAFETY

Public health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. The primary goal is to identify and prevent potential accidents or impacts on the general public.

A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses public safety during construction, demolition, and renovation activities; and during subsequent operations of those facilities. Various stressors in the environment can adversely affect human health and safety. Identification and control or elimination of these stressors can reduce risks to health and safety to acceptable levels or eliminate risk entirely.

This discussion of public health and safety addresses flight safety, Bird/Animal Aircraft Strike Hazard (BASH), APZs, and environmental health and safety risks to children. The installation-specific program that addresses flight safety concerns is called the AICUZ Program, which recommends land uses that are compatible with noise levels, accident potential, and obstruction clearance criteria for military airfield operations.

6.3.1 REGULATORY SETTING

Aircraft safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with Federal Aviation Regulations Part 91, *General Operating and Flight Rules*, which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. In addition, naval aviators must also adhere to the flight rules, Air Traffic Control, and safety procedures provided in Navy guidance. Specific Navy requirements are outlined in OPNAVINST 3710.7 (series), the Naval Air Training and Operating Procedures Standardization manual, which provides standard language, communication methods, nomenclature, and flight and operating procedures. This manual also provides processes and procedures that improve combat readiness (through asset-preservation) and achieve a substantial reduction in aircraft mishaps, thereby safeguarding people and resources. Additionally, NAVAIR 00-80T-114, the Naval Air Training and Operating Procedures Standardization Air Traffic Control Manual, provides Navy requirements for air traffic control services to aircraft utilizing military-controlled airspace.

Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to "make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

6.3.2 AFFECTED ENVIRONMENT

The affected environment includes NS Norfolk airspace and areas within Clear Zones and APZs for NS Norfolk. The following discussions provide a description of the existing conditions for each of the categories under public health and safety resources at NS Norfolk.

6.3.2.1 Flight Safety

Navy requirements outlined in OPNAVINST 3500.39C, Operational Risk Management, provide a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. The FAA is responsible for ensuring safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. In order to fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. The primary safety concern with regard to military training flights is the potential for aircraft mishaps to occur, which could be caused by mid-air collisions with other aircraft or objects, weather difficulties, mechanical failures, pilot error, or BASH events.

Aircraft mishaps are classified in OPNAVINST 3750.6S as Class A, B, C, or D, with Class A mishaps being the most severe, with total property damage of $2 million or more (threshold was $1 million prior to 2010), total aircraft loss, or a fatality and/or permanent total disability. Combat losses are excluded from these mishap statistics. Class B mishaps are those with total property damage of $500,000 or more, but less than $2 million, or results in permanent partial disability or three or more personnel are hospitalized for in-patient care. Class C mishaps are those with total property damage of $50,000 or more, but less than $500,000, or a non-fatal injury that results in at least one day away from work. Class D is the least severe with total property damage $20,000 or more, but less than $50,000, or a recordable injury or illness occurs. Worldwide, only a small number of mishaps occur in hundreds of thousands of military aircraft operations each year.

NS Norfolk maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The initial response element usually consists of the Fire Chief, who would normally be the first on-scene Commander, fire-fighting and crash-rescue personnel, medical personnel, security police, and crash-recovery personnel. The second phase is the mishap investigation, which is comprised of an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed.

The Navy places an extremely high priority on safety during training and real-world operations, as well as valuing the safety of its pilots and the surrounding communities. Navy pilots are well-trained, and to complement flight training, all pilots use state-of-the-art simulators extensively. Simulator training includes all facets of flight operations and comprehensive emergency procedures, which minimizes risk associated with mishaps due to pilot error. Additionally, highly trained maintenance crews perform routine inspections on each aircraft in accordance with Navy and Marine Corps regulations, and maintenance activities are monitored by senior technicians to ensure the aircraft are equipped to withstand the rigors of operational and training events safely.

6.3.2.2 Bird/Animal Aircraft Strike Hazard

Potential bird/animal aircraft strikes are another safety concern for aircraft operations. The average of strikes at NS Norfolk between 2005 and 2015 was 28 per year (NAVFAC, 2015). Aircraft strikes of birds or other animals (e.g., bats and deer) are a safety concern because of the potential for damage to aircraft or injury to pilots or local populations if an aircraft crash should occur in a populated area. Aircraft may encounter birds at altitudes of 30,000 feet MSL or higher. However, most reported bird strikes occur at an elevation of less than 1,000 feet. Birds, in particular, are drawn to the open, grassy areas and warm pavement of an airfield. Although most bird and animal strikes do not result in crashes, they may cause structural and mechanical damage to aircraft. Due to the speed of the aircraft, collisions with birds or other animals can happen with considerable force.

Design modifications to the airfield also can be used to reduce the attractiveness of these types of land uses to birds and other wildlife, such as lawn height maintenance and decreasing desirable habitat like standing water. Chambers Field has an active BASH program. The airfield safety officer is the acting BASH coordinator, and they have a cooperative working relationship with the Naval Air Station Oceana (Virginia Beach, Virginia) safety officer and their wildlife experts to aid in managing the program. Personnel implement measures such as bird activity monitoring, dispersal scare tactics, lawn maintenance, and storm water drainage configurations to reduce bird and wildlife presence and BASH risk.

6.3.2.3 Accident Potential Zones and Clear Zones

Airfield safety clearances and APZs are established at military airfields under the AICUZ Program. The main goals of the AICUZ Program are to protect the health, safety, and welfare of people living or working near military airfields while preserving the defense flying mission. It achieves these goals by promoting land use compatible with aircraft operations.

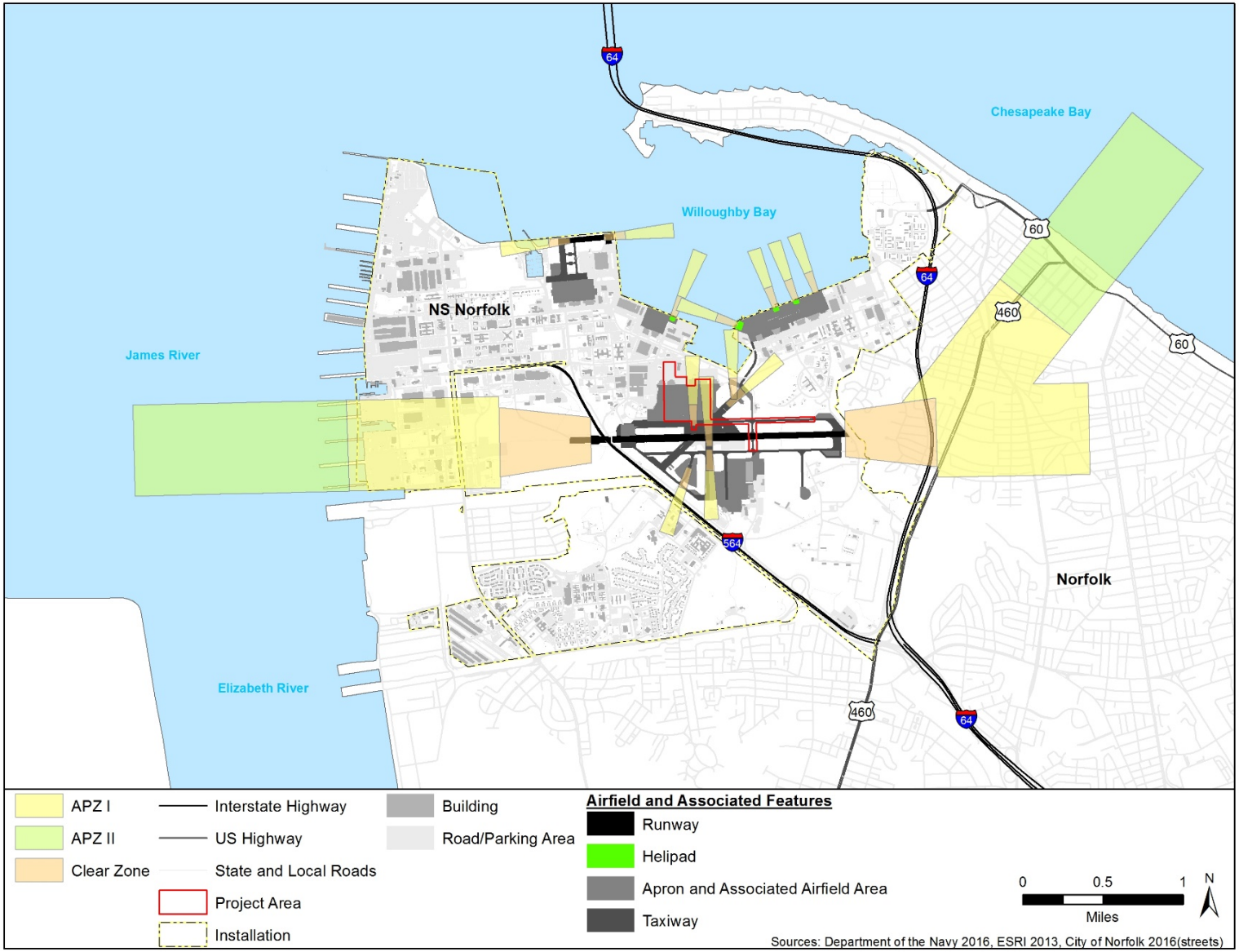


Figure 6.3-1: Clear Zones and Accident Potential Zones at Chambers Field

Clear Zones and APZs are areas in the vicinity of airfield runways where an aircraft mishap is most likely to occur (if one were to occur). While the likelihood of a mishap is remote, the Navy recommends that the intensity and density of land uses within APZs be minimal or low density to ensure the maximum protection of public health and property. The components of a standard AICUZ study are defined as follows (adapted from OPNAVINST 11010.36C, AICUZ Program):

- **Clear Zone –** Extends 3,000 feet immediately beyond the runway and has the highest potential for accidents. A Clear Zone is required for all active runways and should remain undeveloped.
- **APZ-I –** Extends 5,000 feet beyond the Clear Zone, with a width of 3,000 feet. An APZ-I area is provided for flight tracks that experience 5,000 or more annual operations (departures or approaches).
- **APZ-II –** Extends 7,000 feet beyond APZ-I with a width of 3,000 feet.

Clear Zones and APZs at NS Norfolk are shown in **Figure 6.3-1**.

6.3.2.4 Environmental Health and Safety Risks to Children

Health and safety risks to children that have potential to result from the proposed alternatives in this EA may be related to APZs and noise. There are six schools within approximately one mile of the NS Norfolk APZs, Clear Zones, and the proposed facilities site. There are no schools or congregations of children (i.e., schools or playgrounds) within the APZs at NS Norfolk. The closest school with children is approximately one-half mile away from the APZs or Clear Zones. The estimated population within the 65 dB DNL or greater noise zone is 13,382 (refer to **Section 6.2** [Noise]); of those, an estimated 20.8 percent (refer to **Section 6.11** [Socioeconomics]), or approximately 2,800, are children.

6.4 AIR QUALITY

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

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

6.4.1 REGULATORY SETTING

6.4.1.1 Criteria Pollutants and National Ambient Air Quality Standards

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

Under the Clean Air Act (CAA), the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for these pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. These plans, known as State Implementation Plans (SIPs), are developed by state and local air quality management agencies and submitted to USEPA for approval. In Virginia, the Virginia Department of Environmental Quality (VDEQ) is responsible for enforcing air pollution regulations.

6.4.1.2 Hazardous Air Pollutants

In addition to the NAAQS for criteria pollutants, national standards exist for hazardous air pollutants (HAPs), which are regulated under Section 112(b) of the 1990 CAA Amendments. HAPs are compounds known or suspected to cause cancer or other serious health and environmental effects. Unlike criteria pollutants, there are no NAAQS for HAPs. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR part 61). USEPA also promulgated a Mobile Source Air Toxics Rule to regulate sources of HAPs from mobile sources. The USEPA controls HAPs by regulating constituents of concern in fuels, promulgating cleaner engine emission standards, and limiting excessive engine operations.

6.4.1.3 General Conformity

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

A conformity applicability analysis is the first step of a conformity evaluation and assesses if a federal action must be supported by a conformity determination. This is typically done by quantifying applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which can occur at a later time or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency. If the results of the applicability analysis indicate that the total

emissions would not exceed the *de minimis* emissions thresholds, then the conformity evaluation process is completed. *De minimis* threshold emissions are presented in **Table 6.4-1**.

Table 6.4-1: General Conformity *de minimis* Levels

Pollutant	*Area Type*	*Tons Per Year*
Ozone (VOC or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ Direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors)	All nonattainment and maintenance	100
Pb	All nonattainment and maintenance	25

Source: USEPA, 2017a

6.4.1.4 Air Permitting

The CAA established the New Source Review (NSR) and Title V permitting programs for stationary air pollution sources. A permit is required when a stationary source has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specified thresholds. NSR is a preconstruction permitting program, and includes major and minor source permitting. Major NSR includes the Prevention of Significant Deterioration (PSD) permitting program for construction projects at major stationary sources located in NAAQS attainment areas. Minor NSR applies to construction projects that do not necessitate major source permitting. The NSR process ensures that proposed emissions would conform to the SIP. Additional permitting requirements may apply to increases in stationary source GHG emissions for sources that already trigger NSR for criteria pollutant emissions. The Title V program is an operating permit program applicable to all major air pollution sources and a limited number of minor sources. The Title V permitting program ensures that all air quality requirements applicable to an air pollution source are included under a single operating permit. The VDEQ administers the major and minor NSR preconstruction permitting programs and the Title V operating permit program in Virginia.

6.4.2 AFFECTED ENVIRONMENT

6.4.2.1 Air Quality

NS Norfolk is in the City of Norfolk, which is within the Hampton Roads Intrastate Air Quality Control Region (AQCR). The affected environment is the Hampton Roads Intrastate AQCR, which includes the

counties of Isle of Wright, James City, Southampton, and York and independent cites of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg. The Air Division of the VDEQ is responsible for implementing and enforcing state and federal air quality regulations in Virginia.

The USEPA classifies the Hampton Roads Intrastate AQCR as in attainment of all NAAQS (USEPA, 2016). The ACQR was a maintenance area for the 1997 ozone standard, but it attains the 2008 standard. This change in attainment designation occurred on April 6, 2015, when the USEPA revoked the 1997 ozone NAAQS and finalized implementation of the 2008 ozone NAAQS (USEPA, 2015). Since the Hampton Roads Intrastate AQCR is in attainment of all NAAQS, the Proposed Action would not require a General Conformity evaluation.

The most recent emissions inventory for the Hampton Roads Intrastate AQCR is shown in **Table 6.4-2**. VOCs and NO_x emissions are used to represent ozone generation because they are precursors of ozone.

Table 6.4-2: Hampton Roads Intrastate Air Quality Control Region Annual Air Emissions Inventory (Year 2014)

Source Category	*Air Pollutant Emissions (tons per year)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
Mobile Sources	21,407	19,841	192,635	37,784	1,336	2,174	1,342
Stationary/Area Sources	28,215	80,267	32,308	15,346	26,146	24,346	7,252
Total ACQR Emissions	49,622	**100,108**	**224,943**	**53,130**	**27,481**	**26,520**	**8,594**

Source: USEPA, 2017b

Notes: GHG emissions from stationary sources are not available on a county-wide or AQCR level. Therefore, total GHGs presented for the Hampton Roads Intrastate AQCR are incomplete.
mt = metric tons. N/A=not available

Mobile sources of air pollutants at NS Norfolk include aircraft, vessels, ground service equipment and vehicles, and private and government vehicles. For stationary sources, the facility is a Title V major source of VOC, CO, NO_x, SO_2, PM_{10}, and HAPs emissions and it is regulated under a site-wide Title V operating permit (No. TRO-60941). Processes include, but are not limited to: external combustion units (boilers for steam heat and industrial use); internal combustion engines (diesel emergency generators); surface coating operations for maintenance of marine vessels, aircraft, and facilities; abrasive blasting related to marine vessels and aircraft maintenance; and woodworking shops for facility maintenance, packing, and shipping.

The Proposed Action would mainly include mobile source operations that would not require VDEQ air permits. Any other potential operations, such as the use of paints and solvents for routine V-22 maintenance activities or the operation of a diesel-powered electrical emergency generator within the proposed squadron hangar would undergo review to ensure that they would comply with applicable VDEQ rules and permitting regulations.

Table 6.4-3 presents estimates of emissions associated with the most recent year of activity for the existing C-2A detachment at NS Norfolk. Year 2016 was chosen to define existing or baseline emissions for the C-2A detachment, as it included the most recent calendar year of operational activities. Emissions from existing C-2A aircraft activity were based on data developed for the project noise analyses and special studies on aircraft operations (Navy Aircraft Environmental Support Office [AESO], 2015a and 2015b). Emissions for the use of aerospace ground equipment by C-2A aircraft are based on usages developed for generic aircraft groups by the U.S. Air Force (Air Force Civil Engineer Center, 2016).

Emissions from privately owned vehicles (POVs) are based on vehicle trip generation rates developed by the project traffic analysis. **Appendix C** includes data and assumptions used to calculate emissions from existing C-2A activities at NS Norfolk.

The analysis of aircraft operations on concentrations of criteria pollutants is limited to operations that occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level criteria pollutant concentrations.

Table 6.4-3: C-2A Detachment Baseline Annual Air Emissions - NS Norfolk

Year	*Air Pollutant Emissions (tons per year)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
C-2A Flight Operations	0.74	4.01	15.23	1.96	1.32	1.32	4,422
C-2A On-Wing Engine Testing	0.42	2.33	6.35	0.92	0.67	0.67	2,079
Ground Support Equipment	0.22	0.86	1.97	0.00	0.18	0.18	446
POVs – On- and Off-Base	0.30	11.73	1.23	0.03	0.02	0.02	1,464
Total Emissions	1.68	18.93	24.78	2.91	2.19	2.19	8,411

Note: mt=metric tons; NS=Naval Station; POV=personal-owned vehicle

6.4.2.2 Greenhouse Gases and Climate Change

The direct environmental effect of GHG emissions is an increase in global temperatures, which indirectly causes numerous environmental and social effects. Therefore, the analysis domain for proposed GHG impacts would be global. These cumulative global impacts would be manifested as impacts on resources and ecosystems in Virginia.

Climate change refers to any significant change in the measures of climate lasting for an extended period of time (USEPA, 2016). These gases act like a blanket around the earth, trapping energy in the atmosphere and causing it to warm (USEPA, 2016). According to the USEPA, the global average temperature has increased by more than 1.5 degrees Fahrenheit since the late 1800s. Natural causes alone cannot explain all of these changes. Human activities are contributing to climate change, primarily by releasing tons of GHGs, such as carbon dioxide into the atmosphere every year. Most of the warming of the past half century has been caused by human activities that result in the emissions of GHGs, including burning fossil fuels for heat and energy, clearing forests, fertilizing crops, storing waste in landfills, raising livestock, and producing some kinds of industrial products. These GHG emissions include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride and sulfur hexafluoride (USEPA, 2016).

Each GHG is assigned a global warming potential, which refers to the ability of a gas or aerosol to trap heat in the atmosphere (USEPA, 2016). The global warming potential rating system is standardized to carbon dioxide, which has a value of one. The equivalent carbon dioxide rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. An increase in GHGs, especially those with larger global warming potentials, causes more heat to be retained.

The buildup of GHGs in the atmosphere and the warming of the planet affect many aspects of the environment. Not all of the effects of greenhouse gases are related to climate. For example, elevated

concentrations of carbon dioxide can lead to ocean acidification and stimulate terrestrial plant growth, and methane emissions can contribute to higher ozone levels.

The United States and the world are warming, global sea level is rising, and some types of extreme weather events are becoming more frequent and more severe (U.S. Global Change Research Program, 2016). Recent observed changes due to global warming include rising temperatures, shrinking glaciers and sea ice, sea level rise, a lengthened growing season, and shifts in plant and animal ranges (U.S. Global Change Research Program, 2014). Predictions of future environmental impacts due to global warming include continuing sea level rise; changing weather patterns, including increases in the severity of storms and droughts; changes to local and regional ecosystems, including the potential loss of species; and a substantial reduction in winter snowpack. These elements of climate change may impact the way the Navy executes its missions by increasing demand to provide humanitarian assistance and relief related to natural disasters, reducing the availability of infrastructure at coastal installations due to rising sea levels and increased flooding, and limiting training activities due to severe weather and available supporting infrastructure. The Navy's role in the defense of our country requires planning for a wide range of contingencies. Included in these contingencies is the future trend of climate change.

The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and reduce emissions of greenhouse gases. The Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy has adopted energy, environmental, and climate change goals including increasing alternative energy use Navy-wide to 50 percent by 2020; reducing non-tactical petroleum use; ensuring environmentally sound acquisition practices; and ensuring environmentally compliant operations for ships, submarines, aircraft, and facilities operated by the Navy.

While the implications of climate change may influence factors such as water availability and agriculture and food security, the factors applicable to the Proposed Action in the study area include extreme weather and sea level rise. These climate change factors are described below and are further discussed, as appropriate, in the water resources, infrastructure, and biological resources sections.

Extreme Weather. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historical record that dates back to the mid-1880s; this can be attributed to both natural variability and climate change (U.S. Global Change Research Program, 2014). Because the study area is in a region of transition for precipitation between wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations (U.S. Global Change Research Program, 2014).

Sea Level Rise. The Chesapeake Bay region, including the Hampton Roads area, has the highest rates of sea level rise on the Atlantic Coast of the United States (Eggleston et al., 2013). Over the past century, Chesapeake Bay waters have risen about 1 foot and are predicted to rise another 1.3 to 5.2 feet over the next 100 years (Chesapeake Bay Program, 2016). In addition, land in the region is sinking, primarily from natural causes, resulting in sea levels rising faster than the global average (Center for Sea Level Rise, 2016). As a result, Virginia Beach, about 22 miles southeast of NS Norfolk has been identified as among the most vulnerable areas to sea level rise within the United States based on the population living on land less than 1 meter above local mean high water (Strauss et al., 2012). Impacts from sea level rise in the study area may have implications on the available beach/shoreline areas and ecosystems for sensitive species. Ecosystems such as tidal marshes are at risk from sea level rise; the pace of sea level rise will increasingly lead to inundation of coastal wetlands in the region (U.S. Global Change Research

Program, 2014). Sea level rise in coastal habitats can increase the salinity of surface water areas, leading to a decline in the extent and composition of coastal marshes. This increase in salinity impacts the plant and animal species that are present in these areas. Climate change could result in shifts in local species composition, invasive or new locally viable species, changes in species growth rates, shifts in migratory patterns or dates, and alterations to spawning seasons (Osgood, 2008). The DoD conducts research on sea level rise and develops measures for installations to adapt to this threat (DoD Strategic Environmental Research and Development Program, 2014 and 2016).

6.5 TRANSPORTATION

This discussion of transportation includes vehicular traffic and alternative transportation. Vehicular traffic refers to the movement of vehicles on roadway networks and street systems, and alternative transportation refers to ridesharing and mass transit. Air transportation is discussed under Airfields and Airspace.

6.5.1 REGULATORY SETTING

The Virginia Department of Transportation (VDOT) is responsible for building, maintaining and operating the state's roads, bridges and tunnels. In addition, through the Commonwealth Transportation Board, it provides funding for airports, seaports, rail, and public transportation (VDOT, 2016). Hampton Roads Transit operates bus, light rail, and ferry services throughout the Hampton Roads region. The City of Norfolk Division of Transportation is responsible for the safety and efficiency of traffic flow involving vehicular traffic, vehicular parking, and bicycle and pedestrian safety (City of Norfolk, 2016).

Existing roadway capacity to accommodate vehicle use is typically described in terms of average daily traffic (ADT) volume.

6.5.2 AFFECTED ENVIRONMENT

The affected environment is the transportation network serving NS Norfolk in the City of Norfolk. NS Norfolk is located within a regional area known as the Navy Triangle Influence Area (NTIA) (NAVFAC, 2013). The NTIA is located within the City of Norfolk and is bound approximately by the Willoughby Bay to the north, Terminal Boulevard to the south, the James River and Elizabeth River to the west, and I-64 to the east (**Figure 6.5-1)**.

The transportation network serving the area consists of interstate and local street systems, which include I-64, I-564, Terminal Boulevard, Hampton Boulevard, and Admiral Taussig Boulevard. These transportation facilities are also shared with other major local, state, and regional partners such as Virginia Port Authority, the City of Norfolk, and Old Dominion University (NAVFAC, 2013).

NS Norfolk is one of the major employment centers in the south side of the Hampton Roads region, consisting of the cities of Chesapeake, Norfolk, Portsmouth, Suffolk, and Virginia Beach. The majority of commuters to NS Norfolk come from the surrounding cities of Virginia Beach, Norfolk, and Chesapeake. Of those, most come from Virginia Beach or Chesapeake via I-64 and I-564. All routes to NS Norfolk experience travel delays during peak hours, including bridge and tunnel crossings for a portion of commuters coming from Hampton, Newport News, Poquoson, Suffolk, and other points on the north side of Hampton Roads.

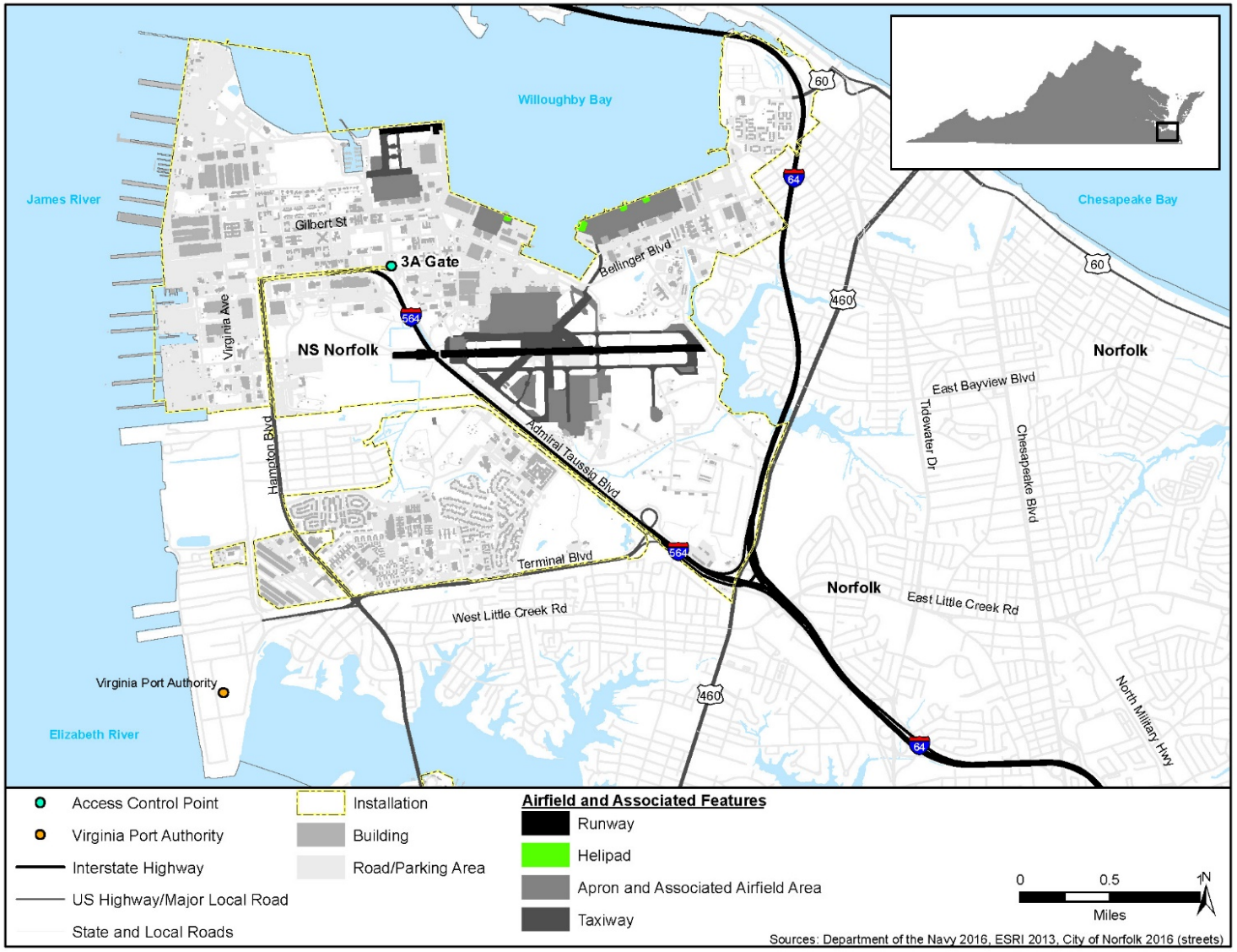


Figure 6.5-1: Norfolk Roadway Network

6.5.2.1 Vehicular Traffic

6.5.2.1.1 Traffic Circulation

NS Norfolk contains nine military gate facilities; however, two were permanently closed by the Navy and are no longer manned (Gate 3 and Gate 6). The remaining secured gates to NS Norfolk include Gates 1, 2, 3A, 4, 5, 10, and 22. Gate 5 serves as the truck gate and services all non-military commercial and industrial vehicles entering NS Norfolk. Gate 22 primarily provides access to traffic destined to the Air Terminal and Chambers Field as well as the primary access point for heavy artillery vehicles; however, connectivity to the rest of NS Norfolk is possible from this gate. The operations of these gates often vary based on the level of security threats, available security personnel, and traffic incidents that occur inside or outside the facility. Peak hours for traffic at NS Norfolk gates are 5:15 a.m. to 6:15 a.m. and 3:00 p.m. to 4:00 p.m. (NAVFAC, 2014b).

Within the NTIA, there are three primary roadway classifications. Internal local streets are located within NS Norfolk boundaries and are the responsibility of the Navy. External arterials are the responsibility of the City of Norfolk. There also are two interstates within the NTIA (I-64 and I-564) providing regional connectivity with the rest of Hampton Roads; these are maintained by VDOT and the Federal Highway Administration (NAVFAC, 2013). I-64 serves as a primary route for commuters destined to NS Norfolk from the areas surrounding Norfolk. I-64 is an east-west route that traverses the Commonwealth of Virginia from the West Virginia border, passes through Charlottesville and the capital city of Richmond, and terminates in the Hampton Roads region. Within the City of Norfolk, the interstate is primarily oriented north-south as it approaches this terminus. I-64 is a four-lane, divided highway from the Hampton Roads Bridge Tunnel to the I-564 interchange within the NTIA. From the I-564 interchange to the Norfolk city limits, I-64 is a six-lane, divided highway. Throughout the entire City of Norfolk, I-64 has a posted speed limit of 55 miles per hour (mph). East of the I-564 interchange, I-64 also has a reversible, two-lane, high-occupancy vehicle (HOV) center roadway with a posted speed limit of 65 mph.

I-564 is a northwest/southeast freeway spur that extends northwest from the I-64 interchange near Granby Street into the NTIA near Gate 3A. I-564 has interchanges at Terminal Boulevard and at Gate 3A before transitioning to Admiral Taussig Boulevard, which continues west into NS Norfolk. I-564 is generally a six-lane facility with one lane serving as an HOV lane during directional peak periods (inbound to NS Norfolk during the a.m. peak hour and outbound from NS Norfolk during the p.m. peak hour) (NAVFAC, 2014b).

Numerous arterials within the City of Norfolk provide access to each of the security gates at NS Norfolk and include:

- Hampton Boulevard (Gate 1, Gate 2, and Gate 5)
- Admiral Taussig Boulevard (Gate 1, Gate 2, and Gate 3A)
- Bay Avenue (Gate 4)
- Ridgewell Avenue (Gate 10)
- Granby Street (Gate 22)

Other significant external roadways include Little Creek Road, Mall Drive, and Hammond Road. Little Creek Road parallels Terminal Boulevard to the south providing a primary connection between I-64 through Wards Corner and Hampton Boulevard (NAVFAC, 2013).

Mall Drive, Hammond Road, and Seabee Avenue are Navy maintained streets within the City of Norfolk providing access to the Norfolk Naval Exchange Complex and alternative routes during peak periods. Mall Drive and Hammond Road are both one-way access points to the Naval Exchange Complex (with Mall Drive serving traffic entering Naval Exchange Complex and Hammond Road serving traffic exiting Naval Exchange Complex). Seabee Road is the westbound leg of the Hampton Boulevard and B Avenue intersection. Seabee Road also provides access for trucks and commercial vehicles destined to the existing truck inspection station and other privately owned vehicles destined to the Naval Pass Office (NAVFAC, 2013).

Admiral Taussig Boulevard, Maryland Avenue, Bainbridge Avenue, Bellinger Boulevard, and B Avenue all serve NS Norfolk security checkpoint gates, while Gilbert Street and Towway Drive provide an east-west connection through NS Norfolk connecting the piers to the eastern part of the installation, including Chambers Field (NAVFAC, 2013). The local street network internal to NS Norfolk is comprised of several primary facilities—Virginia Avenue, Admiral Taussig Boulevard (inside the fence line), Maryland Avenue, Bainbridge Avenue, B Avenue, Gilbert Street, Bellinger Boulevard, and Towway Drive. Virginia Avenue serves as the primary truck route, running in a north/south direction parallel to the piers on the western boundary of NS Norfolk (NAVFAC, 2013).

6.5.2.1.2 Traffic Conditions

The regional roadway network, including access routes through the City of Norfolk to NS Norfolk, experience a high level of commuter traffic congestion. Traffic congestion is also experienced on-base on 5th Avenue at Bellinger Boulevard (NS Norfolk, 2011). The current traffic pattern focuses most traffic on the primary routes: Admiral Taussig Boulevard, Gilbert Street, and Bellinger Boulevard. A large volume of NS Norfolk traffic travels I-564 to Gate 3A at Admiral Taussig Boulevard. According to VDOT 2014 traffic data, I-564 carried 53,000 ADT (calculated from annual average daily traffic divided by days in the year) between I-64 and Terminal Boulevard, and 21,000 ADT between Terminal Boulevard and Admiral Taussig Boulevard (VDOT, 2014).

The Navy has worked extensively with VDOT on planning for potential roadway improvements to improve traffic flow through the NTIA to and from NS Norfolk (NAVFAC, 2013). VDOT has several projects that have been constructed, are under construction, or are programmed. These include: Hampton Boulevard grade separation for railway movements (completed), intermodal connection to realign I-564 for improved access to NS Norfolk, and I-64 widening improvements between I-564 in Norfolk and I-64 in Hampton (VDOT, 2016).

6.5.2.2 Alternative Transportation

Alternatives to personal occupancy vehicles at NS Norfolk includes ridesharing (i.e., carpool, vanpool) or mass transit to, from, and within the NTIA. Transit service is provided by Hampton Roads Transit. There are six bus routes serving NS Norfolk:

- Route 2 (NS Norfolk/Hampton Boulevard)
- Route 3 (Downtown Norfolk/NS Norfolk)
- Route 21 (NS Norfolk/Joint Expeditionary Base Little Creek)
- MAX Route 919 (Virginia Beach to NS Norfolk)
- MAX Route 922 (Chesapeake-Virginia Beach to NS Norfolk)
- MAX Route 965 (Newport News & Hampton to NS Norfolk)

Hampton Roads Transit also operates three, 150-passenger ferries on the Elizabeth River between Norfolk and Portsmouth. They travel between North Landing and High Street in Portsmouth and the Waterside festival marketplace in downtown Norfolk. Ferries operate every 30 minutes with 15-minute service during the summer at peak times on weekends. Schedules are subject to change based on operating situations (weather, mechanical problems, etc.). The ferry is wheelchair accessible and allows boarding passengers to walk on with their bicycles.

Hampton Roads Transit is also considering an extension of the light rail transit to NS Norfolk to help alleviate commuter traffic congestion (NS Norfolk, 2011). The Norfolk Westside Transit Study is a joint effort between Hampton Roads Transit and the City of Norfolk. The transit study, initiated in April 2017 and funded by a federal grant, is scheduled to be completed in 12 months. It will explore a potential connection from the existing Tide light rail system to NS Norfolk, along the western side of Norfolk. The Naval Station Norfolk Transit Extension Study, completed in 2015, explores transit connections and future light rail system expansion in Norfolk.

6.6 BIOLOGICAL RESOURCES

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

Within this EA, biological resources are divided into two major categories: (1) terrestrial vegetation and (2) terrestrial wildlife. Marine vegetation and wildlife would not be impacted by the Proposed Action and therefore are not addressed in this EA. Threatened, endangered, and other special status species are discussed in **Sections 6.6.2.6** (Federally Listed Species) and **6.6.2.7** (Other Special Status Species). The United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) system was accessed to request an *Official Species List* under Section 7(c) of the Endangered Species Act (ESA). The *Official Species List* (Consultation Code: 05E2VA00-2017-SLI-4748) was received via letter dated September 1, 2017 (USFS, 2017b) and is provided in **Appendix D**. **Table 6.6-1** lists all federally listed species that are potentially present within or in the vicinity of NS Norfolk as noted in the *Official Species List* and in the installation's Integrated Natural Resources Management Plan (INRMP), but as notated herein, outside of the specific airfield project area. Federally listed marine species that would not be impacted by the Proposed Action are described in **Section 6.6.2.6**, but are not carried forward for analysis.

Table 6.6-1: Federally Listed Rare Wildlife Species with Potential to Occur at NS Norfolk

Common Name (Scientific Name)	*Status*	*Habitat*
Birds		
Piping Plover (*Charadrius melodus*)	FE, Tier II	Shoreline. Barrier beaches and sand spits. No known occurrences or suitable habitat exist within the project area.
Red Knot (*Calidris canutus*)	FT, Tier I	Shoreline and intertidal areas (mudflats and sand flats). No known occurrences or suitable habitat exist within the project area.
Roseate Tern (*Sterna dougallii dougallii*)	FE	Shallow coastal waters, inlets, and salt marshes. No known occurrences or suitable habitat exist within the project area.

Table 6.6-1: Federally Listed Rare Wildlife Species with Potential to Occur at NS Norfolk (cont.)

Common Name (Scientific Name)	*Status*	*Habitat*
Fish		
Atlantic sturgeon (*Acipenser oxyrinchus*)	FE, Tier I	Aquatic. No suitable habitat exists within the project area.
Mammals		
Northern long-eared bat (Myotis septentrionalis)	FT, Tier I	Forest. Hibernate in caves and mines. Mature forests for summer roosts and feeding.
West Indian manatee (*Trichechus manatus*)	FE, MMPA, Tier IV	Aquatic. No suitable habitat exists within the project area.
Fin whale (*Balaenoptera physalis*)	FE, MMPA	Deep, offshore waters of all major oceans
Reptiles		
Hawksbill sea turtle (*Eretmochelys imbricate*)	FE	Aquatic. No suitable habitat exists within the project area. No documented use of NS Norfolk beaches by sea turtles for nesting.
Kemp's ridley sea turtle (*Lepidochelys kempii*)	FE, Tier I	Aquatic. No suitable habitat exists within the project area. No documented use of NS Norfolk beaches by sea turtles for nesting.
Loggerhead sea turtle (*Caretta caretta*) - Northwest Atlantic Ocean DPS	FT, Tier I	Aquatic. No suitable habitat exists within the project area. No documented use of NS Norfolk beaches by sea turtles for nesting. Potential for occurrence within lower rivers of the Chesapeake and Elizabeth Rivers, outside of the project area.
Leatherback sea turtle (*Dermochelys coriacea*)	FE, Tier I	Aquatic. No suitable habitat exists within the project area. No documented use of NS Norfolk beaches by sea turtles for nesting.
Green sea turtle (*Chelonia mydas*) - North Atlantic DPS	FT, Tier I	Aquatic. No suitable habitat exists within the project area. No documented use of NS Norfolk beaches by sea turtles for nesting.

Sources: NAVFAC, 2017; National Oceanic and Atmospheric Administration, 2017; USFWS, 2017b; Virginia Department of Game and Inland Fisheries (VDGIF), 2015

Notes: FE=Federally Endangered; MMPA = Marine Mammal Protection Act; Tier I=VDGIF Critical Conservation Need; Tier II=VDGIF Very High Conservation Need; Tier IV = VDGIF Moderate Conservation Need

6.6.1 REGULATORY SETTING

Special-status species, for the purposes of this EA, are those species listed as threatened or endangered under the ESA, species afforded federal protection under the Marine Mammal Protection Act (MMPA), or the Bald and Golden Eagle Protection Act (BGEPA).

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires action proponents to consult with the USFWS or National Oceanic and Atmospheric Administration Fisheries to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of designated critical habitat. Critical habitat cannot be designated on any areas owned, controlled, or designated for use by the DoD

where an INRMP has been developed that, as determined by the Department of Interior or Department of Commerce Secretary, provides a benefit to the species subject to critical habitat designation.

All marine mammals are protected under the provisions of the MMPA. The MMPA prohibits any person or vessel from "taking" marine mammals in the United States or the high seas without authorization.

In addition to the special status species noted, birds, both migratory and most native-resident bird species, are protected under the Migratory Bird Treaty Act (MBTA), and their conservation by federal agencies is mandated by EO 13186 (Migratory Bird Conservation). Under the MBTA it is unlawful by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, [or] possess migratory birds or their nests or eggs at any time, unless permitted by regulation. The 2003 National Defense Authorization Act gave the Secretary of the Interior authority to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during authorized military readiness activities. The final rule authorizing the DoD to take migratory birds in such cases includes a requirement that the Armed Forces must confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate adverse effects of the Proposed Action if the action will have a significant adverse effect on a population of migratory bird species.

Birds of Conservation Concern (BCC) are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCC have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which BCC have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the MBTA and EO 13186 (USFWS, 2008).

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

The Coastal Zone Management Act (CZMA) establishes a federal-state partnership to provide for the comprehensive management of coastal resources. Coastal states and territories develop management programs based on enforceable policies and mechanisms to balance resource protection and coastal development needs. Actions implemented on federal lands must ensure consistency with these plans and programs to the maximum extent practicable. Consistency with the CZMA is discussed in **Chapter 9** (Other Considerations Required by NEPA).

6.6.2 AFFECTED ENVIRONMENT

The affected environment for biological resources includes the portions of NS Norfolk where permanent and temporary impacts could occur from implementation of the Proposed Action.

Information about biological resources is based on existing data. The following sources were reviewed to obtain relevant biological data:

- NS Norfolk and Craney Island Fuel Terminal INRMP (NAVFAC, 2017)
- USFWS IPaC *Official Species List* (Consultation Code: 05E2VA00-2017-SLI-4748) (USFWS, 2017b)
- VDGIF State Wildlife Action Plan (VDGIF, 2015)
- NS Norfolk BASH Program (Navy, 2012)

6.6.2.1 Terrestrial Vegetation

Descriptions of the vegetation communities present at NS Norfolk are provided in the INRMP (NAVFAC, 2017). Appendix F of the INRMP contains the Flora Species Checklist for NS Norfolk, with occurrences that were noted during the 2015 vegetation surveys.

The majority of the land area at NS Norfolk is intensely developed, with very little open space that remains in natural condition. Most areas are improved, dominated by turf grasses (such as airfields, Clear Zones, buildings, and associated urban areas), and recreational/open areas (such as maintained landscaped lawns, mowed fields, created wetlands, and recreational fields) (**Figure 6.6-1**). The project area is located in a developed area mainly devoid of vegetation (**Figure 6.6-1**).

Sporadic patches of forested communities, unmanaged scrub-shrub, and wetland communities are present, but outside of the project area (NAVFAC, 2017). The restored tidal wetland at the northeastern corner of the installation, known as Monkey Bottom, contains a variety of saltmarsh species and is one of the few areas along the coast line not highly rip-rapped (although there is some still there). Monkey Bottom is dominated by common reed (*Phragmites australis*), a highly invasive species, and saltmarsh grasses (*Spartina* sp.) and is located to the east of the solar array (NAVFAC, 2017). To the south of the solar array is a designated Chesapeake Bay Wildlife Habitat no mow zone that juts out into Willoughby Bay, which is dominated by unmaintained native grasses and coastal shrubs such as Jesuit's bark (*Iva frutescens*) and wax myrtle (*Morella cerifera*) (NAVFAC, 2017).

The southeastern corner of the installation contains most of the disturbed and fragmented natural forested communities that exist on NS Norfolk. These forest communities exist in small sporadic patches with no commercial value, and are largely dominated by loblolly pine (*Pinus taeda*) and mixed hardwoods. According to the U.S. National Vegetation Classification system, forested communities at NS Norfolk consist of Great Dismal Swamp successional peat dome pine-hardwood forest, early to mid-successional loblolly pine forest, and successional tuliptree-loblolly pine upland forest, which are all common forest types associated with the region.

The Proposed Action would occur in a developed area mainly devoid of natural habitat areas or plant communities. Therefore, terrestrial vegetation is not discussed further in this EA.

6.6.2.2 Terrestrial Wildlife

Information on terrestrial wildlife occurring at NS Norfolk is provided in the INRMP (NAVFAC, 2017). **Appendix E** of the INRMP includes the list of avian species detected during surveys in 2015; the full fauna lists from the previous pre-final INRMPs for NS Norfolk; and the lists of endangered, threatened, and special concern species with potential to occur at NS Norfolk. A summary of this information is provided below.

According to the Virginia Fish and Wildlife Information System, 50 reptile and 35 amphibian (herpetofauna) species are known to occur or may potentially occur on NS Norfolk (NAVFAC, 2017). Species may include greater siren (*Siren lacertian*), spotted salamander (*Ambystoma maculatum*), bullfrog (*Rana catesbeiana*), stinkpot (*Sternotherus odoratus*), northern fence lizard (*Sceloporus undulates hyacinthinus*), and eastern garter snake (*Thamnophilis sirtalis sirtalis*). The urban environment and lack of large forested areas at NS Norfolk and surrounding community limit the number of mammals that are likely to occur. Those that do occur are generally species adapted to urban and open habitats. Common large- to medium-sized mammals include red fox (*Vulpes vulpes*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), Virginia opossum (*Didelphis virginiana virginiana*), raccoon (*Procyon*

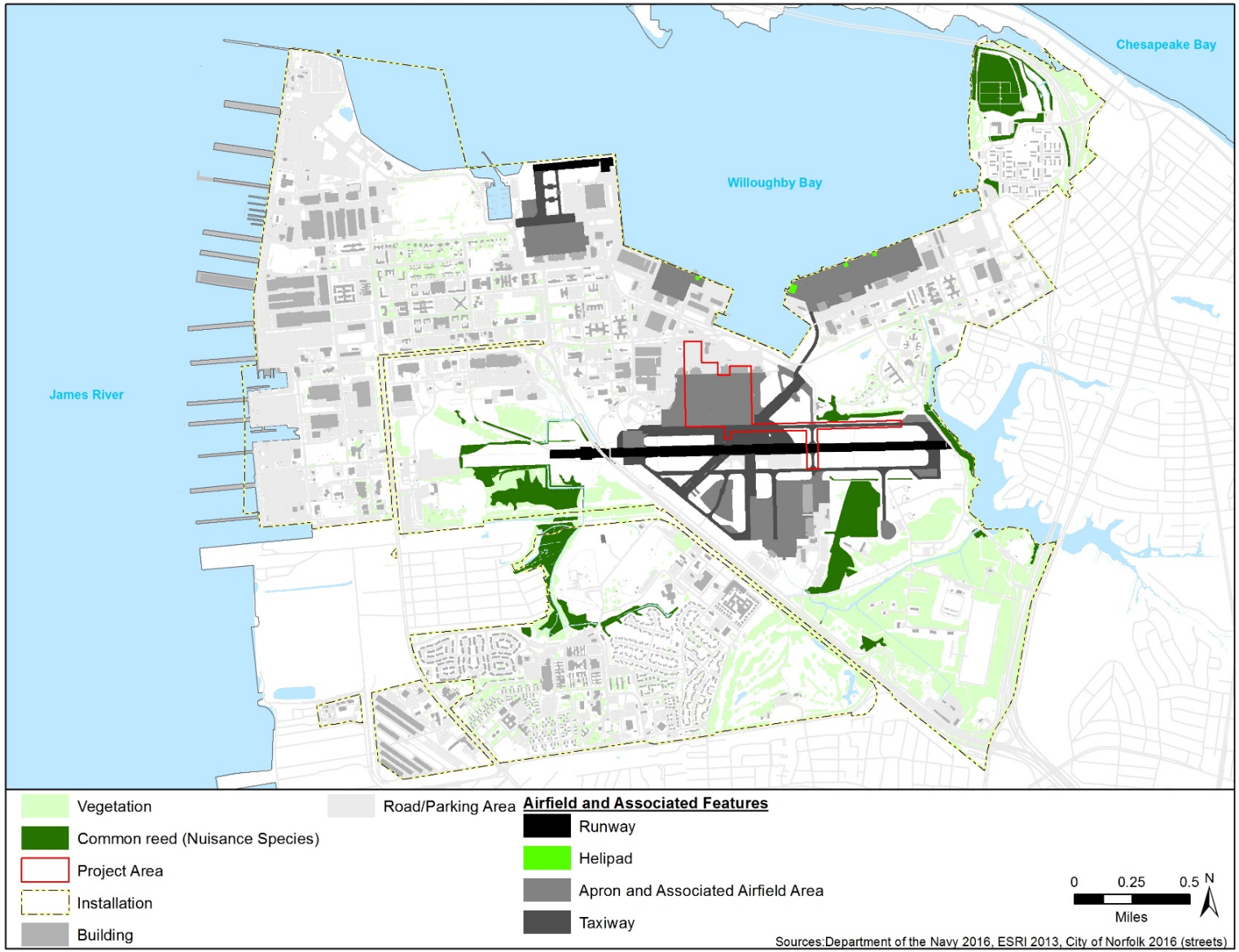


Figure 6.6-1: Vegetation Communities at NS Norfolk

lotor), eastern cottontail (*Sylvilagus floridanus*), eastern gray squirrel (*Sciurus carolinensis*), and muskrat (*Ondatra zibethicus*). Smaller insectivores include the southeastern shrew (*Sorex longirostris longirostris*), eastern mole (*Scalopus aquaticus*), Norway rat (*Rattus norvegicus*), and several species of mice, including the house mouse (*Mus musculus*) and white-footed mouse (*Peromyscus leucopus*) (NAVFAC, 2017).

Acoustic bat surveys were conducted at NS Norfolk in the spring, summer, and fall of 2015. In the spring, only a single big brown bat (*Eptesicus fuscus*) was recorded at NS Norfolk, whereas in the summer and fall, 69 and 8 bat calls were recorded, respectively. Species identified with a likelihood of occurrence include four VDGIF-listed, species including the Rafinesque's eastern big-eared bat (*Corynorhinus rafinesquii macrotis*), the tri-colored bat (*Perimyotis subflavus*), the silver-haired bat (*Lasionycteris noctivagans*), and eastern red bat (*Lasiurus borealis*) (NAVFAC, 2017). The species are further discussed under the Other Special Status Species section.

6.6.2.3 Marine Wildlife

Information on marine wildlife occurring at NS Norfolk is provided in the INRMP (NAVFAC, 2017). The nearshore and tidal/brackish waters surrounding NS Norfolk support a wide diversity of fish species and resident or migratory seabirds. Marine mammals and aquatic reptiles are also known to utilize waters near NS Norfolk and Willoughby Bay; however these species are not commonly observed (Navy, 2013a).

A total of 48 fish species were collected in the nearshore waters of NS Norfolk during 2015 surveys (NAVFAC, 2017). Bay anchovy (*Anchoa mitchilli*), blueback herring (*Alosa aestivalis*), and Atlantic croaker (*Micropogonias undulatus*) are the most commonly occurring species. Three Virginia State Wildlife Action Plan rated species (tier IV - moderate concern) have been documented to occur and include the blueback herring (*Alosa aestivalis*), alewife herring (*Alosa pseudoharengus*), and American shad (*Alosa sapidissima*). In addition, the federally and state-endangered Atlantic sturgeon (*Acipenser oxyrinchus*), ranked tier I (critical conservation need) in the State Wildlife Action Plan, has been documented; refer to **Section 6.6.2.6.4** (Atlantic Sturgeon) for this discussion. The Proposed Action would not take place underwater and would not affect fish or essential fish habitat. As such, they are not discussed further in this document.

Four federally listed species of sea turtles (Kemp's ridley sea turtle, loggerhead sea turtle, leatherback sea turtle, and green sea turtle) are known to occur in Chesapeake Bay. These species are discussed under **Section 6.6.2.6.6** (Sea Turtles)**.**

6.6.2.3.1 Marine Mammals

The MMPA is administered by the USFWS and National Marine Fisheries Service (NMFS) to protect and manage marine mammals. Two species protected under the MMPA, bottlenose dolphin (*Tursiops truncates*) and the federally endangered West Indian manatee (*Trichechus manatus*), are the only species documented to utilize waters near NS Norfolk (NAVFAC, 2017). Bottlenose dolphins were observed around NS Norfolk in three of the four seasons surveyed (fall, spring, and summer) during nearshore surveys conducted in 2015. Under Alternative 1 and 2, the Proposed Action would not take place underwater and would not affect bottlenose dolphin habitat. Additionally, the decrease in annual air operations under Alternative 1 and increase in annual air operations under Alternative 2 would have negligible effects on the existing noise environment over the water (see **Section 6.2** [Noise]). Therefore, there would be no increase in noise that would adversely affect marine mammals. Consequently, the Navy has determined that the Proposed Action would not result in reasonably foreseeable "takes" of a marine mammal species by harassment, injury or mortality, as defined under the MMPA, and there

would be no impact to marine mammals. As such, bottlenose dolphins are not discussed further in this document. The West Indian manatee is discussed further under **Section 6.6.2.6.7** (West Indian Manatee).

6.6.2.3.2 Seabirds

Open waters surrounding NS Norfolk including nearby bays and rivers, provide habitat for a wide range of avian species. Seabirds including several species of gulls (*Larus* spp.), terns (*Sternula* spp.), ducks (*Anas* spp.), and geese (*Branta* spp.) are common offshore as well as in beach and inland areas. Marine/coastal habitat would not be impacted under the Proposed Action. In addition, as described in **Section 6.2** (Noise), implementation of the Proposed Action would not result in a perceptible change to noise, including noise over the marine environment. As such, seabirds are not discussed further in this document.

6.6.2.4 Migratory Birds

A complete list of all species of migratory birds protected under the MBTA is in the *Federal Register* (50 CFR 10.13). In addition, **Appendix E** of the INRMP contains a full list of bird species known to occur at NS Norfolk (NAVFAC, 2017). According to the USFWS' BCC list (USFWS, 2008), NS Norfolk lies within BCR 27 – (Southeastern Coastal Plain). Of the 53 bird species listed by USFWS for BCR 27, 38 species are known to occur at NS Norfolk. **Table 6.6-2** presents these species.

Table 6.6-2: Birds of Conservation Concern Observed at NS Norfolk

Common Name	*(Scientific Name)*	*Potential to Occur within the Project Area*
Saltmarsh Sharp-tailed Sparrow	*Ammodramus caudacutus*	*likely*
Seaside Sparrow	*Ammodramus maritimus*	*likely*
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*	*likely*
Chuck-will's-widow	*Antrostomus carolinensis*	*likely*
Upland Sandpiper	*Bartramia longicauda*	*likely*
American Bittern	*Botaurus lentiginosus*	*likely*
Red Knot	*Calidris canutus*	*likely*
Semipalmated Sandpiper	*Calidris pusilla*	*likely*
Whip-poor-will	*Caprimulgus vociferus*	*likely*
Western Snowy Plover	*Charadrius nivosus nivosus*	*no*
Wilson's Plover	*Charadrius wilsonia*	*likely*
Sedge Wren	*Cistothorus platensis*	*likely*
Common Ground-Dove	*Columbina passerina*	*likely*
Yellow Rail	*Coturnicops noveboracensis*	*likely*
Rusty Blackbird	*Euphagus carolinus*	*likely*
Peregrine Falcon	*Falco peregrinus*	*yes, observed during 2015 surveys at NS Norfolk*
American Kestrel	*Falco sparverius*	*yes, observed during 2015 surveys at NS Norfolk*
Red-throated Loon	*Gavia stellata*	*likely*
Gull-billed Tern	*Gelochelidon nilotica*	*likely*

Table 6.6-2: Birds of Conservation Concern Observed at NS Norfolk (cont.)

Common Name	*(Scientific Name)*	*Potential to Occur within the Project Area*
Kentucky Warbler	*Geothlypis formosa*	*likely*
American Oystercatcher	*Haematopus palliatus*	*yes, observed during 2015 surveys at NS Norfolk*
Bald Eagle	*Haliaeetus leucocephalus*	*yes, observed during 2015 surveys at NS Norfolk*
Wood Thrush	*Hylocichla mustelina*	*likely*
Least Bittern	*Ixobrychus exilis*	*likely*
Black Rail	*Laterallus jamaicensis*	*likely*
Short-billed Dowitcher	*Limnodromus griseus*	*likely*
Swainson's Warbler	*Limnothlypis swainsonii*	*likely*
Marbled Godwit	*Limosa fedoa*	*likely*
Red-headed Woodpecker	*Melanerpes erythrocephalus*	*likely*
Whimbrel	*Numenius phaeopus*	*likely*
Prothonotary Warbler	*Protonotaria citrea*	*likely*
Cerulean Warbler	*Setophaga cerulea*	*likely*
Prairie Warbler	*Setophaga discolor*	*yes, observed during 2015 surveys at NS Norfolk*
Black-throated Green Warbler	*Setophaga virens*	*likely*
Brown-headed Nuthatch	*Sitta pusilla*	*likely*
Least Tern	*Sternula antillarum*	*yes, observed during 2015 surveys at NS Norfolk*
Sandwich Tern	*Thalasseus sandvicensis*	*likely*
Solitary Sandpiper	*Tringa solitaria*	*likely*

Sources: NAVFAC, 2017; USFWS, 2008

NS Norfolk is located in the Atlantic migratory flyway, and the coastal region is an important stopover for migratory birds during spring and fall migrations. The open fields, urban areas, and wetlands, as well as the open water of the nearby bays and rivers, provide habitat for a wide range of avian species. Bird surveys conducted in 2015 identified 103 bird species at NS Norfolk, including six species rated Tier IV (moderate concern) in the Virginia State Wildlife Action Plan, two species rated Tier II (very high conservation need)—the yellow-crowned night-heron (*Nyctanassa violacea*) and the black skimmer (*Rynchops niger*)—and three species not previously included in the installation's bird species list: eastern wild turkey (*Meleagris gallopavo*), Eurasian collared dove (*Streptoplelia decaocto*), and white-throated sparrow (*Zonotrichia albicollis*). Additionally, six BCC species were observed and include peregrine falcon (*Falco peregrinus*), American kestrel (*Falco sparverius*), American oystercatcher (*Haematopus palliatus*), bald eagle (*Haliaeetus leucocephalus*), prairie warbler (*Setophaga discolor*), and least tern (*Sternula antillarum*).

Common species identified include pied-billed grebe (*Podilymbus podiceps*), green-backed heron (*Butorides virescens*), sharp-shinned hawk (*Accipter striatus*), killdeer (*Charadrius vociferus*), ring-billed gull (*Larus delawarensis*), common flicker (*Colaptes auratus*), fish crow (*Corvus ossifragus*), American

robin (*Turdus migratorius*), rock pigeon (C*olumba livia*), Canada goose (*Branta canadensis*), and European starling (*Sturnus vulgaris*). Osprey are known to nest on natural and man-made structures at NS Norfolk, primarily along Mason Creek and in Willoughby Bay (NAVFAC, 2017), which creates a BASH concern.

6.6.2.5 Bird/Animal Aircraft Strike Hazards

Information on BASH occurring at NS Norfolk is provided in the INRMP (NAVFAC, 2017). Appendix H of the INRMP contains the NS Norfolk BASH Safety Plan.

The presence of resident and migratory birds creates a BASH risk at NS Norfolk. The NS Norfolk BASH Plan prescribes an ongoing process to reduce the potential for collisions between aircraft and birds or other animals. The BASH Plan: (1) establishes a Bird Hazard Working Group and designates responsibilities to its members; (2) establishes procedures to identify high hazard situations and aids supervisors and aircrews in altering or discontinuing flying operations when required; (3) establishes aircraft and airfield operating procedures to avoid high-hazard situations; (4) disseminates information to all assigned and transient aircrews on bird hazards and procedures for bird avoidance; (5) establishes guidelines to decrease airfield attractiveness to birds by eliminating, controlling, or reducing environmental factors which support birds; (6) provides guidelines for dispersing birds when they are present on the airfield; (7) identifies organizations with authority to upgrade, initiate, or downgrade bird hazard conditions; (8) establishes procedures for reporting damaging/non-damaging bird strikes; and (9) establishes procedures for collecting bird strike remains.

A control program for BASH is in place at NS Norfolk, which includes a U.S. Department of Agriculture Wildlife Services BASH biologist who actively hazes birds away from the airfield. The BASH program also includes habitat alterations to reduce bird attractants near the airfield.

BASH strikes have been regularly reported at NS Norfolk since the start of record keeping in 1981, with 559 reported strikes to aircraft (540 bird, 19 bat) between 1981 and 2015 (NAVFAC, 2015). The most commonly reported bird strike species include band-tailed gull, wood duck, mourning dove, European starling, mallard, and Canada geese. Known bat strike species include eastern red bat, hoary bat (*Lasiurus cinereus*), and big brown bat. During 2015, twenty-nine strikes were reported at NS Norfolk. The average strikes between 2005 and 2015 was 28 per year (NAVFAC, 2015).

6.6.2.6 Federally Listed Species

Table 6.6-1 at the beginning of this section, lists the federally listed wildlife species known to the region that have the potential to occur within the project area, along with their status and habitat. However, no federally endangered, threatened, or candidate species of flora or fauna are known to be present at NS Norfolk. Federally listed species that would not be affected by the Proposed Action are described in this section but not carried forward for analysis.

6.6.2.6.1 Piping Plover

The piping plover, federally listed as threatened, is known to the region but no occurrences have ever been recorded at NS Norfolk (NAVFAC, 2017). Additionally, NS Norfolk is located outside of federal designated critical habitat for the piping plover (USFWS, 2017b). Virginia is part of this population's southern breeding range and since 1986 has supported a relatively stable number of nesting pairs. Since the late 1990s, 100 percent of the breeding activity in Virginia has occurred on the Eastern Shore's barrier islands (VDGIF, 2017). Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the piping plover. This species is not carried forward for further analysis in this EA.

6.6.2.6.2 Red Knot

No occurrences of the federally threatened red knot have been recorded at NS Norfolk (NAVFAC, 2017). The red knot migrates extremely long distances between nesting areas, traveling 9,300 miles from their wintering grounds at the southern tip of South America to return to their breeding grounds in the Canadian Arctic (NatureServe, 2017a). In Virginia, red knots utilize coastline habitats in late April and early June to rest and refuel. Known habitats occur outside of the project area, and include the Virginia Barrier Islands, False Cape State Park, and Back Bay and Chincoteague National Wildlife Refuges (VDGIF, 2016). Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the red knot. This species is not carried forward for further analysis in this EA.

6.6.2.6.3 Roseate Tern

No occurrences of the federally endangered roseate tern have been recorded at NS Norfolk (NAVFAC, 2017). In Virginia, foraging habitats include the barrier islands, salt marshes, shallow coastal waters, inlets and offshore seas. No known breeding occurs south of Long Island, New York (Center for Biological Diversity, 2017). There is no suitable habitat for the roseate tern within the project area. Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the roseate tern. This species is not carried forward for further analysis in this EA.

6.6.2.6.4 Atlantic Sturgeon

The federally endangered Atlantic sturgeon has been detected offshore of NS Norfolk. There is only one known spawning population for the sturgeon in the James River. Current evidence of Atlantic sturgeon spawning in rivers of the Chesapeake Bay distinct population segment is lacking (National Oceanic and Atmospheric Administration, n.d.). The Proposed Action would not take place underwater and would not affect Atlantic sturgeon habitat. Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the Atlantic sturgeon. This species is not carried forward for further analysis in this EA.

6.6.2.6.5 Northern Long-eared Bat

Range for the northern long-eared bat, federally and state listed as threatened, includes the City of Norfolk (USFWS, 2017c). However, no occurrences of northern long-eared bat have ever been recorded at NS Norfolk (NAVFAC, 2017). Most recently, roving bat acoustic surveys were conducted in the spring, summer, and fall of 2015. No northern long-eared bats were detected. No suitable foraging habitat exists within the project area. Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the northern long-eared bat.

The INRMP recommends an additional threatened and endangered species inventory be conducted to include a combination of acoustic and mist-netting bat surveys to monitor known bat populations at NS Norfolk. If the new data were to identify presence of the northern long-eared bat, the Navy would immediately notify the USFWS. Due to lack of documented presence and suitable habitat, this species is not carried forward for further analysis in this EA.

6.6.2.6.6 Sea Turtles

Five federally listed species of sea turtles (Hawksbill sea turtle, Kemp's ridley sea turtle, Loggerhead sea turtle, Leatherback sea turtle, and green sea turtle) are known to occur in Chesapeake Bay from May to mid-November, with peak abundance from June through October (NAVFAC, 2017). There has been no documented use of NS Norfolk beaches by sea turtles for nesting. It is believed the current condition of the shoreline habitats at NS Norfolk is not favored for nesting by any of the federally listed sea turtle

species; however, species are documented within the lower Chesapeake and the Elizabeth Rivers. No suitable habitat exists within the project area. The Proposed Action would not take place underwater and would not affect sea turtle habitat. Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the Hawksbill sea turtle, Kemp's ridley sea turtle, Loggerhead sea turtle, Leatherback sea turtle, or green sea turtle. These species are not carried forward for further analysis in this EA.

6.6.2.6.7 West Indian Manatee

The federally endangered West Indian manatee has been detected in the waters near NS Norfolk. A lone manatee was observed in September 1995 in Willoughby Bay. The sighting was considered unusual (NAVFAC, 2017). No suitable habitat exists within the project area. The Proposed Action would not take place underwater and would not affect manatee habitat. Additionally, the decrease in annual air operations under Alternative 1 and increase in annual air operations under Alternative 2 would have negligible effects on the existing noise environment over the water (see **Section 6.2** [Noise]). Therefore, there would be no increase in noise that would adversely affect marine mammals. Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the West Indian manatee. This species is not carried forward for further analysis in this EA.

6.6.2.6.8 Fin Whale

The federally endangered fin whale has been observed in the Chesapeake Bay, and although rare in shallow depths, has the potential to utilize waters near NS Norfolk. However, the Proposed Action would not take place underwater and would not affect fin whale habitat. Additionally, the decrease in annual air operations under Alternative 1 and increase in annual air operations under Alternative 2 would have negligible effects on the existing noise environment over the water (see **Section 6.2** [Noise]). Therefore, there would be no increase in noise that would adversely affect marine mammals. Accordingly, the Navy has determined that the Proposed Action would have *no effect* on the fin whale. This species is not carried forward for further analysis in this EA.

6.6.2.7 Other Special Status Species

No bald eagles, which are protected under the BGEPA, are known to occur within the project area. The closest bald eagle nest (NO1502) is located approximately 1,700 feet from the end of runway 10/28 and 1.25 miles from the proposed aircraft hangar (USFWS, 2017b). This nest was last occupied in 2016. No aircraft strikes with bald eagles have been recorded in the BASH records for NS Norfolk.

Four bat species listed in the VDGIF State Wildlife Action Plan were confirmed at NS Norfolk during roving bat acoustic surveys conducted in the spring, summer, and fall of 2015 (NAVFAC, 2017). These species include the Rafinesque's eastern big-eared bat (listed under the Virginia ESA as endangered; *Tier I Critical Conservation Need*), the tri-colored bat (listed under the Virginia ESA as endangered; *Tier I Critical Conservation Need*), the silver-haired bat (*Tier IV Moderate Concern*), and eastern red bat (*Tier IV Moderate Concern*).

The INRMP lists recommended projects for protecting these bat species, including: (1) implementing additional surveys for bats, with a combination of passive acoustic surveys and mist-netting and (2) building bat houses away from the Airfield Operations Area. Annual bat monitoring, along with regular acoustic surveys, could help natural resource managers better understand which species occur on the installation, when and where they occur, and how their population numbers are changing through time. Mist-netting would allow properly trained wildlife biologists to not only definitively

identify which species are present, but would also provide an opportunity to check for signs of white-nose syndrome in the local bat population (NAVFAC, 2017). Additionally, the INRMP proposes bat surveys, with a combination of acoustic surveys and mist-netting, to monitor the seasonal presence of the Rafinesque's eastern big-eared bat and the tri-colored bat (NAVFAC, 2017).

6.6.2.8 Climate Change

An overall discussion of climate change is provided in **Section 6.4.2.2** (Greenhouse Gases and Climate Change). This section provides a discussion of climate change as it relates to biological resources at NS Norfolk. Climate is an important environmental influence on ecosystems. Changing climate affects ecosystems in various ways. For instance, warming may force species to migrate to higher latitudes or higher elevations where temperatures are more conducive to their survival. Similarly, as the sea level rises, saltwater intrusion into a freshwater system may force some key species to relocate or die, thus removing predators or prey that are critical in the existing food chain.

Ecosystems can serve as natural buffers from extreme events such as wildfires, flooding, and drought. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Examples include reefs and barrier islands that protect coastal ecosystems from storm surges, wetland ecosystems that absorb floodwaters, and cyclical wildfires that clear excess forest debris and reduce the risk of dangerously large fires.

Climate change and shifts in ecological conditions could support the spread of pathogens, parasites, and diseases, with potentially serious effects on human health, agriculture, and fisheries. Climate change, along with habitat destruction and pollution, is one of the important stressors that can contribute to species extinction. The Intergovernmental Panel on Climate Change estimates that 20 to 30 percent of the plant and animal species evaluated so far in climate change studies are at risk of extinction if temperatures reach the levels projected to occur by the end of this century.

While the implications of climate change may influence of the various ecological processes noted above, the factors applicable to the Proposed Action at NS Norfolk include extreme weather and sea level rise.

Sea level rise has the potential to affect existing coastal infrastructure critical to the NS Norfolk. Impacts from sea level rise at NS Norfolk may have implications on the available shoreline areas, coastal flooding, and ecosystems. Coastal ecosystems are particularly vulnerable to climate change because many have already been dramatically altered by human stresses; climate change will result in further degradation or loss of the services that these ecosystems provide, including potentially irreversible impacts (U.S. Global Change Research Program, 2014). Sea level rise in coastal habitats can increase the salinity of surface water areas, leading to a decline in the extent and composition of coastal marshes. This increase in salinity impacts the plant and animal species that are present in these areas. Climate change could support shifts in local species composition, invasive or new locally viable species, changes in species growth rates, shifts in migratory patterns or dates, and alterations to spawning seasons (Osgood, 2008).

6.7 WATER RESOURCES

This discussion of water resources includes groundwater, surface water, wetlands, and floodplains. This section discusses the physical characteristics of these resources; wildlife and vegetation are addressed in **Section 6.6** (Biological Resources).

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

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load (TMDL) is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur.

Wetlands are jointly defined by USEPA and USACE as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include "swamps, marshes, bogs and similar areas" (40 CFR section 230.3[t] and 33 CFR section 328.3[b]).

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation, that is, the 100-year and 500-year flood. Floodplain delineation maps are produced by the Federal Emergency Management Agency and provide a basis for comparing the locale of the Proposed Action to the floodplains.

6.7.1 REGULATORY SETTING

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

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

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

Section 438 of the Energy Independence and Security Act (42 U.S.C. section 17094) establishes stormwater design requirements for development and redevelopment projects. Under these

requirements, federal facility projects larger than 5,000 square feet 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 Virginia's NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to obtain coverage under an NPDES Construction General Permit for stormwater discharges. Construction or demolition that necessitates an individual permit also requires preparation of a Notice of Intent to discharge stormwater and a Stormwater Pollution Prevention Plan (SWPPP) that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Wetlands are currently regulated by USACE under Section 404 of the CWA as a subset of all "waters of the United States." The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Jurisdictional waters of the United States regulated under the CWA include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, and "other" waters that, if degraded or destroyed, could affect interstate commerce. The full regulatory definition of waters of the United States is provided in the CWA.

EO 11990, *Protection of Wetlands,* requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other waters of the United States. Any discharge of dredge or fill into waters of the United States requires a permit from the USACE.

EO 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a one percent chance of inundation by a flood event in a given year.

The CZMA provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Actions occurring within the coastal zone commonly have several resource areas that may be relevant to the CZMA. The CZMA regulatory setting discussion is discussed in **Section 9.1.1** (Coastal Zone Management). CZMA enforceable policies under the approved Virginia Coastal Zone Management program include policies administered by the Chesapeake Bay Act and its regulations. According to VDEQ, federal actions on federal lands not within the coastal zone (per Section 304 of CZMA), but within the Tidewater area of Virginia, are required to be consistent to the maximum extent practicable with the performance criteria related to regulation of locally designated Resource Protection Areas (RPAs) and Resource Management Areas as provided in sections 9VAC25-830-130 and 140. RPAs include tidal wetlands, certain non-tidal wetlands, and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. In Norfolk, Resource Management Areas, which

require less stringent performance criteria than RPAs, consist of the land area adjacent to and landward of the RPA and extend landward to include the remainder of the lot or parcel designated as RPA.

6.7.2 AFFECTED ENVIRONMENT

6.7.2.1 Groundwater

The shallow aquifer system underlying NS Norfolk is composed of the Columbia (surficial) aquifer, the Yorktown confining zone, and the Yorktown-Eastover aquifer (McFarland and Bruce, 2006; Smith and Harlow, 2002). The Columbia aquifer is 4 to 4.5 feet below ground surface near NS Norfolk. Water quality in the Columbia aquifer is poor, and the aquifer is not locally used as a source of potable water (NAVFAC, 2007). The depth of the aquifer varies seasonally and during drought cycles. The Yorktown confining zone occurs across most of the coastal plain and locally obstructs groundwater flow from the surficial aquifer to the underlying Yorktown-Eastover aquifer. The Yorktown-Eastover aquifer begins several hundred feet below ground surface. This feature is wedge-shaped, ranging from 100 to 200 feet thick inland to 240 to 280 feet thick at the eastern shoreline of Virginia Beach (McFarland and Bruce, 2006; Smith and Harlow, 2002). The Columbia Aquifer is tidally influenced and discharges to Mason Creek, the Elizabeth River, and Willoughby Bay (Agency for Toxic Substances and Disease Registry, 2002). Groundwater recharge in the area occurs mainly through precipitation infiltrating the Columbia aquifer. Recharge of this surficial aquifer is limited due to a shallow layer of clayey (impermeable) soil. Urban development, including paved surfaces, drains and drainage ditches, and stormwater sewers, also inhibit groundwater recharge in the developed areas of Norfolk (Smith and Harlow, 2002). Concerns about declining groundwater levels as a result of groundwater withdrawals in southeastern Virginia have led to the region, including Norfolk, being designated as a groundwater management area by the Commonwealth.

6.7.2.2 Surface Water

NS Norfolk is in the Chesapeake Bay drainage basin and is surrounded by highly modified shorelines and dredged waterways. The installation is bordered to the west by the James River Hampton Roads Harbor, to the north by Willoughby Bay, and to the east by Mason Creek. The James River Hampton Roads Harbor and Willoughby Bay are listed as an Impaired Waters by the VDEQ. The James River Hampton Roads Harbor is listed 5a due to chlorophyll-a, nutrient/eutrophication, biological indicators, and polychlorinated biphenyls (PCBs) in fish tissues (VDEQ, 2014). Willoughby Bay is listed 5a due to PCB in fish tissues and enterococcus bacterial counts in beach areas (VDEQ, 2014). A 5a classification denotes that the water body is impaired for one or more designated uses by one or more pollutants and requires that TMDLs be established for those pollutants to meet water quality standards.

Surface water at NS Norfolk drains mainly to Mason Creek east of the installation, the James River Hampton Roads Harbor west of the installation, or to the remnants of Bousch Creek in the central part of the installation. Because of the proximity of the Atlantic Ocean and the low relief in the area, surface waters on the installation are tidally influenced or brackish (CH2M HILL, 2005). However, no surface water bodies are located within the project area at NS Norfolk. Surface runoff at the installation is transported via a system of storm drainage ditches and underground culverts to Mason Creek, the James River Hampton Roads Harbor, and Willoughby Bay (CH2M HILL, 2005; Garman and Harris, 1997). Stormwater runoff from the project area collects in a series of storm drains and discharges to the north in Willoughby Bay through stormwater outfall 115.

NS Norfolk operates under a Virginia Pollutant Discharge Elimination System (VPDES) permit (permit #VA0004421) that covers outfalls that discharge stormwater from various industrial facilities on the

installation. As part of the permit program, NS Norfolk has prepared a SWPPP to control stormwater discharges from the installation that could adversely affect water quality in surrounding surface waters. The plan identifies sources of pollution that affect the quality of stormwater discharges from industrial areas associated with airfield operation and support activities. The plan also provides guidelines for the installation's SWPPP and technical procedures such as best management practices (BMPs) to prevent illicit discharges to the stormwater drainage system. BMPs include structural modifications such as skimmer dams, spill-control gates, oil/water separators, and roof and canopy structures over waste storage areas and personnel training.

In addition, NS Norfolk operates in accordance with the Virginia Stormwater Management Program (VSMP) and Municipal Separate Stormwater Sewer System general permit (permit# VAR040114) for non-industrial stormwater discharges, as administered by the VDEQ.

6.7.2.3 Wetlands

Wetlands at NS Norfolk mostly occur within the vegetated areas adjacent to the runway and taxiways at Chambers Field, along Mason Creek, and in isolated areas on the shoreline of Willoughby Bay (EDAW, 2007). There are approximately 100 acres of delineated wetlands on NS Norfolk (NAVFAC, 2007). No wetlands occur within the project area. However, there are wetlands adjacent to the project area approximately 50 feet north of the existing taxiway (**Figure 6.7-1**). The existing wetlands are contained on federal lands and are regulated under Section 404 of the CWA, and to the extent there are any spillover effects into the coastal zone, are subject to the enforceable policies contained within the Chesapeake Bay Act as part of the approved Virginia Coastal Zone Management Program.

6.7.2.4 Floodplains

Federal Emergency Management Agency estimates the Zone AE base flood elevation in the nearest flood hazard area to the project area to be 8 feet above mean sea level (AMSL) (Federal Emergency Management Agency, 2017). Portions of NS Norfolk adjacent to Willoughby Bay and the Elizabeth River are below the base flood elevation and would likely be within the 100-year floodplain (**Figure 6.7-2**). However, most of the project area is located at approximately 10 feet AMSL and outside of the 100-year floodplain. Portions of the taxiway expansion area are located within the 100-year floodplain (Federal Emergency Management Agency, 2017).

6.7.2.5 Climate Change

An overall discussion of climate change is provided in **Section 6.4.2.2** (Greenhouse Gases and Climate Change). This section provides a discussion of climate change as it relates to water resources at NS Norfolk. A global sea level rise of approximately 0.5 meters to 2 meters (2 feet to 7 feet) has been predicted over the next century from 2000 to 2100. Under the present sea level, approximately 60 percent of the coastal land around NS Norfolk would be underwater with the occurrence of a 100-year interval storm surge event. With a 7-foot rise in sea level, approximately 80 percent of the coastal land surrounding the installation would be underwater with the occurrence of a 100-year event including the project area (Li et al., 2013). In addition, the Norfolk area is undergoing land subsidence, mainly from natural causes, which makes it one of the more vulnerable areas in the country to the impacts from sea level rise. A 2014 risk quantification from sea level rise at NS Norfolk found that a 0.5-meter (2-foot) sea level rise would dramatically increase probabilities of infrastructure damage and losses in mission performance at the installation (Burkes-Copes et al., 2014).

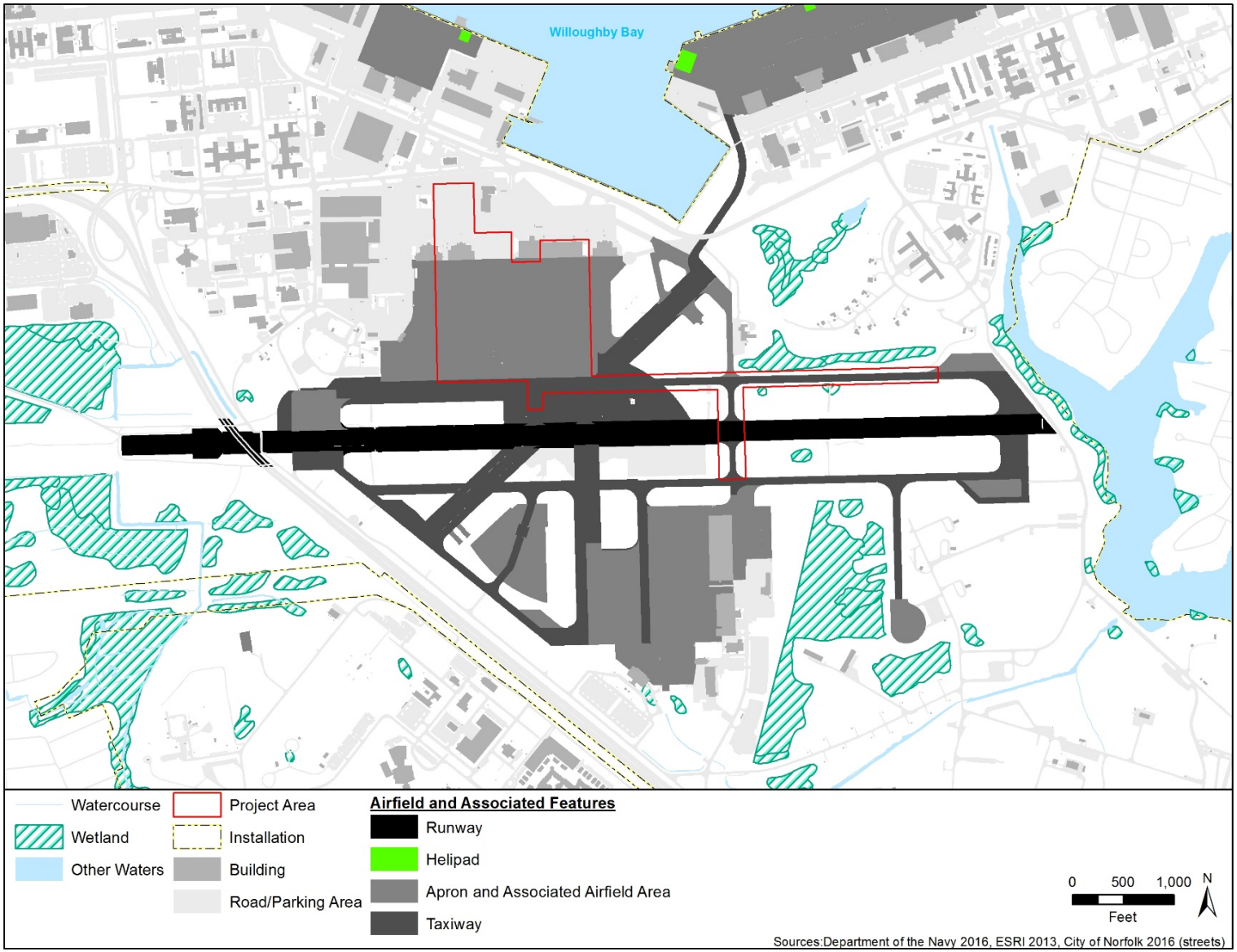


Figure 6.7-1: Wetlands and Other Waters of the United States at NS Norfolk

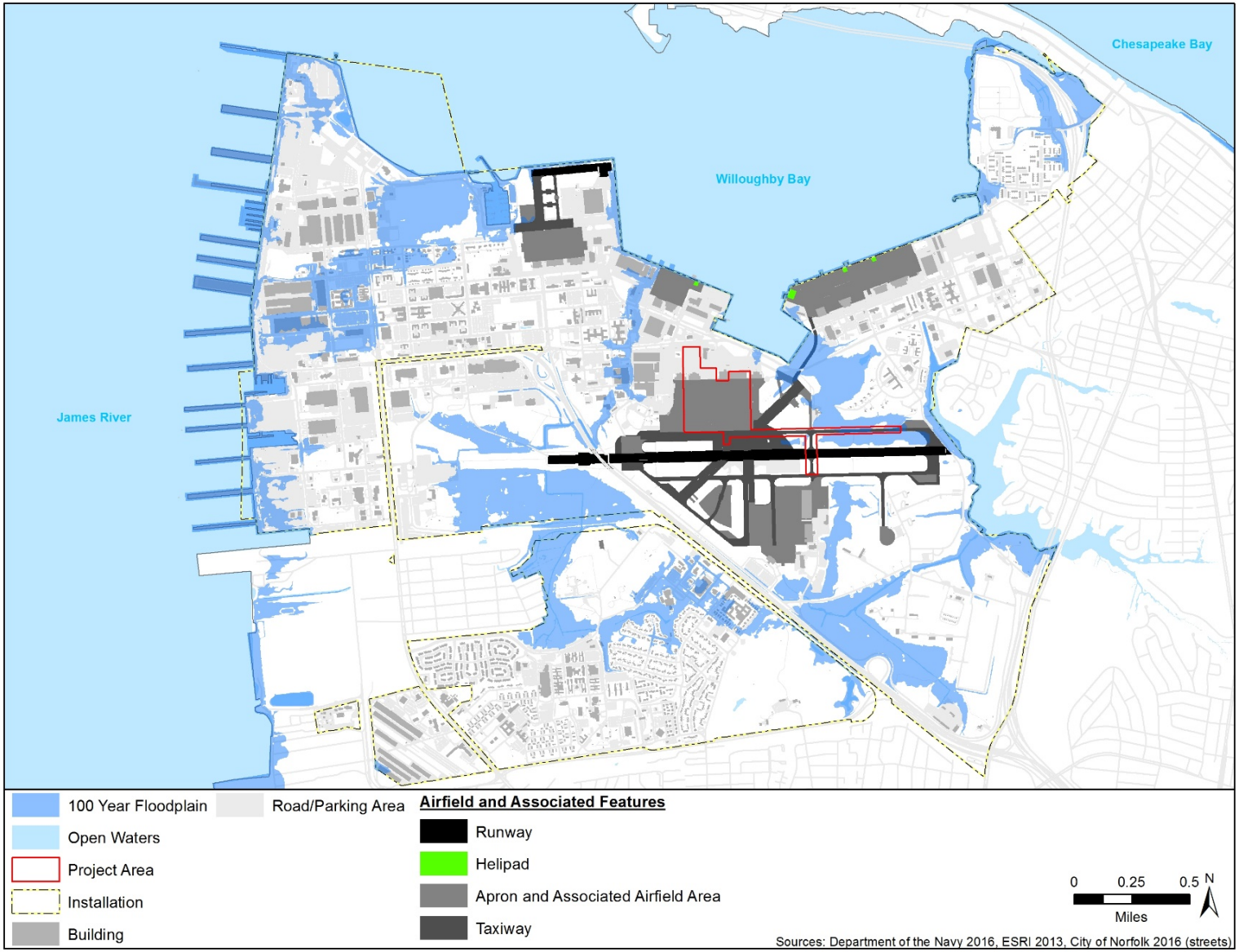


Figure 6.7-2: 100-Year Flood Plain at NS Norfolk

Sea level rise and storm surge can also have impacts far beyond the area directly affected. Sea level rise can combine with other climate-related impacts and existing pressures, such as land subsidence, causing significant economic and ecological implications. Freshwater supplies from rivers, streams, and groundwater sources near the coast are at risk from accelerated saltwater intrusion due to higher sea levels. Porous aquifers in some areas make them particularly vulnerable to saltwater intrusion.

6.8 INFRASTRUCTURE

This section discusses infrastructure including utilities (including water distribution, wastewater collection, stormwater collection, solid waste management, and energy), and facilities. Transportation systems and traffic are addressed separately in **Section 6.5** (Transportation). The affected environment is infrastructure at NS Norfolk, the City of Norfolk, and Hampton Roads.

6.8.1 REGULATORY SETTING

EO 13834, *Efficient Federal Operations*, requires federal departments and agencies to meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. The goals of this EO focus on increasing building energy efficiency, renewable energy usage, reducing potable and non-potable water consumption, conforming with sustainable design principles, and implementing waste prevention/recycling measures. In accordance with this EO, the Navy must prioritize actions that reduce waste, cut costs, enhance the resilience of federal infrastructure and operations, and enable more effective accomplishment of its mission.

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

6.8.2 AFFECTED ENVIRONMENT

6.8.2.1 Water Distribution

Potable water is provided by the City of Norfolk. The water distribution system on NS Norfolk is maintained by the Navy Public Works Center, Utilities Department, which serves a population of approximately 45,000 people. In Fiscal Year 2013, the average daily consumption at NS Norfolk was 2.73 million gallons per day (MGD). Norfolk's primary water supply comes from eight reservoirs located in Norfolk as well as Suffolk/Isle of Wight County. Additional water sources include the Blackwater and Nottoway Rivers and four deep wells located in Suffolk (Navy, 2014c). From the reservoirs, water is pumped through pipes to the City of Norfolk's 37th Street Treatment Plant, which has a capacity of 28 MGD (CH2M HILL, 2014a).

6.8.2.2 Wastewater Collection

Sanitary sewer services are provided by the Hampton Roads Sanitation District. Hampton Roads Sanitation District services 1.7 million people throughout Hampton Roads and operates 13 treatment plants with a combined capacity of 249 MGD (Hampton Roads Sanitation District, 2016). NS Norfolk operates under a Hampton Roads Sanitation District Industrial Wastewater Discharge Permit. The permit requires all active oil/water separators, sedimentation traps, and valves to be inspected quarterly and maintained to manufacturer's specifications. It also requires an inspection log to be kept for all pretreatment devices. Aircraft wash racks at NS Norfolk are equipped with oil/water separators and

diversion valves. During aircraft washing, the valves are positioned so that the effluent is directed into the sanitary sewer. At all other times, the valves are positioned to discharge to the stormwater system.

6.8.2.3 Stormwater Collection

NS Norfolk has an extensive stormwater collection system that includes gutters, culverts, ditches, and underground piping, which directs stormwater into receiving channels and stormwater detention basins. Stormwater is discharged into surrounding waters. NS Norfolk operates under a VPDES permit for industrial discharges as well as a Virginia General Permit for Small Municipal Separate Storm Sewer Systems. The VPDES permit sets requirements for sampling and analyzing runoff from stormwater and non-stormwater sources. In accordance with the VPDES permit, NS Norfolk prepared an SWPPP (Navy, 2015c) to identify potential sources of pollution that may affect the water quality of stormwater discharges associated with an industrial activity, including air transportation operations, and identify BMPs to ensure protection of waters from adverse water quality impacts.

The Small Municipal Separate Storm Sewer Systems permit requires NS Norfolk to develop, implement, and enforce control measures at the installation, including public involvement, outreach and education on stormwater impacts, construction and post construction stormwater runoff control and management, illicit discharge detection and elimination, and pollution prevention.

The Proposed Action would not result in an alteration of the collection system. Therefore, stormwater collection infrastructure is not addressed further in **Section 7.8** (Infrastructure).

6.8.2.4 Solid Waste Management

Solid waste management services for NS Norfolk are provided by the City of Norfolk Waste Management Division. To ensure protection of human health and the environment, solid waste is managed in compliance with the installation's Solid Waste Management Plan. The Navy's goal is to divert 50 percent of non-hazardous solid waste from landfills. Currently, solid waste is transported to an off-installation refuse derived fuel plant in Portsmouth that supplies steam to Norfolk Naval Shipyard.

6.8.2.5 Energy

The majority of electric power is provided to NS Norfolk by Dominion Virginia Power. Dominion provides electricity to more than 2.4 million customers through its local delivery companies in Virginia and northeastern North Carolina. NS Norfolk's load ranges from 90 to 110 megawatts (300 megawatts is available) (Eyler, 2016). Additional electricity is supplied by a 3-megawatt solar array located on the installation. The installation also plans to operate a cogeneration plant that would generate an additional 15 megawatts at NS Norfolk.

Natural gas is supplied to NS Norfolk by Virginia Natural Gas. Natural gas is used for steam production and heat throughout NS Norfolk. Steam is currently produced at two steam plants at NS Norfolk and is distributed throughout the installation. Steam loads at NS Norfolk consist of buildings, ships, and distribution losses. A partial conversion from centralized steam to natural gas heating or high-efficiency boilers has taken place at NS Norfolk to increase energy efficiency where applicable. The planned 15-megawatt cogeneration plant will also produce steam once it is operational.

Liquid fuels, including diesel, gasoline, and jet fuel, are supplied to the installation by contractors. Fuel is stored in aboveground and underground storage tanks. Primary uses for liquid fuels include steam generation, emergency electricity generation, aircraft, land-based vehicles, and water-based vehicles.

6.9 CULTURAL RESOURCES

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

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Traditional cultural properties may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

6.9.1 REGULATORY SETTING

Cultural resources are governed by other federal laws and regulations, including the National Historic Preservation Act (NHPA), Archeological and Historic Preservation Act, American Indian Religious Freedom Act, Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Federal agencies' responsibility for protecting historic properties is defined primarily by sections 106 and 110 of the NHPA. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties. Section 110 of the NHPA requires federal agencies to establish—in conjunction with the Secretary of the Interior—historic preservation programs for the identification, evaluation, and protection of historic properties. Cultural resources also may be covered by state, local, and territorial laws.

6.9.2 AFFECTED ENVIRONMENT

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

The Navy has conducted inventories of cultural resources at NS Norfolk to identify historic properties that are listed or potentially eligible for listing in the NRHP (NAVFAC, 2013).

The area of potential effect (APE) for cultural resources is the geographic area or areas within which an undertaking (project, activity, program, or practice) may cause changes in the character or use of any historic properties present. The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking. For this Proposed Action, the Navy determined that the APE includes the project area (i.e., where facilities construction would occur) (see **Figure 2.1-2**) and its viewshed.

Typically, the Navy would also consider the 65 dB DNL noise contour as defining the APE in order to evaluate the potential impacts of the Proposed Action as it relates to cultural resources and historic

properties, including architectural or built resources, archaeological resources, and American Indian Resources. Typically, this analysis would evaluate the undertaking with the potential to affect historic properties and consider both the direct effects of the proposed action (construction, renovation and demolition activities) as related to architectural features of historic properties and the indirect effects of the proposed action (noise, vibration and aesthetics of aircraft operations) on historic properties. Since there is no discernable change in aircraft noise contours (refer to **Section 7.2** [Noise]) between the No Action Alternative and the action alternatives, and a very slight change in operational tempo at the airfield, any potential effects of the undertaking would be nearly identical to current conditions. Furthermore, the Navy is relying on previous consultations for the broader area under the 65 dB DNL noise contour. Therefore, the Navy is focusing its analysis on the direct effects of the Proposed Action related to construction, renovation, and demolition activities and indirect effects of noise, vibration, and aesthetics of those construction activities within the viewshed.

To facilitate management of cultural resources in accordance with the NHPA, the Navy has developed and implemented a Regional Integrated Cultural Resources Management Plan (ICRMP) for the Hampton Roads facilities (Navy, 2013e), including those in this EA. NS Norfolk is currently covered under a Regional Programmatic Agreement (PA), which was executed in 1999 among Commander, Navy Region Mid-Atlantic; the Advisory Council on Historic Preservation; and Virginia SHPO (Navy, 1999).

The Regional PA provides a system for categorizing buildings and structures and for assigning agreed upon treatments for each category of property. The Navy and the Virginia SHPO have agreed to the appropriate treatment categories for all resources predating 1948 that were constructed at the installations covered by the agreement.

The highest priority preservation rating (Category 1) indicates that the district or overall property is of outstanding significance and deserves the corresponding highest level of commitment and care from the Navy. A Category 2 historic preservation priority rating for a district or overall property indicates that it retains good, but somewhat compromised, integrity of the features that define its sense of place. A Category 3 historic preservation priority rating for a district or overall property indicates that it has seriously compromised integrity of the features that define its sense of place.

Each historic preservation priority category has an applicable treatment category, which outlines specific historic preservation treatment considerations for each category. The Regional PA also includes a list of activities that are acknowledged to have no adverse effect, and which Commander, Navy Region Mid-Atlantic may implement without consultation with the Virginia SHPO (Navy, 2013e).

6.9.2.1 Architectural Resources

In 1998, the Navy prepared an intensive-level survey of architectural resources at NS Norfolk, including Chambers Field (Navy, 1998). The survey was based upon architectural resources studies conducted in the 1970s, 1980s, and 1990s. The purpose of the 1998 survey was to provide NRHP eligibility recommendations for 643 architectural resources built at NS Norfolk prior to 1947 and identified by the Navy in a preliminary architectural survey completed in 1996. These surveys resulted in the identification of three NRHP-eligible districts at NS Norfolk: the Naval Administration/Recruit Training Station Historic District, the Naval Supply Depot Historic District, and the Naval Air Station Historic District (Navy, 2013e; Navy, 1999). In addition, in 1975, the Jamestown Exposition Site Historic District was listed in the NRHP. An additional survey of resources constructed between 1948 and 1962 that have become 50 years old since the initial survey was completed, and no additional potentially significant properties were identified (Navy, 2013e).

The following provides a summary of the NRHP-eligible and NRHP-listed architectural resources at NS Norfolk, including their historic preservation rating; none are located within the APE.

6.9.2.1.1 Jamestown Exposition Site Historic District

The Jamestown Exposition Site Historic District is located in the northwest portion of NS Norfolk, more than 1 mile northwest of the APE (**Figure 6.9-1**). Listed in the NRHP in 1975, the Jamestown Exposition Site Historic District includes buildings constructed for the 1907 Jamestown Exposition, as well as other quarters and support buildings either acquired or built by the Navy when it established Naval Operating Base Norfolk in 1917 (Navy, 2013e). All but three of the historic buildings (Buildings G29, M47, and M104) were transferred from the Navy to Mid-Atlantic Military Family Communities LLC in 2005 as part of a Public Private Venture project for family housing, and the Navy is no longer responsible for managing these facilities. The Jamestown Exposition Site Historic District has a historic preservation priority rating of Category 1 under the Regional PA (Navy, 2013e).

6.9.2.1.2 Naval Administration/Recruit Training Station Historic District

The Naval Administration/Recruit Training Station Historic District is located in the northwest portion of NS Norfolk about 0.8 miles northwest of the APE (**Figure 6.9-1**). Determined eligible under NRHP Criteria A and C with a period of significance of 1917 to 1946, the Naval Administration/Recruit Training Station Historic District is associated with the evolution of naval recruit training. The district represents the core area of administration, recruit, training, and recreational activities and illustrates the characteristics of permanent military construction spanning the period of World War I through World War II. The district encompasses various building types, including administration and school buildings, barracks, mess hall, and recreation and personnel support buildings, of which 24 resources contribute to the NRHP eligibility of the historic district (Navy, 2013e). The district overlies the site design created for the 1907 Jamestown Exposition and retains the original street grid and several important buildings in Block N (Buildings N21, N23, and N24) that are considered to be individually eligible for inclusion in the NRHP. The Naval Administration/Recruit Training Station Historic District has a historic preservation priority rating of Category 2 under the Regional PA (Navy, 2013e).

6.9.2.1.3 Naval Supply Depot Historic District

The Naval Supply Depot Historic District is located in the northwest portion of NS Norfolk, about 1.7 miles northwest of the APE (**Figure 6.9-1**). The Naval Supply Depot Historic District was determined eligible under NRHP Criteria A and C, with a period of significance of 1941 to 1945. The district is associated with the evolution of naval supply functions, and by World War II housed the Navy's largest supply depot. The district currently consists of a very large-scale warehouse (Warehouse W143) on its west side, and a pier with transit shed (Pier 8 and Transit Shed W4) on the east, with the two areas divided by Decatur Avenue (Navy, 2013e). The Naval Supply Depot Historic District has a historic preservation priority rating of Category 2 under the Regional PA (Navy, 2013e).

6.9.2.1.4 Naval Air Station Historic District

The Naval Air Station Historic District is located in the north-central portion of NS Norfolk, between about 0.4 miles northwest and 0.1 miles north of the APE (**Figure 6.9-1**). Determined eligible under NRHP Criteria A and C with a period of significance of 1917–1948, the Naval Air Station Historic District illustrates the evolution of naval aviation from World War I through World War II when the aircraft carrier assumed equal importance with the battleship (Navy, 2013e). The Naval Air Station Historic District is made up of five different (discontiguous) parcels and represents all aspects of the installation's mission.

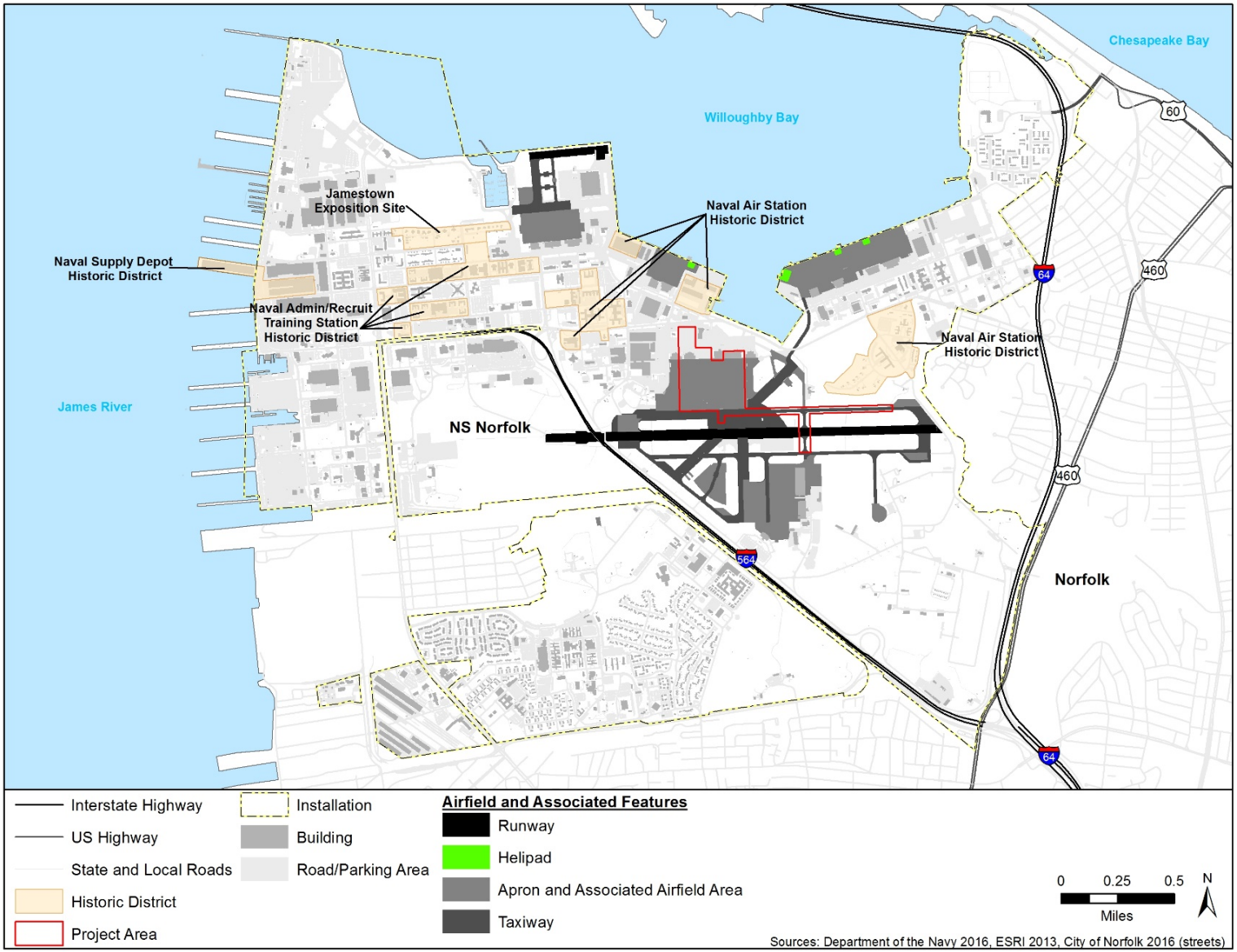


Figure 6.9-1: Historic Districts at NS Norfolk

There are currently 40 resources that contribute to the historic district. The Navy is no longer responsible for managing 14 of these facilities, including 2 in the Administration and Support component (Buildings U16 and U20) and 12 in the Family Housing Area (Buildings SP18, SP19, SP20, SP21, SP22, SP23, SP24, SP25, SP26, SP27, SP34, and SP56). This leaves 25 contributing resources under the responsibility of the Navy. The Naval Air Station Historic District has a historic preservation priority rating of Category 2 under the Regional PA (Navy, 2013e).

6.9.2.2 Archaeological Resources

There have been 12 reports or letters generated between 1990 and 2014 from eight Phase 1 archaeological surveys, one predictive model and resource assessment of NS Norfolk, two Phase 1a assessments (one of which was subsequently incorporated into the predictive modeling report), and one letter detailing monitoring that occurred on the installation (NAVFAC, 2013). Five sites have been identified at NS Norfolk, one site has been determined potentially eligible for listing on the NRHP and four sites have been determined not eligible by the Virginia SHPO. Archaeological testing was conducted in the vicinity of the airfield in 1999. The testing revealed no intact cultural horizons, and no cultural artifacts were recovered from a significant context. There are no NRHP-eligible or NRHP-listed archaeological resources located within the APE.

6.9.2.2.1 Traditional Cultural Properties

The Navy consults with federally recognized Indian tribes on actions with the potential to significantly affect protected tribal resources, tribal treaty rights, or Indian lands. Until the Pamunkey Indian Tribe of Virginia received federal recognition in January 2016, there had been no federally recognized Indian tribes located in the Commonwealth of Virginia. However, in the past, two federally recognized tribes have requested to review federal projects located in the Hampton Roads area: the Catawba Indian Nation and the United Keetoowah Band of the Cherokee Indians in Oklahoma.

There are no traditional cultural properties (TCPs) at NS Norfolk listed in the NRHP and no known sites are considered potentially eligible for listing. The Navy sent letters to the Absentee Shawnee Tribe, Catawba Indian Nation, Cherokee Nation, Eastern Band of Cherokee Indians, Pamunkey Indian Tribe, Tuscarora Nation of New York, and the United Keetoowah Band of Cherokee Indians in Oklahoma on November 20, 2017, requesting information about any TCPs (refer to **Appendix E**). Responses are included in **Appendix E**.

6.10 HAZARDOUS MATERIALS AND WASTE

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

6.10.1 REGULATORY SETTING

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

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments, as: “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or

incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR part 273. Four types of waste are currently covered under the universal wastes regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), PCBs, and lead-based paint (LBP). USEPA is given authority to regulate special hazard substances by the Toxic Substances Control Act. Asbestos is also regulated by USEPA under the Clean Air Act, and the Comprehensive Environmental Response, Compensation, and Liability Act.

Included in the special hazards analysis are perfluorinated compounds (PFC) and polyfluoroalkyl substances (PFAS). PFC and PFAS are a suite of over 100 chemicals, several of which are of emerging public health concern to the Navy, USEPA, state regulators, public water systems, and the general public. USEPA uses the Unregulated Contaminant Monitoring Rule (UCMR) to collect data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA). Under this rule the Navy was required to sample drinking water at 17 installations. Independent of the UCMR, the Navy is also taking action to identify PFC/PFAS potential areas of concern (AOC) at all of its installations. The Navy, In accordance with Navy guidance on the identification of potential AOCs (Navy, 2016b), is committed to identifying, evaluating, and where appropriate, remediating contamination resulting from its activities.

The most common Navy activity that results in the release of PFC/PFAS to the environment is through the use of aqueous film forming foam (AFFF) for testing, training, firefighting, and other emergency responses. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are the primary PFOSs of concern. Current Navy policy (Navy, 2016c) forbids the uncontrolled environmental release of AFFF except for emergency responses and requires that hangar AFFF systems have appropriate controls in place to prevent environmental releases. The Navy intends to remove, dispose, and replace legacy AFFF that contains PFAS once environmentally suitable substitutes are identified and certified to meet Military Defense Specifications. The most recent formulations are free of PFOS but may contain trace quantities of PFOA. The Navy is removing all uninstalled PFOS-containing AFFF in drums and cans to prevent future environmental releases.

The DoD established the Defense Environmental Restoration Program (DERP) to facilitate thorough investigation and cleanup of contaminated sites on military installations (active installations, installations subject to Base Realignment and Closure, and formerly used defense sites). The Installation Restoration Program and the Military Munitions Response Program are components of the DERP. The Installation Restoration Program requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The Military Munitions Response Program addresses nonoperational rangelands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination. The Environmental Restoration Program is the Navy's initiative to address DERP.

6.10.2 AFFECTED ENVIRONMENT

6.10.2.1 Hazardous Materials

Routine operations on NS Norfolk require various hazardous materials, including petroleum, oil, and lubricant products; solvents; cleaning agents; paints; adhesives; and other products necessary to perform aircraft, ship, ground vehicle, and equipment maintenance; military training activities; facilities repair and maintenance; and administrative and housing functions (NAVFAC, 2013). Hazardous material at NS Norfolk is managed in accordance with Commander, Navy Installation Command Mid-Atlantic Instruction 6280.1A, *Regional Consolidated Hazardous Material Reutilization and Inventory Management* and the *Hazardous Materials Reutilization, Hazardous Waste Minimization and Disposal Guide*.

6.10.2.2 Hazardous Waste

NS Norfolk is a large quantity generator of hazardous waste. Hazardous waste at NS Norfolk is managed in accordance with the *Hazardous Materials Reutilization, Hazardous Waste Minimization and Disposal Guide*. Hazardous wastes associated with aircraft maintenance are generated in the project area. These may include spent solvents; waste paint; batteries; aerosols, adhesives, and debris generated by sanding/grinding activities. These wastes are managed per the above referenced documents and applicable regulations.

6.10.2.3 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyfluoroalkyl Substances)

ACMs and LBP are potentially present in many older structures on the installation. PCBs are man-made chemicals that persist in the environment and were widely used in construction materials (e.g., caulk) and electrical products prior to 1978. It is assumed that all structures constructed prior to 1978 potentially contain PCB-containing materials. All ACM, LBP, and PCB-containing materials are handled in accordance with applicable federal and state regulations, Navy Mid-Atlantic regional regulations, and NS Norfolk standard operation procedures (Navy, 2013f).

AFFF is used for fire suppression at NS Norfolk. Per the EPA UCMR, NS Norfolk was required to sample for PFAS/PFC contamination. The EPA Drinking Water Health Advisory limit of 0.07 micrograms per liter was not exceeded (all results were below the minimum reporting level of .02 micrograms per liter) (USEPA, 2017c). Seven AOCs for potential PFAS/PFC contamination have been identified at NS Norfolk; however only one, the Building LP-20, site is within the project area. This site, along with the others will undergo a systematic investigation to determine the presence of and address any PFAS/PFC contamination.

6.10.2.4 Defense Environmental Restoration Program

NS Norfolk is listed on USEPA's National Priorities List; however, all remedies for treatment are in place. The DoD has developed the Installation Restoration Program (IRP) to facilitate thorough investigation and cleanup of contaminated sites on military installations. Twenty-three IRP sites have been identified on the installation (Navy, 2013f).

IRP Site 20, the Building LP-20 site, is located in the northwest part of the project area (**Figure 6.10-1**). Investigations at the site began in 1986 following a release of Jet Propulsion-5 fuel from an underground pipeline. Since 1986, numerous investigations have been conducted to evaluate the extent of releases from underground fuel pipelines, the industrial wastewater line, and various underground storage tanks

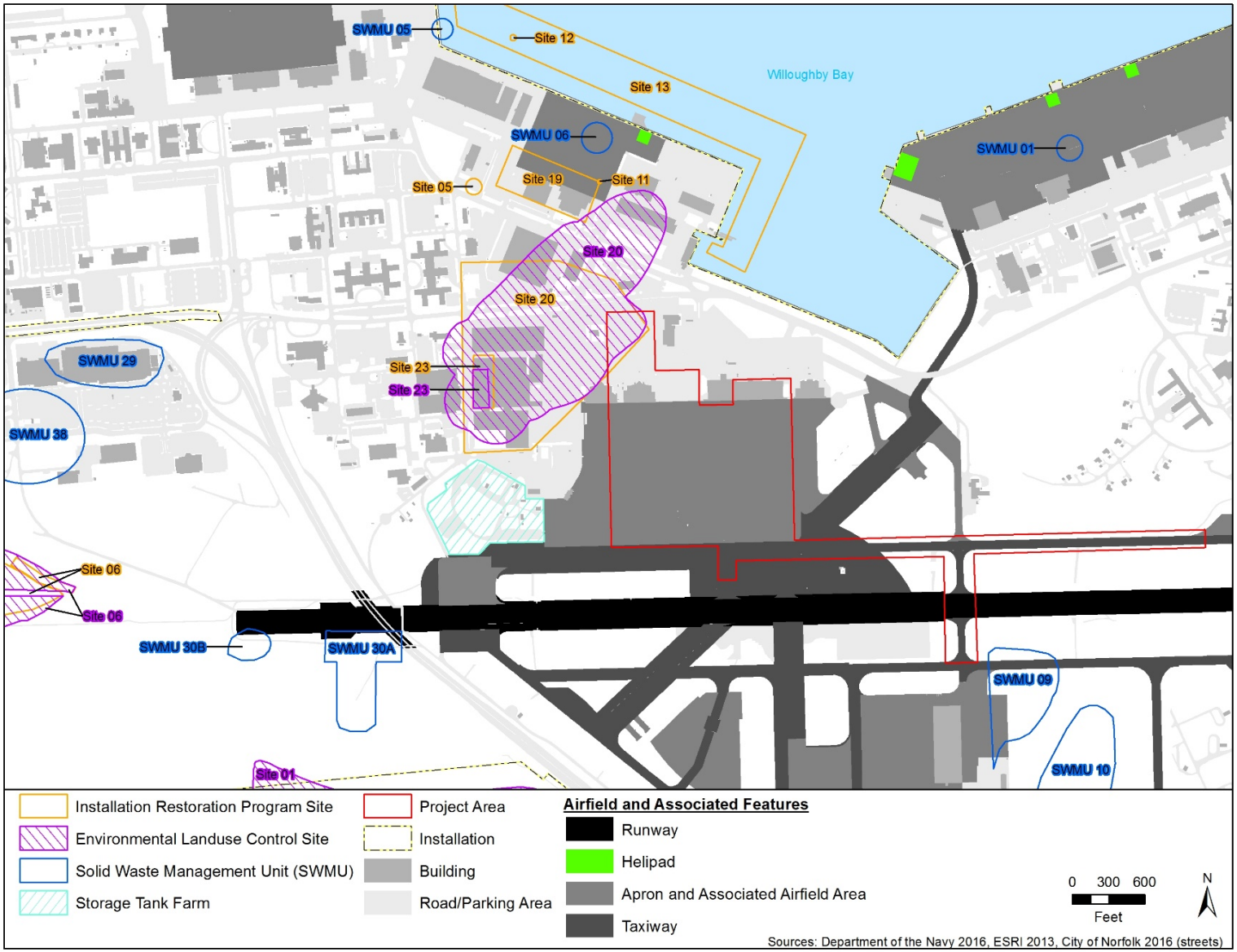


Figure 6.10-1: Installation Restoration Sites Near Project Area

at the site. These investigations determined that significant amounts of free product, as well as chlorinated solvents, are present. Specifically, chlorinated solvents were detected near LP-20 and LP-26. In addition, petroleum products are present east of Building LP-22 and south of Building LP-179. Vinyl chloride; 1,1-dichloroethene; 1,2- dichloroethene; 1,2- dichloroethene; trichloroethylene; and benzene were detected in the shallow aquifer (Columbia). Furthermore, vinyl chloride; 1,2- dichloroethene; and trichloroethylene were also detected in the deep aquifer (Yorktown) (CH2MHILL, 2014a; CH2MHILL, 2014b) . As mentioned, a remedy is in place for this site and land use controls (LUCs) have been applied. The remedy at IRP Site 20 consists of treating shallow groundwater (through air sparging and soil vapor extraction and enhanced by groundwater extraction and treatment) with LUCs, including the following: prohibit use of the shallow and deep aquifer groundwater, ensure concrete and asphalt pavement are maintained to minimize exposure to site soils, and prohibit changes from current building use or construction of new buildings without further evaluation of potential vapor intrusion risks and/or implementation of mitigation measures. The LUCs are protective of human health and the environment (CH2MHILL, 2014c).

6.11 SOCIOECONOMICS

This section discusses population demographics and economic indicators to provide key insights into socioeconomic conditions that might be affected by a proposed action.

The USEPA defines Environmental Justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

6.11.1 REGULATORY SETTING

Socioeconomic data shown in this section are presented at the city and USCB Metropolitan Statistical Area levels to characterize baseline socioeconomic conditions in the context of local and regional trends. A Metropolitan Statistical Area is a geographic entity defined for use by federal statistical agencies based on the concept of a core urban area with a high degree of economic and social integration with surrounding communities. Data have been collected from previously published documents issued by federal, state, and local agencies and from state and national databases (e.g., USCB).

Consistent with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations. The Council on Environmental Quality (CEQ) Environmental Guidance under the National Environmental Policy Act defines a minority population as either: (1) the minority population of the affected area exceeds 50 percent, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the appropriate community of comparison (CEQ, 1997). Low-income environmental justice communities are identified by comparing the percentage of the population living below the poverty level to the larger community as a whole (CEQ, 1997). If the percentage of residents with incomes below the poverty level in the block group is greater than (or equal to) the percentage of residents in the community of comparison who have incomes below the poverty level, then there is a low-income environmental justice community.

6.11.2 AFFECTED ENVIRONMENT

The City of Norfolk is located in the Virginia Beach-Norfolk-Newport News, Virginia-North Carolina Metropolitan Statistical Area (MSA). The City of Norfolk and the MSA comprise the affected

environment. In 2010, the MSA consisted of these locations: Currituck County (North Carolina); Gloucester County, Isle of Wight County, James City County, Mathews County, Surry County, York County, City of Chesapeake, City of Hampton, City of Newport News, City of Norfolk, City of Poquoson, City of Portsmouth, City of Suffolk, City of Virginia Beach, and City of Williamsburg (Virginia). The MSA makes up most of the region known as Hampton Roads.

6.11.2.1 Demographics

Demographics include data on population, race, age, housing, and income. Demographic data for the City of Norfolk and the Virginia Beach-Norfolk-Newport News, VA-NC MSA are provided in **Table 6.11-1**. The 2010 population in the City of Norfolk was 242,803 and in the MSA was 1,641,078. The 2020 population is projected to increase approximately 3.8 percent from 2010 levels in Norfolk, and 6.0 percent in the MSA.

Table 6.11-1: Demographics

Population	***City of Norfolk***	***Virginia Beach-Norfolk-Newport News, Virginia-North Carolina MSA (Virginia Portion)***
Population (2010)	242,803	1,641,078
Population Projection (2020)	252,128	1,739,169
Population Projection (2030)	258,323	1,835,533
Minority (2020)	57%	44%
Median Age (2010)	29.7	35.4
Under Age 18	20.8%	23.6%
Housing Units	95,018	686,297
Per Capita Income (2013)	$23,510	$28,240
Median Household Income (2013)	$44,030	$56,161
Individuals Living Below the Poverty Level (2013)	22.4%	13.0%

Sources: Virginia Employment Commission, 2017; City of Norfolk, 2014

The median age is lower in Norfolk (29.7 years) than in the MSA (35.4 years) and the percentage of the population less than 18 years is also lower in Norfolk (20.8 percent) than in the MSA (23.6 percent).

The Navy determined whether there are any areas of minority and low-income populations that may experience disproportionately high and adverse impacts from the Proposed Action. These environmental justice communities were determined by analyzing the demographic and economic characteristics of the affected area and comparing those to the characteristics of the larger community as a whole. This larger community is known as the community of comparison. For the purposes of this EA, the environmental justice analysis concentrates on the communities most likely affected by actions at NS Norfolk, including areas exposed to the 65 dB DNL or greater noise zones for aircraft operations (refer to **Section 6.2** [Noise]); this includes the City of Norfolk. The community of comparison is the Virginia Beach-Norfolk-Newport News, VA-NC MSA. **Table 6.11-1** shows that the projected 2020 minority population is expected to be above 50 percent (57 percent) in Norfolk and 44 percent in the MSA. Based on these demographics, the City of Norfolk is considered an environmental justice community, as defined by CEQ (CEQ, 1997).

Per capita income and median household income are both lower in the City of Norfolk ($23,510 and $44,030, respectively) than in the MSA ($28,240 and $56,161, respectively). The percentage of

individuals living below the poverty line is greater in Norfolk (22.4 percent) than in the MSA (13 percent). Therefore, the City of Norfolk has a low-income population compared to the MSA.

Key industries of employment within the region include government (federal, state, and local), health care and social assistance, retail trade, and accommodation and food services. The five largest employers in the MSA include DoD, Huntington Ingalls Industries, Inc., Sentara Healthcare, City of Virginia Beach Schools, and Walmart (Virginia Employment Commission, 2017). The MSA unemployment rate has declined from 7.6 percent in 2010 to 4.6 percent in 2016. The Norfolk unemployment rate was 5.2 percent in 2016. The comparable rate for the United States was 4.9 percent (Virginia Employment Commission 2017).

6.11.2.2 Navy Role in Demographics

NS Norfolk is the home of the Navy's Atlantic Fleet and is the largest naval complex in the world based on its supported population. More than 300 tenant commands and activities operate at the base. The Navy's total contribution to the Hampton Roads regional economy includes approximately 114,000 jobs, including 62,000 at NS Norfolk, over $7.8 billion in annual military and civilian payroll expenditures, and approximately $1.3 billion in procurement for goods and services. The total economic impact of the Navy is approximately $9.2 billion in the Hampton Roads region (Naval Station Norfolk Community Plans and Liaison Office, 2014).

NS Norfolk provides military housing for unaccompanied personnel and families. Currently, unaccompanied housing consists of 6,456 beds split between Public Private Venture and traditional government owned barracks. An additional 708 beds will be added by October 2018 (Adelman, 2016). For accompanied personnel, there are 684 privatized homes of which, at the end of Fiscal Year 2016, 29 were vacant. The wait list varies by rank and bedroom size, but ranges from 1 to 24 months for enlisted housing and 3 to 18 months for officer housing (NS Norfolk, 2016).

Norfolk Public Schools is composed of 48 public schools with an enrollment of approximately 32,000 students. Norfolk Public Schools has excess capacity in preschool, middle, and high school levels, but is over capacity at the elementary school level (City of Norfolk, 2017).

NS Norfolk also offers child and youth programs including the Willoughby Child Development Center with 306 spaces and the Hampton Boulevard Child Development Center with 272 spaces. For dual/single active duty military families requiring extended care due to scheduled shiftwork and/or official duty there are two 24/7 child and youth centers with a total of 120 spaces. Occupancy varies week to week depending on schedules (NS Norfolk, 2016).

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7 EAST COAST FLEET LOGISTICS CENTER ENVIRONMENTAL CONSEQUENCES

This chapter presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. The following discussion elaborates on the nature of the characteristics that might relate to resources. "Significantly," as used in the National Environmental Policy Act, requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 Code of Federal Regulations [CFR] part 1508.27). Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would be expected to be significant.

7.1 AIRFIELDS AND AIRSPACE

The analysis of airfields and airspace management involves consideration of many factors, including the types, locations, and frequency of airspace operations, the presence or absence of already designated (controlled) airspace, and the amount of air traffic using or transiting through a given area. Specifically, this assessment examines how the Proposed Action would affect airspace management structure and airfield operations related to the Naval Station (NS) Norfolk complex. The communities surrounding Chambers Field at NS Norfolk are assessed for impacts from changes to the number of annual operations that would occur from the Proposed Action under each of the alternatives.

AIRFIELDS AND AIRSPACE
POTENTIAL IMPACTS AT NS NORFOLK

Alternative 1:

- Aircraft operations would not change; no impact on airspace management or local air traffic.

Alternative 2:

- Aircraft operations would increase 8.5 percent, but would not adversely affect airspace management or use of local air traffic environment.
- No impacts to existing base arrival or departure procedures to accommodate Navy V-22 aircraft performance or airfield sorties.

7.1.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, NS Norfolk would not transition to Navy V-22 aircraft. In the near term, C-2A operations at the airfield and associated airspace at NS Norfolk would remain consistent with existing conditions (approximately 7,000 annual operations). The C-2A would continue to operate as it currently does until it would need to be retired. Under this unlikely scenario, if there is no replacement aircraft, there would be a small reduction in airfield operations.

However, there would be an increase in the total number of aircraft operations at NS Norfolk under the No Action Alternative due to an ongoing action for United States (U.S.) Marine Corps Reserve Squadron to obtain their full complement of U.S. Marine Corps Reserve MV-22B aircraft. The increase would be 3,100 aircraft operations. Refer to **Section 7.2** (Noise) for additional details on operations.

These changes in operations levels would have a negligible impact on the airfield and airspace at NS Norfolk.

7.1.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

Under Alternative 1, Navy V-22 aircraft would replace existing C-2A aircraft at Naval Air Station (NAS) North Island and NS Norfolk, and total fleet logistics squadron aircraft at NS Norfolk would decrease from 17 aircraft to 15 aircraft (three of which are home guard aircraft) when compared to the No Action Alternative. Annual airfield operations of Navy V-22 at NS Norfolk would be about the same as C-2A operations under the No Action Alternative. Refer to **Section 7.2** (Noise) for additional details on operations. Operations at secondary airfields are discussed in **Section 2.3.2.4** (Aircraft Operations under Alternative 1). Therefore, Alternative 1 would have no impact to the NS Norfolk airfield environment.

Transit flights for access to and from the home and secondary airfields would occur throughout the southwest and mid-Atlantic regions of the United States (refer to **Section 2.1.4.3** Special Use Airspace and Transit Flights). Navy V-22 transits would occur at altitudes exceeding 3,000 feet above ground level. No changes to airspace would be required for Alternative 1. Transits would be dispersed throughout the available airspace and would have no or negligible impact to airspace.

Therefore, implementation of Alternative 1 would not result in significant impacts to airfields and airspace.

7.1.3 ALTERNATIVE 2 POTENTIAL EAST COAST IMPACTS

Under Alternative 2, Navy V-22 aircraft would replace existing C-2A aircraft at NAS North Island and NS Norfolk. Additionally, the Navy V-22 training squadron and maintenance school would be established on the East Coast at NS Norfolk. Under Alternative 2, total fleet logistics squadron aircraft at NS Norfolk would increase from 17 aircraft to 20 aircraft when compared to the No Action Alternative. Commensurate with the slight increase in aircraft, Alternative 2 would result in an additional 12,700 annual Navy V-22 airfield operations at NS Norfolk, an increase of 5,700 operations from C-2A operations under the No Action Alternative. Refer to **Section 7.2** (Noise) for additional details on operations. Operations at secondary airfields are discussed in **Section 2.3.3.4** (Aircraft Operations under Alternative 2).

Annual flight operations of all aircraft at NS Norfolk under baseline conditions total approximately 63,800 per year (refer to **Section 6.2.7**). Total annual operations of all aircraft would increase from 66,900 under the No Action Alternative to 72,600 under Alternative 2. With a proposed increase of 5,700 operations under Alternative 2, this would represent an approximate 8.5 percent increase in operations at NS Norfolk. This small increase would not adversely affect airspace management and use within the local air traffic environment. No changes to base arrival or departure procedures would be required to accommodate the Navy V-22 aircraft performance or airfield sorties. Therefore, effects on airspace use in the local Chambers Field air traffic environment would be negligible.

As described for Alternative 1, transit flights under Alternative 2 to and from the home and secondary airfields would occur throughout the southwest and mid-Atlantic regions of the United States (refer to **Section 2.1.4.3** Special Use Airspace and Transit Flights). Navy V-22 transits would occur at altitudes exceeding 3,000 feet above ground level. No changes to airspace would be required for Alternative 2. Transits would be dispersed throughout the available airspace and would have no or negligible impact to

airspace. Therefore, implementation of Alternative 2 would not result in significant impacts to airfields and airspace.

7.1.4 CONCLUSION

Under Alternative 1, annual airfield operations of Navy V-22 at NS Norfolk would be about the same as C-2A operations under the No Action Alternative. Therefore, Alternative 1 would have no impact to airfields and airspace at Chambers Field.

Alternative 2 would increase annual airfield operations of all aircraft at NS Norfolk by approximately 8.5 percent compared to the No Action Alternative. This small increase would not impact civilian aircraft or other users in the vicinity of NS Norfolk, as existing standard operating procedures and course rules would continue to apply to minimize safety risks. Navy V-22 usage of associated airspace would be consistent with current operations, and there would be no direct or indirect impact to airspace.

Under both Alternative 1 and Alternative 2, the transit flights dispersed throughout the available airspace would have negligible impact to airspace.

Therefore, implementation of Alternative 1 or Alternative 2 would not result in significant impacts to airfields and airspace.

7.2 NOISE

The noise impact analysis presented in this noise section is the result of noise modeling that analyzed the projected noise levels based upon a wide range of inputs (such as flight tracks, aircraft type, and number of aircraft operations). For a full discussion of noise modeling and background data used for this analysis, refer to **Section 6.2.1** (Basics of Sound and A-weighted Sound Level) and **Appendix B**. The noise levels analyzed and described within this study are from computer-modeled noise and not actual noise measurements at Chambers Field. Computer modeling provides a tool to assess potential noise impacts. Day-Night Average Sound Level (DNL) noise contours are generated by a computer model that draws from a library of actual aircraft noise measurements. Noise contours produced by the model allow a comparison of existing conditions and proposed changes or alternative actions that do not currently exist or operate at the installation.

NOISE
POTENTIAL IMPACTS AT NS NORFOLK

Alternatives 1 and 2:

- Short-term construction noise impacts. No sensitive receptors would be affected. Proposed construction would be located near the flight line, and aircraft-related noise would dominate the construction noise.
- Alternative 1: No perceptible difference in noise exposure.
- Alternative 2: 8.5 percent increase in operations would have a negligible change in noise contours and would not be perceptible to populations exposed; not likely expose any new population to noise levels greater than 65 dB DNL.
- No impacts to AICUZ Program land use compatibility recommendations.
- No noise impact or minor impact at 18 points of interest in the community for single event metrics, L_{max} and SEL, or the probability of awakening.

7.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur. However, there would be a change in the total number of aircraft operations at NS Norfolk, compared with the baseline presented

in **Section 6.2** (Noise), due to an ongoing action for U.S. Marine Corps Reserve Squadron VMM-774 to obtain their full complement of 12 MV-22B aircraft at NS Norfolk. The Navy V-22 would not replace the C-2A under this alternative and all other aircraft operations would remain the same.

Under baseline conditions, there are an average of approximately 63,800 annual operations of all aircraft at NS Norfolk. Under the No Action Alternative, there would be an increase of 3,100 aircraft operations, all of which would be U.S. Marine Corps Reserve MV-22B aircraft, resulting in a total of approximately 66,900 operations. **Table 7.2-1** shows the summary breakdown of total aircraft operations, general type of operations, as well as the day/night breakdown of operations at NS Norfolk. For a more in-depth breakdown of aircraft operations at Norfolk, see **Appendix B**. For the No Action Alterative, 50,200 operations occur during the day (approximately 75 percent), while 16,700 operations occur at night (approximately 25 percent).

Table 7.2-1: Annual Aircraft Operations under the No Action Alternative at NS Norfolk

Operation Type[1, 2]	*Acoustic Day (7:00 a.m. – 10:00 p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrival	13,100	4,500	17,600
Departure	13,100	4,500	17,600
Closed Pattern	24,000	7,700	31,700
Total	**50,200**	**16,700**	**66,900**

Note:
[1] No Action Alternative includes projected increase above baseline established in Table 6.2-2. Operations numbers are based on an annual average. As such, some individual years will be higher than the average, and some will be lower than the average.
[2] An operation is one take-off or one landing; numbers are rounded to the nearest 100.

7.2.1.1 Projected DNL Noise Exposure

The projected DNL noise contours under the No Action Alternative are shown on **Figure 7.2-1**. The figure shows the No Action Alternative compared to the baseline conditions contours from **Section 6.2** (Noise). As shown, there are negligible differences between the contours. As with baseline conditions, the 65 decibels (dB) DNL and greater contours are elongated in an east–west direction due to the orientation of the runways at NS Norfolk. To the west of the runway, the 65 dB and greater DNL contours are contained on-base or extend over water. To the east, the 65 dB and greater contours create narrow bands that cover populated areas. However, much of the noise exposure is contained within NS Norfolk boundaries, or is over water.

Table 7.2-2 presents total noise exposure in terms of estimated acreage and population under the No Action Alternative. As with baseline conditions, population estimates were calculated using census block group data from the 2015 U.S. Census Bureau (USCB) American Community Survey five-year estimates. Geographic Information Systems software was used to determine the area of each census block that was affected by the noise contours shown in **Figure 7.2-1**, and then used to estimate population affected within each block. Noise exposure is calculated by multiplying the total population by the ratio of areas affected by noise. This methodology assumes an evenly distributed population throughout the census block. Note that acreages reported and used for calculations exclude water bodies.

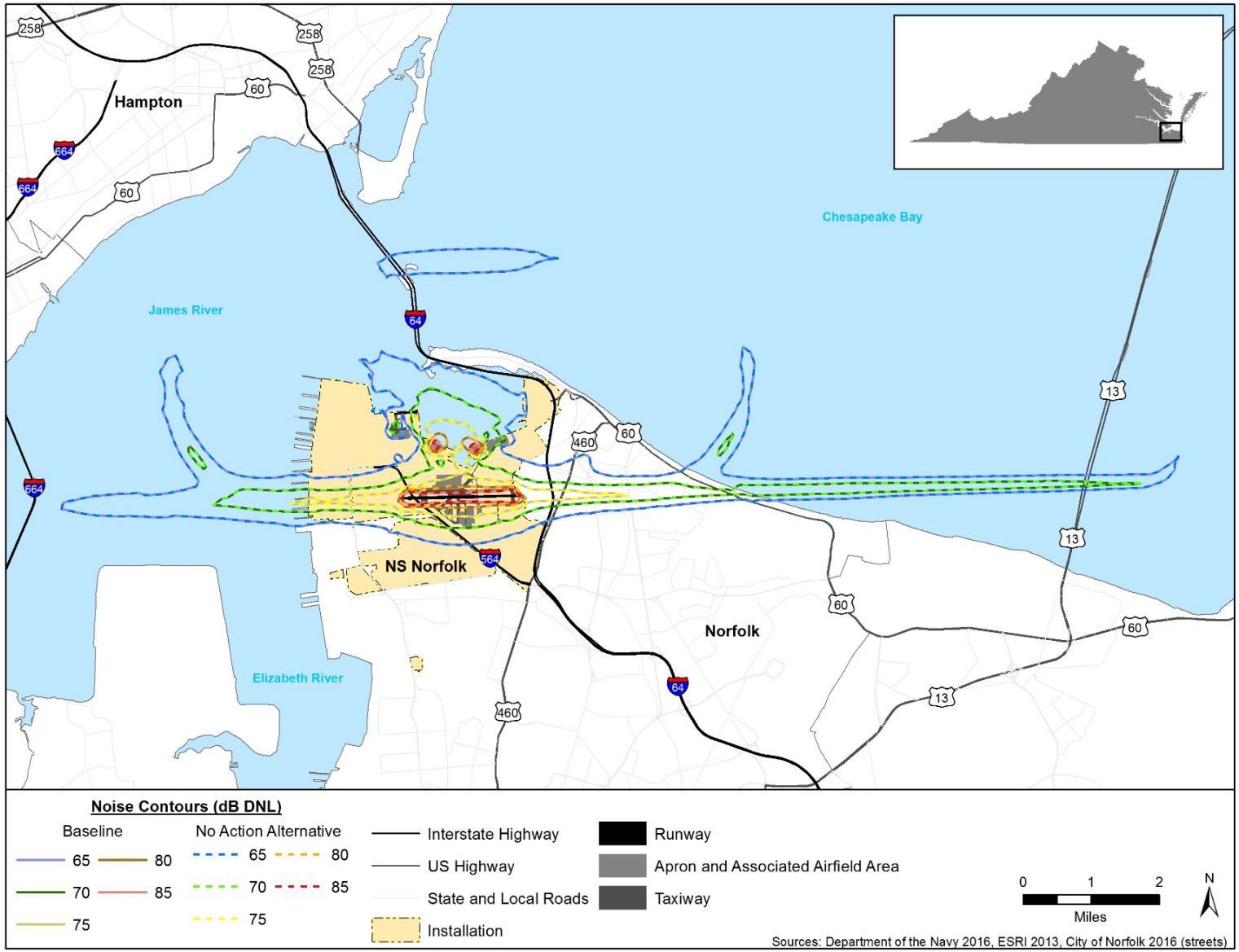

Figure 7.2-1: No Action Alternative DNL Contours Compared to Baseline Conditions

Table 7.2-2: Acreage and Estimated Population Impacts under No Action Alterantive Compared to Baseline Conditions

DNL (dBA)	*Total Acres[1]*	*Off-Base Acres[1]*	*Estimated Population*	*Change in Total Acres[1]*	*Change in Off-Base Acres[2]*	*Change in Estimated Population[2,3]*
85 or greater	174	0	0	0	0	0
80 or greater	340	4	0	0	0	0
75 or greater	839	124	1,059	+30	0	+6
70 or greater	1,858	540	5,391	+30	+1	+9
65 or greater	3,470	1,316	13,420	+38	+4	+38

Source: USCB, 2017
Notes: dBA=A-weighted sound level
[1]Acres exclusive of water bodies.
[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 DNL or greater" means all acreage and population exposed to DNL at or greater than 65 dBA and includes the acres/population in the rows above.
[3] Population is based on assumed even distribution of 2015 census block population data.

As shown in **Table 7.2-2**, no off-base exposure to DNL levels equal to or greater than 80 dB DNL occur at NS Norfolk. It is estimated that 13,420 people would be exposed to noise levels greater than 65 dB DNL under the No Action Alternative, an increase of 38 people when compared to baseline conditions. However, only 1,059 people are estimated to be exposed to levels of 75 dB or greater, which represents an increase of six people. While these numbers appear to be increases in population impacted, the actual noise increase would be less than 1 dBA and would be imperceptible in the area affected. An increase in 4 off-base acres in the area exposed to 65+ dBA DNL would be spread along the edge of the noise contour that encompasses 3,470 acres. That would be an increase of approximately 0.3 percent. In most cases, the additional area is less than 50 feet wide, and would not constitute exposing new populations to noise levels greater than 65 dBA DNL. There would effectively be no perceptible difference between the No Action Alternative and baseline conditions.

The No Action Alternative would not alter baseline noise contours to the extent that there would be any impacts to the Air Installations Compatible Use Zones (AICUZ) Program land use recommendations. Jet aircraft that routinely use NS Norfolk are the primary drivers of the noise contours. As such, the No Action Alternative would have no impact to the AICUZ Program.

7.2.1.2 Supplemental Noise Analysis

Table 7.2-3 shows the DNL values calculated at each of the points of interest (POIs) under the No Action Alternative and the relative change as compared to baseline conditions. There would be no change in DNL values at any of the 18 POI locations from the additional aircraft operations under the No Action Alternative.

Table 7.2-3: No Action Alternative DNL Values at Point of Interest Locations

POI Identification	*POI Name*	*DNL (dBA)*	*Change in DNL from Baseline (dBA)*
1	Newport News	50	--
2	Hampton	44	--
3	Fort Monroe	51	--
4	Willoughby	62	--
5	West Ocean View	61	--
6	East Ocean View	69	--
7	Little Creek	57	--
8	North Granby	74	--
9	Northside	75	--
10	Terminal	55	--
11	Meadowbrook	53	--
12	Wards Corner	55	--
13	Central Granby	57	--
14	Brentwood	52	--
15	Suburban Park	48	--
16	South Granby	46	--
17	Naval Station	62	--
18	Camp Allen	59	--

7.2.1.2.1 Maximum Sound Level and Sound Exposure Level

As with baseline conditions, the loudest events at each of the POIs was calculated and compared to baseline conditions. Since the only difference between the No Action Alternative and baseline conditions would be the addition of MV-22B aircraft operations, the loudest Sound Exposure Level (SEL) and maximum A-weighted sound level (L_{max}) values at the POIs would not change. Refer to **Table 6.2-5** for a list of the loudest aircraft noise events and the number times these events occur. As shown in **Table 6.2-5**, the loudest events at NS Norfolk are those produced by military jet aircraft and occasionally CH-53E helicopters. Jet aircraft operations and CH-53E operation numbers would not change from the baseline to the No Action Alternative; therefore, there would be no changes to the loudest SEL and L_{max} values at the POIs surrounding NS Norfolk.

7.2.1.2.2 Sleep Disturbance

Table 7.2-4 lists the probabilities of awakening during aircraft overflight at least once in a night between the hours of 10:00 p.m. and 7:00 a.m. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 10 to 11 percent at the North Granby location, with windows open. Of the 18 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed. There would be no change in the probability of awakening at any of the POI locations when the No Action Alternative is compared to baseline conditions.

Table 7.2-4: Probability of Awakening at Point of Interest Locations Near NS Norfolk under the No Action Alternative

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
1 – Newport News	0.09	<1%	<1%
2 – Hampton	0.008	<1%	<1%
3 – Fort Monroe	0.237	<1%	<1%
4 – Willoughby	0.316	<1%	1-2%
5 – West Ocean View	0.775	1-2%	2-3%
6 – East Ocean View	0.765	2-3%	3-4%
7 – Little Creek	0.431	<1%	1-2%
8 – North Granby	2.454	7-8%	10-11%
9 – Northside	2.601	6-7%	9-10%
10 – Terminal	0.393	<1%	1-2%
11 – Meadowbrook	0.216	<1%	<1%
12 – Wards Corner	0.216	<1%	<1%
13 – Central Granby	0.350	<1%	1-2%
14 – Brentwood	0.216	<1%	<1%
15 – Suburban Park	0.11	<1%	<1%
16 – South Granby	0	NA	NA
17 – Naval Station	0.353	1-2%	1-2%
18 – Camp Allen	0.353	<1%	1-2%

Notes:
[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.
[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.
[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.

7.2.2 Alternative 1 Potential East Coast Impacts

7.2.2.1 Construction

Sound generated by construction, modification, expansion, and demolition actions under Alternative 1 would result in short-term noise impacts at and near Chambers Field. Refer to **Section 4.2.2.1** (Noise-Construction) for a general discussion of construction noise. Because the proposed construction is located on the flight line, aircraft-related noise would likely dominate construction noise. No sensitive noise receptors or other POIs are located in the vicinity of the proposed construction activity; therefore, there would not be a significant construction noise-related impact.

Noise would be generated by trucks delivering materials to the construction site and construction worker vehicles. These noise impacts would be temporary and short term and would be consistent with traffic noise in an urban environment; therefore, the impact would not be significant. Minimization measures such as limiting truck traffic to regular daytime working hours would reduce these impacts.

Therefore, construction proposed under Alternative 1 would not result in significant noise impacts at NS Norfolk.

7.2.2.2 Operations

Under Alternative 1, the C-2A squadron stationed at NS Norfolk would be replaced with the Navy V-22. Implementation of Alternative 1 would result in approximately the same number of aircraft operations at NS Norfolk as under the No Action Alternative. **Table 7.2-5** shows the breakdown of aircraft

operations at NS Norfolk under Alternative 1. For this alternative, there would be a total of approximately 66,900 annual operations, about the same as annual operations of the No Action Alternative.

Table 7.2-5: Annual Aircraft Operations under Alternative 1 at NS Norfolk

Operation Type[1,2]	*Acoustic Day (7:00 a.m. – 10:00 p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrival	13,100	4,400	17,500
Departure	13,100	4,400	17,500
Closed Pattern	24,200	7,700	31,900
Total	**50,400**	**16,500**	**66,900**

Notes:
[1]An operation is one take-off or one landing; numbers are rounded to the nearest 100.
[2]Operations numbers are based on an annual average. As such, some individual years would be higher than the average, and some would be lower than the average.

The day/night ratio of operations remains unchanged from the No Action Alternative. For a more detailed breakdown of flight operations, see **Appendix B**. Operations would vary from year to year due to global events. If there is a busy time of surge conditions, it is usually followed by a quieter time once squadrons have departed to support mission requirements elsewhere. Operations at secondary airfields are discussed in **Section 2.3.2.4** (Aircraft Operations under Alternative 1). Navy V-22 transits to and from the home and secondary airfields (refer to **Section 2.1.4.3** Special Use Airspace and Transit Flights) would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, noise impacts during transit flights would be negligible.

7.2.2.2.1 Projected DNL Noise Exposure

The noise contours under Alternative 1 are shown on **Figure 7.2-2**. The figure shows Alternative 1 compared to the No Action Alternative contours from **Section 7.2.1** (No Action Alternative). In part, because the total annual operations are almost identical, there are negligible differences between the contours. As with the No Action Alternative, the 65 dB DNL and greater contours are elongated in an east–west direction due to the orientation of the runways at NS Norfolk. To the west of the runway, the 65 dB and greater DNL contours are contained on-base or extend over water. To the east, the 65 dB and greater contours create narrow bands that cover populated areas. However, much of the noise exposure is contained within NS Norfolk boundaries, or is over water. The slight changes over the water are one 1 dBA DNL or less, and the change would not be perceptible to biological resources or recreational users of the river and the bay. The differences in the noise contours between Alternative 1 and the No Action Alternative are almost imperceptible.

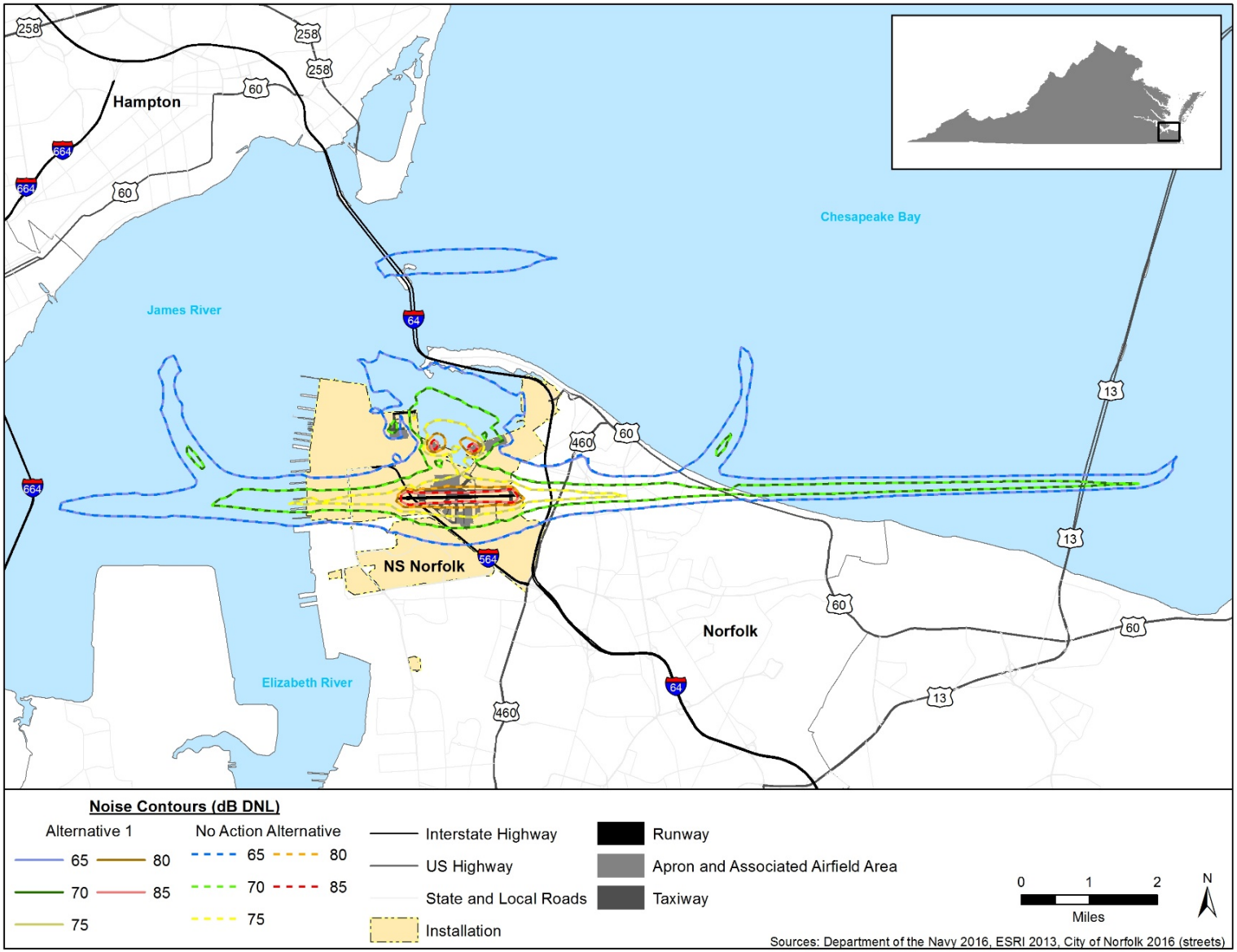

Figure 7.2-2: Alternative 1 DNL Contours Compared to the No Action Alternative

Table 7.2-6 presents total noise exposure in terms of estimated acreage and population under Alternative 1. Note that acreages reported and used for calculations exclude water bodies.

Table 7.2-6: Acreage and Estimated Population Impacts under Alternative 1 Compared to No Action Alternative

DNL (dBA)	*Total Acres[1]*	*Off-Base Acres[1]*	*Estimated Population*	*Change in Total Acres[1]*	*Change in Off-Base Acres[2]*	*Change in Estimated Population[2,3]*
85 or greater	172	0	0	-2	0	0
80 or greater	337	4	0	-3	0	0
75 or greater	830	123	1,052	-9	-1	-7
70 or greater	1,843	536	5,361	-15	-4	-30
65 or greater	3,438	1,296	13,187	-32	-20	-233

Source: USCB, 2017
Notes:
[1] Acres exclusive of water bodies.
[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 DNL or greater" means all acreage and population exposed to DNL at or greater than 65 dBA and includes the acres/population in the rows above.
[3] Population is based on assumed even distribution of 2015 census block population.

As shown in **Table 7.2-6** no off-base exposure to DNL levels equal to or greater than 80 dB DNL occur at NS Norfolk. It is estimated that 13,187 people are exposed to noise levels greater than 65 dB DNL, a decrease of 233 people when compared to the No Action Alternative. Only 1,052 people are estimated to be exposed to levels of 75 dB or greater, which represents a decrease of seven people. The populations exposed to these levels are all located directly to the east of the runway at NS Norfolk.

The reduction in acres shown in **Table 7.2-6** for Alternative 1 compared to the No Action Alternative is caused by the differing flight characteristics of the Navy V-22 tilt-rotor aircraft compared with the C-2A fixed wing and the use of slightly different flight tracks. For more information on the flight track differences between the Navy V-22 and the C-2A, refer to **Appendix B**.

Alternative 1 would not alter DNL noise contours to the extent that there would be any impacts to AICUZ Program land use recommendations. Jet aircraft that routinely use NS Norfolk are the primary drivers of the DNL noise contours. As such, Alternative 1 would have no impact to the AICUZ Program.

7.2.2.2.2 Supplemental Noise Analysis

Table 7.2-7 shows the DNL values calculated at each of the POIs under Alternative 1 and the relative change compared to the No Action Alternative. There would be no change in DNL values at any of the 18 POI locations from the proposed additional aircraft operations under Alternative 1.

Table 7.2-7: Alternative 1 DNL Values at Point of Interest Locations

POI Identification	*POI Name*	*DNL (dBA)*	*Change in DNL from No Action (dBA)*
1	Newport News	50	--
2	Hampton	44	--
3	Fort Monroe	51	--
4	Willoughby	62	--
5	West Ocean View	61	--
6	East Ocean View	69	--

Table 7.2-7: Alternative 1 DNL Values at Point of Interest Locations (cont.)

POI Identification	*POI Name*	*DNL (dBA)*	*Change in DNL from No Action (dBA)*
7	Little Creek	57	--
8	North Granby	74	--
9	Northside	75	--
10	Terminal	55	--
11	Meadowbrook	53	--
12	Wards Corner	55	--
13	Central Granby	57	--
14	Brentwood	52	--
15	Suburban Park	48	--
16	South Granby	46	--
17	Naval Station	62	--
18	Camp Allen	59	--

Maximum Sound Level and Sound Exposure Level

The loudest events at each of the POIs was calculated for Alternative 1 and compared to the No Action Alternative. Since the only difference between Alternative 1 and the No Action Alternative would be the removal of C-2A operations and the addition of Navy V-22 operations, the loudest SEL and L_{max} values at the POIs would not change. Refer to **Table 6.2-5** for a list of the loudest aircraft noise events and the number of times these events occur. As shown in **Table 6.2-5**, the loudest events at NS Norfolk are those produced by military jet aircraft and occasionally CH-53E helicopters. Jet aircraft operations and CH-53E operation numbers would not change from the No Action Alternative to Alternative 1, and the Navy V-22 operations would not contribute to the loudest events at any of the POIs. Therefore, there would be no changes to the loudest SEL and L_{max} values at the POIs surrounding NS Norfolk.

Sleep Disturbance

Table 7.2-8 lists the probabilities of awakening during aircraft overflight at least once in the night between the hours of 10:00 p.m. and 7:00 a.m. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 13 to 14 percent at the North Granby location, with windows open. Of the 18 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed. While Alternative 1 has slightly less annual operations than the No Action Alternative, there would be a small increase in the probability of awakening at the North Granby location. Under Alternative 1, the probability of awakening increases from 7-8 percent to 9-10 percent for windows closed, and from 10-11 percent to 13-14 percent for windows open when compared to the No Action Alternative. The North Granby location is the only location that shows any difference in probability of awakening with implementation of Alternative 1. Note that this POI is immediately east of the runway.

Table 7.2-8: Probability of Awakening at Point of Interest Locations Near NS Norfolk under Alternative 1

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
1 – Newport News	0.09	<1%	<1%
2 – Hampton	0.008	<1%	<1%
3 – Fort Monroe	0.237	<1%	<1%
4 – Willoughby	0.316	<1%	1-2%
5 – West Ocean View	0.775	1-2%	2-3%
6 – East Ocean View	0.765	2-3%	3-4%
7 – Little Creek	0.431	<1%	1-2%
8 – North Granby	3.764	9-10%	13-14%
9 – Northside	1.528	6-7%	9-10%
10 – Terminal	0.393	<1%	1-2%
11 – Meadowbrook	0.216	<1%	<1%
12 – Wards Corner	0.216	<1%	<1%
13 – Central Granby	0.350	<1%	1-2%
14 – Brentwood	0.216	<1%	<1%
15 – Suburban Park	0.11	<1%	<1%
16 – South Granby	0	NA	NA
17 – Naval Station	0.353	1-2%	1-2%
18 – Camp Allen	0.353	<1%	1-2%

Notes:
[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.
[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.
[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.

7.2.2.3 Vibration

The loudest SEL from Navy V-22 operations would not exceed 110 dB at the POIs. Therefore, vibration effects from Navy V-22 operations would be expected to be minor.

7.2.3 Alternative 2 Potential East Coast Impacts

7.2.3.1 Construction

Construction noise generated by construction, modification, expansion, and demolition actions under Alternative 2 would result in short-term noise impacts at and near Chambers Field. Refer to **Section 4.2.2.1** (Noise - Construction) for a general discussion of construction noise.

Because the proposed construction is located on the flight line, aircraft-related noise would likely dominate construction noise. No residential areas or other POIs are located in the vicinity of the proposed construction activity; therefore, there would not be a significant construction noise-related impact. Therefore, construction proposed under Alternative 2 would not result in significant noise impacts at NS Norfolk.

7.2.3.2 Operations

Implementation of Alternative 2 would show an increase in aircraft operations at NS Norfolk when compared to the No Action Alternative. Under Alternative 2, the C-2A squadron stationed at NS Norfolk would be replaced with the Navy V-22, and the Navy V-22 training squadron, consisting of five aircraft,

and a maintenance school would be established on the East Coast at NS Norfolk. **Table 7.2-9** shows the breakdown of aircraft operations at NS Norfolk under Alternative 2. There would be a total of 72,600 annual operations of all aircraft, an increase of 5,700 annual operations above the No Action Alternative.

Table 7.2-9: Annual Aircraft Operations under Alternative 2 at NS Norfolk

Operation Type [1,2]	*Acoustic Day (7:00 a.m. – 10:00 p.m.)*	*Acoustic Night (10:00 p.m. – 7:00 a.m.)*	*Total*
Arrival	13,700	4,500	18,200
Departure	13,700	4,500	18,200
Closed Pattern	27,500	8,700	36,200
Total	**54,900**	**17,700**	**72,600**

Notes:

[1] An operation is one take-off or one landing; numbers are rounded to the nearest 100.

[2] Operations numbers are based on an annual average. As such, some individual years would be higher than the average, and some would be lower than the average.

Operations would vary from year to year due to global events. If there is a busy time of surge conditions, it is usually followed by a quieter time once squadrons have departed to support mission requirements elsewhere. The day/night ratio of operations remains unchanged from the No Action Alternative. Operations at secondary airfields are discussed in **Section 2.3.3.4** (Aircraft Operations under Alternative 2). Navy V-22 transits to and from the home and secondary airfields (refer to **Section 2.1.4.3** Special Use Airspace and Transit Flights) would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, noise impacts during transit flights would be negligible.

7.2.3.2.1 Projected DNL Noise Exposure

The projected DNL noise contours under Alternative 2 are shown on **Figure 7.2-3**. The figure shows Alternative 2 compared to the No Action Alternative contours from **Section 7.2.1** (No Action Alternative). Even though Alternative 2 has an increased number of operations, the noise contours are almost identical. As with the No Action Alternative, the 65 dB DNL and greater contours are elongated in an east–west direction due to the orientation of the runways at NS Norfolk.

To the west of the runway, the 65 dB and greater DNL contours are contained on-base or extend over water. To the east, the 65 and greater contours create narrow bands that cover populated areas. However, much of the noise exposure is contained within NS Norfolk boundaries, or is over water. The slight changes over the water are 1 dBA DNL or less, and would not be perceptible to biological resources or recreational users of the river and the bay. The differences in the noise contours between Alternative 2 and the No Action Alternative would be imperceptible.

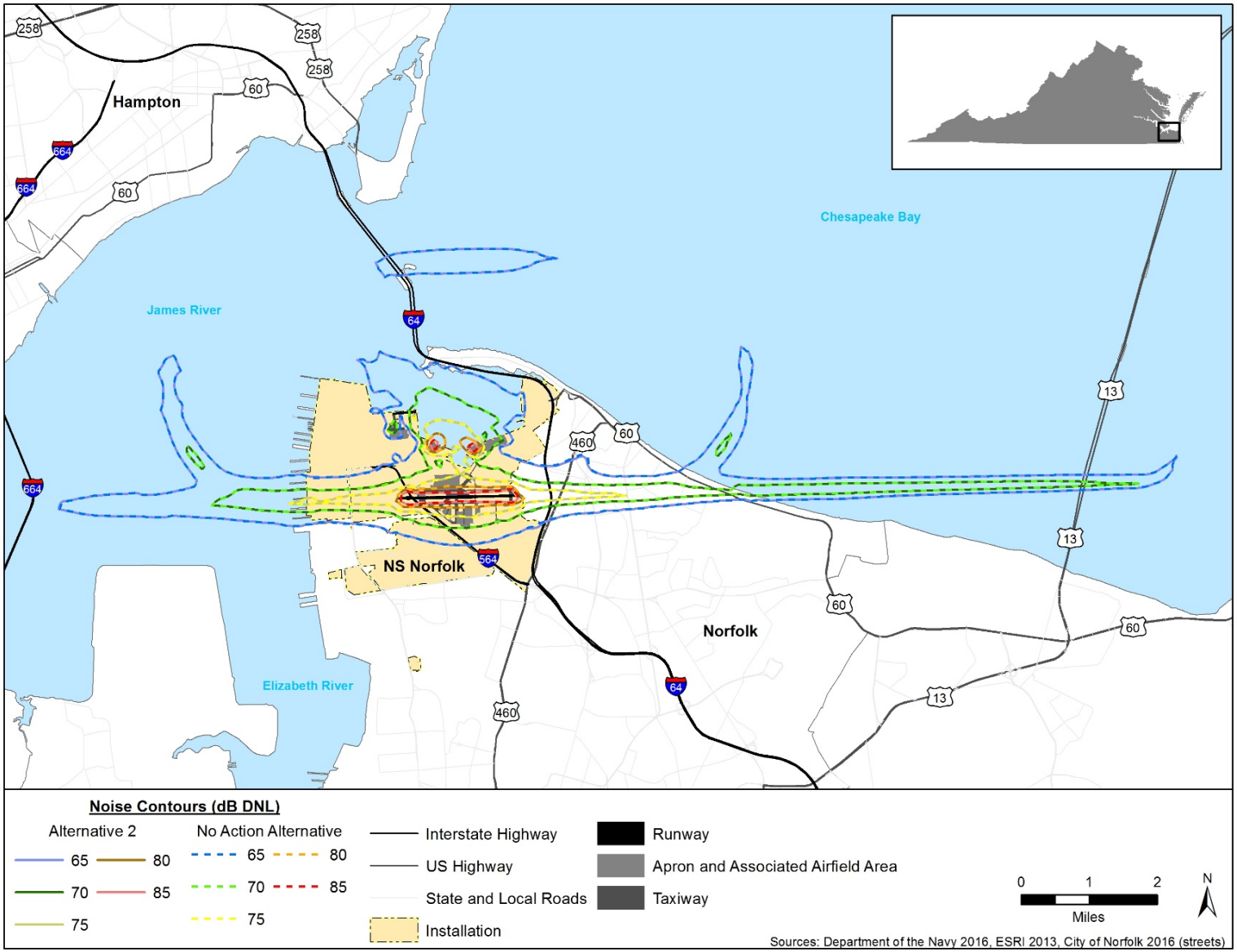

Figure 7.2-3: Alternative 2 DNL Contours Compared to the No Action Alternative

Table 7.2-10 presents total noise exposure in terms of estimated acreage and population under Alternative 2. Note that acreage reported and used for calculations excludes water bodies.

Table 7.2-10: Acreage and Estimated Population Impacts under Alternative 2 Compared to the No Action Alternative

DNL (dBA)	*Total Acres[1]*	*Off-Base Acres[1]*	*Estimated Population*	*Change in Total Acres*	*Change in Off-Base Acres[2]*	*Change in Estimated Population[2,3]*
85 or greater	172	0	0	-2	0	0
80 or greater	337	4	0	-3	0	0
75 or greater	833	124	1,064	-6	0	+5
70 or greater	1,850	539	5,383	-8	-1	-8
65 or greater	3,466	1,304	13,258	-4	-12	-162

Source: USCB, 2017
Notes:
[1] Acres exclusive of water bodies.
[2] Total acres and population estimated to be within the given dBA level or greater. For example, "65 DNL or greater" means all acreage and population exposed to DNL at or greater than 65 dBA and includes the acres/population in the rows above.
[3] Population is based on assumed even distribution of 2015 census block population.

As shown in **Table 7.2-10**, no off-base exposure to DNL levels equal to or greater than 80 dB DNL occur at NS Norfolk. It is estimated that 13,258 people are exposed to noise levels greater than 65 dB DNL, a decrease of 162 people when compared to the No Action Alternative. An estimated 1,064 people would be exposed to levels of 75 dB or greater, which represents an increase of five people. The populations exposed to these levels are all located directly to the east of the runway at NS Norfolk. There would be 4 acres less area exposed to noise levels greater than 65 dB DNL. As discussed under Alternative 1 in **Section 7.2.2** (Alternative 1), the reduction in acreages shown in **Table 7.2-10** is due to the different flight characteristics of the Navy V-22 when compared to those of the C-2A under the No Action Alternative.

Alternative 2 would not alter DNL noise contours to the extent that there would be any impacts to the AICUZ land use recommendations. Jet aircraft that routinely use NS Norfolk are the primary drivers of the DNL noise contours. As such, Alternative 2 would have no impact to the AICUZ Program.

7.2.3.2.2 Supplemental Noise Analysis

Table 7.2-11 shows the DNL values calculated at each of the POIs under Alternative 2 and the relative change when compared to the No Action Alternative. There would be no change in DNL values at any of the 18 POI locations from the proposed additional aircraft operations under Alternative 2.

Table 7.2-11: Alternative 2 DNL Values at Point of Interest Locations

POI Identification	*POI Name*	*DNL (dBA)*	*Change in DNL from No Action (dBA)*
1	Newport News	50	--
2	Hampton	44	--
3	Fort Monroe	51	--
4	Willoughby	62	--
5	West Ocean View	61	--

Table 7.2-11: Alternative 2 DNL Values at Point of Interest Locations (cont.)

POI Identification	*POI Name*	*DNL (dBA)*	*Change in DNL from No Action (dBA)*
6	East Ocean View	69	--
7	Little Creek	57	--
8	North Granby	74	--
9	Northside	75	--
10	Terminal	55	--
11	Meadowbrook	53	--
12	Wards Corner	55	--
13	Central Granby	57	--
14	Brentwood	52	--
15	Suburban Park	48	--
16	South Granby	46	--
17	Naval Station	62	--
18	Camp Allen	59	--

Maximum Sound Level and Sound Exposure Level

The loudest events at each of the POIs was calculated for Alternative 2 and compared to the No Action Alternative. Since the only difference between Alternative 2 and the No Action Alternative would be the removal of C-2A operations and the addition of Navy V-22 operations, the loudest SEL and L_{max} values at the POIs would not change. Refer to **Table 6.2-5** for a list of the loudest aircraft noise events and the number times these events occur. As shown in **Table 6.2-5**, the loudest events at NS Norfolk are those produced by military jet aircraft and occasionally CH-53E helicopters. Jet aircraft operations and CH-53E operation numbers would not change from the No Action Alternative to Alternative 2, and the Navy V-22 operations would not contribute to the loudest events at any of the POIs. Therefore there would be no changes to the loudest SEL and L_{max} values at the POIs surrounding NS Norfolk.

Sleep Disturbance

Table 7.2-12 lists the probabilities of awakening during aircraft overflight at least once in a night between the hours of 10:00 p.m. and 7:00 a.m. The probability of awakening for the representative locations range from a low of less than one percent with windows closed, to a high of 13-14 percent at the North Granby location, with windows open. Of the 18 POIs evaluated, 12 have a less than one percent chance of awakening with windows closed. Under Alternative 2, there would a small increase in the probability of awakening at the North Granby and Northside locations. At North Granby, the probability of awakening increases from 7-8 percent to 9-10 percent for windows closed, and from 10-11 percent to 13-14 percent for windows open when compared to the No Action Alternative. At Northside, the probability of awakening increases from 6-7 percent to 7-8 percent for windows closed, and from 9-10 percent to 10-11 percent with windows open. These are the only locations that show any difference in probability of awakening with implementation of Alternative 2. Note that these two POIs are immediately east of the runway.

Table 7.2-12: Probability of Awakening at Point of Interest Locations Near NS Norfolk under Alternative 2

POI Identification – Name	*Probability of Awakening*		
	NA90[1]	*Windows Closed[2]*	*Windows Open[3]*
1 – Newport News	0.09	<1%	<1%
2 – Hampton	0.008	<1%	<1%
3 – Fort Monroe	0.237	<1%	<1%
4 – Willoughby	0.316	<1%	1-2%
5 – West Ocean View	0.775	1-2%	2-3%
6 – East Ocean View	0.765	2-3%	3-4%
7 – Little Creek	0.431	<1%	1-2%
8 – North Granby	3.894	9-10%	13-14%
9 – Northside	3.058	7-8%	10-11%
10 – Terminal	0.393	<1%	1-2%
11 – Meadowbrook	0.216	<1%	<1%
12 – Wards Corner	0.216	<1%	<1%
13 – Central Granby	0.350	<1%	1-2%
14 – Brentwood	0.216	<1%	<1%
15 – Suburban Park	0.11	<1%	<1%
16 – South Granby	0	NA	NA
17 – Naval Station	0.353	1-2%	1-2%
18 – Camp Allen	0.353	<1%	1-2%

Notes:
[1] Number of aircraft events above 90 dB SEL for average 9-hour night; this metric assumes normal sleeping hours of 10 p.m. to 7 a.m.
[2] Windows Closed assumes a 25 dB noise level reduction between the outdoors and indoors.
[3] Windows Open assumes a 15 dB noise level reduction between the outdoors and indoors.

7.2.3.3 Vibration

The loudest SEL from Navy V-22 operations would not exceed 110 dB at the POIs. Therefore, vibration effects from Navy V-22 operations would be expected to be minor.

7.2.4 CONCLUSION

Under the No Action Alternative, there would be no perceptible change in noise with the minor ongoing increase in air operations. Implementation of Alternative 1 or Alternative 2 would have little to no perceptible impact with regard to construction or operations noise at NS Norfolk compared to the No Action Alternative. None of the alternatives would result in a perceptible change in the Department of Defense's (DoD's) primary noise metric, DNL. In fact, the results are nearly indistinguishable from the baseline. This indicates that the aircraft and types of events that cause the primary contribution to the DNL are not affected by the proposed alternatives at NS Norfolk.

Implementation of Alternative 1 or Alternative 2 would not alter DNL noise contours to the extent that there would be any impacts to the NS Norfolk AICUZ Program land use recommendations. Jet aircraft that routinely use NS Norfolk are the primary drivers of the DNL noise contours. As such, the alternatives would have no impact to the AICUZ Program.

At the 18 POIs in the community, the loudest expected regular events were also analyzed. The results of calculating the single event metrics, L_{max} and SEL, for the loudest events showed no difference from the baseline or in comparing the alternatives. This indicates that for the representative sampling of the

surrounding area, the events that the public would experience as the loudest regular events would not change under Alternative 1 or Alternative 2.

Those same POIs were examined for changes to the probability of awakening, a measurement of the loudness and frequency of occurrence of loud events during the nighttime. These results show that for 12 of the 18 points, there would be less than a 1 percent change in the probability of awakening during any given night under Alternative 1 or Alternative 2. At two POIs immediately adjacent to the east end of the main runway, there would be a 1 to 3 percent increase in the probability of awakening under Alternative 1 or Alternative 2; the 3 percent increase would result at the POI closest to the runway under the condition that a person would be trying to sleep there with the windows open during night flying activity at the NS Norfolk.

Therefore, implementation of Alternative 1 or Alternative 2 would not result in significant noise impacts at NS Norfolk.

7.3 PUBLIC HEALTH AND SAFETY

The safety and environmental health analysis contained in the respective sections addresses issues related to the health and well-being of military personnel and civilians, including children, living on or in the vicinity of NS Norfolk. Specifically, this section provides information on hazards associated with flight safety, Bird/Animal Aircraft Strike Hazard (BASH), Accident Potential Zones (APZs), and potential health and safety risks to children.

In this EA, potential impacts to flight safety at NS Norfolk are analyzed by considering the possible changes to mishap rates as a result of proposed Navy V-22 operations. Potential changes to Clear Zones and/or APZs for NS Norfolk are analyzed in accordance with Office of the Chief of Naval Operations Instruction (OPNAVINST) 11010.36C, which sets Clear Zone and APZ requirements for Navy airfields. The number and types of operations proposed under each alternative determine if changes to airfield Clear Zones or APZs are required.

PUBLIC HEALTH AND SAFETY
POTENTIAL IMPACTS AT NS NORFOLK

Alternatives 1 and 2:

- Minor increases number of air operations would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield.
- Airborne training augmented with extensive training on a flight simulator (i.e., containerized flight training device), would minimize risk associated with mishaps.
- Alternative 2: BASH risk is managed through continued application of BASH measures and would be expected to remain similar to existing levels. No impact to BASH Program recommendations on airfield habitat.
- No environmental health risks or safety risks that may disproportionately affect children.

There would be no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these safety measures are implemented, risks are minimized, even though they can never be eliminated.

To complement airspace management measures, all Navy pilots use state-of-the-art simulators. Simulator training includes flight operations and comprehensive emergency procedures, which minimizes risk associated with pilot error. Additionally, highly trained maintenance crews perform inspections on each aircraft in accordance with Navy regulations, and maintenance activities are monitored to ensure that aircraft are equipped to withstand the rigors of operational and training events safely. Analysis of flight risks correlates Class A mishap rates and BASH with projected airfield utilization.

7.3.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur. However, as discussed in **Section 6.2** (Noise), there would be change in the total number of aircraft operations at NS Norfolk compared with the baseline because of an ongoing U.S. Marine Corps MV-22B action. This action (unrelated to the Proposed Action of this EA) was evaluated in a 2015 EA (Marine Corps, 2015), which concluded that there would be no change to the potential for BASH events or impacts to public health and safety. Risk is managed through continued application of BASH measures, and the risk of BASH would be expected to remain similar to existing levels. No changes to established Clear Zones, APZs, or other established airfield safety features would be required.

The No Action Alternative would not change the potential for public health or safety impacts to children. As discussed above, and in **Section 7.1** (Airfields and Airspace) and **Section 7.2** (Noise), the APZs would not change, there would be no congregation of children within the APZs (i.e., no schools or playgrounds within the APZs), no measurable effects to flight safety, and no perceptible change in noise.

Therefore, no significant direct or indirect impacts to public health and safety would occur under the No Action Alternative. The No Action Alternative would not result in environmental health risks or safety risks that may disproportionately affect children.

Therefore, no significant public health or safety impacts would occur with the No Action Alternative.

7.3.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

Proposed renovation and infrastructure improvement projects related to Alternative 1 would have no impact on APZs or aircraft take-off or landing surfaces. New construction and building renovation activity would not result in any greater safety risk or obstructions to navigation.

Implementation of Alternative 1 would not measurably affect airfield safety at Chambers Field. The Navy V-22 replacement would result in two fewer aircraft assigned and total annual flight operations would be about the same as the No Action Alternative. Operations at secondary airfields are discussed in **Section 2.3.2.4** (Aircraft Operations under Alternative 1). Navy V-22 transits to and from the home and secondary airfields are discussed in **Section 2.1.4.3** (Special Use Airspace and Transit Flights).

To augment airborne training missions, pilots flying the Navy V-22 would use a simulator (i.e., containerized flight training device) extensively. Simulator training includes all facets of flight operations and comprehensive emergency procedures. The sophistication and fidelity of current simulators and related computer programs are commensurate with the advancements made in aircraft technology and are extremely realistic. These factors would minimize risk associated with mishaps due to pilot error.

Current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and Navy V-22 airfield flight operations would adhere to established safety procedures. The existing APZs have been established for fixed-wing aircraft, and therefore, are more expansive than

what is required for a rotary-wing aircraft. As such, no changes to established Clear Zones, APZs, or other established airfield safety features would be required.

Alternative 1 would not change the potential for public health or safety impacts, including those related to aviation safety. All training regulations and procedures would reflect Navy V-22 specific rules, and pilots would adhere to the appropriate training and procedure manuals. The airfield would update the emergency and mishap response plans specific to the Navy V-22, if changes are required.

Alternative 1 would not alter the potential for BASH events. BASH Program recommendations are primarily based on airfield habitat and its attractiveness to birds and other wildlife, not types of aircraft operating at the airfield. The operation of the Navy V-22 is not expected to change the BASH Program. Risk is managed through continued application of BASH measures, and the risk of BASH would be expected to remain similar to existing levels. Under Alternative 1, aircraft operations would be the same as the No Action Alternative, and the potential for BASH events would not change.

Alternative 1 would not change the potential for public health or safety impacts to children. As discussed above and in **Section 7.1** (Airfields and Airspace) and **Section 7.2** (Noise), the APZs would not change, there would be no congregations of children within the APZs, no measurable effects to flight safety, and no perceptible change in noise.

Therefore, no significant direct or indirect impacts to public health and safety would occur with implementation of Alternative 1. Alternative 1 would not result in environmental health risks or safety risks that may disproportionately affect children.

7.3.3 Alternative 2 Potential East Coast Impacts

Proposed renovation and infrastructure improvement projects related to Alternative 2 would have no impact on APZs or aircraft take-off or landing surfaces. New construction and building renovation activity would not result in any greater safety risk or obstructions to navigation.

Under Alternative 2, there would be an increase of approximately 8.5 percent in NS Norfolk airfield operations compared to the No Action Alternative. Operations at secondary airfields are discussed in **Section 2.3.3.4** (Aircraft Operations under Alternative 2). Navy V-22 transits to and from the home and secondary airfields are discussed in **Section 2.1.4.3** (Special Use Airspace and Transit Flights).

This increase in take-offs, landings, proficiency training, and other flights would result in a commensurate increase in the safety risk to aircrews and personnel. Current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and Navy V-22 airfield flight operations would adhere to established safety procedures. The airfield would update the emergency and mishap response plans specific to the Navy V-22, if changes are required.

To augment airborne training missions, pilots flying the Navy V-22 would use a simulator (i.e., containerized flight training device) extensively. Simulator training includes all facets of flight operations and comprehensive emergency procedures. The sophistication and fidelity of current simulators and related computer programs are commensurate with the advancements made in aircraft technology and are extremely realistic. These factors would minimize risk associated with mishaps due to pilot error.

No aspect of the Alternative 2 would create attractants with the potential to increase the concentration of birds in the vicinity of the airfields. While there would be an increase in air operations proposed under this alternative, there would be no proposed change planned to existing flight procedures for Chambers Field. Aircrews operating in NS Norfolk airspace would be required to follow applicable

procedures outlined in the Chambers Field BASH Program (Navy, 2012). Special briefings are provided to all pilots whenever the potential exists for greater bird-strike events within the airspace and operations are restricted if necessary; Navy V-22 pilots would be subject to these same procedures. With an increase in operations, the potential for BASH increases slightly; however, the risk is managed through continued application of BASH measures, and the risk of BASH would be expected to remain similar to existing levels.

Operations would fall within the same general types as those that have historically occurred at NS Norfolk. For example, the Navy V-22 would follow established local approach and departure patterns used. Therefore, flight activity and subsequent operations would not require changes to APZs.

Given the low likelihood for an aircraft accident or BASH mishap to occur in the local airfield area and even lower likelihood for civilians to be impacted, the potential for impacts to safety in the vicinity of Chambers Field as a result of Alternative 2 would be negligible.

Alternative 2 would not change the potential for public health or safety impacts to children. As discussed above and in **Section 7.1** (Airfields and Airspace) and **Section 7.2** (Noise), the APZs would not change, there would be no congregations of children within the APZs, no measurable effects to flight safety, and no perceptible change in noise.

Therefore, no significant direct or indirect impacts to public health or safety would occur with implementation of Alternative 2. Alternative 2 would not result in environmental health risks or safety risks that may disproportionately affect children.

7.3.4 CONCLUSION

Minor ongoing increases in the number of air operations at NS Norfolk under the No Action Alternative would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield. With implementation of Alternative 1 or Alternative 2, the Navy would continue to meet the primary goal of the AICUZ program, which is to protect the public's health, safety, and welfare through collaboration with the local community.

Alternative 2 would slightly increase the volume of air operations; however, it would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield. Therefore, no significant impact to safety related to flight safety or BASH is expected under No Action Alternative, Alternative 1, or Alternative 2.

The analysis determined that potential safety impacts would be negligible. Alternatives 1 and 2 would not change the potential for public health or safety impacts to children.

Therefore, implementation of Alternative 1 or Alternative 2 would not result in significant impacts to public health and safety at NS Norfolk, and would not result in environmental health risks or safety risks that may disproportionately affect children.

7.4 AIR QUALITY

Effects on air quality are based on estimated direct and indirect emissions associated with the action alternatives. The region of influence (ROI) for assessing air quality impacts includes the Hampton Roads Intrastate Air Quality Control Region (AQCR). Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations.

AIR QUALITY
POTENTIAL IMPACTS AT NS NORFOLK

Alternatives 1 and 2:

- Construction air emissions would be well below the applicable annual significance thresholds.
- Alternative 2: The net increase in operational emissions would not exceed any significance threshold.

In the case of criteria pollutants for which the ROI is in attainment of a National Ambient Air Quality Standards (NAAQS), the analysis used the U.S. Environmental Protection Agency (USEPA) Prevention of Significant Deterioration major source threshold of 250 tons per year of that pollutant as an indicator of the significance of projected air quality impacts. In the case of criteria pollutants for which the project region does not attain a NAAQS, the analysis used the pollutant threshold that requires a conformity determination for that region. If proposed emissions exceed a PSD or conformity threshold, further analysis was conducted to determine whether impacts were significant. In such cases, if proposed emissions: (1) would not be expected to contribute to an exceedance of an ambient air quality standard or (2) would conform to the approved State Implementation Plan (SIP), then impacts would be less than significant. For the ROI within the Hampton Roads Intrastate AQCR, the applicable analysis thresholds are 250 tons per year of volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxide (NO_x), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in diameter (PM_{10}), and particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$).

The potential effects of proposed greenhouse gas (GHG) emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. However, these global impacts would be manifested as impacts on resources and ecosystems in Virginia, as discussed below. This Environmental Assessment (EA) presents estimates of GHGs that would occur from each project alternative and uses these estimates as indicators of their potential contributions to climate change effects.

The analysis of proposed aircraft operations is limited to operations that occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer where the release of aircraft emissions would affect ground-level criteria pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level criteria pollutant concentrations.

7.4.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur, but future operations would increase slightly under ongoing actions at NS Norfolk. The increase would result in only a minor increase in emissions compared to those generated by baseline operations. The increase would be below the applicable PSD thresholds. Therefore, no significant impacts to air quality or air resources would occur with the No Action Alternative.

7.4.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

7.4.2.1 Construction

Air quality impacts from demolition and construction activities proposed under Alternative 1 at NS Norfolk would occur from: (1) combustive emissions due to the use of fossil fuel-powered equipment and trucks, and (2) fugitive dust emissions (PM_{10} and $PM_{2.5}$) during demolition activities and the use of equipment and vehicles on exposed soils. Construction activity data associated with Alternative 1 were used to estimate project combustive and fugitive dust emissions. It is estimated that construction under this alternative would occur over approximately a 2-year period and prior to emissions generated by proposed operations. **Appendix C** includes data and assumptions used to calculate emissions from proposed construction activities.

Factors needed to derive construction source emission rates were obtained from the USEPA MOVES2014a emissions model for on-road vehicles and nonroad equipment (USEPA, 2015) and special studies on fugitive dust (Countess Environmental, 2006). The analysis assumes that implementation of fugitive dust control for construction and construction measures would reduce emissions of PM_{10} and $PM_{2.5}$ due to fugitive dust by 74 percent from uncontrolled levels during construction. A description of these measures is provided in **Appendix C**.

Table 7.4-1 summarizes the total emissions associated with two years of construction activities under Alternative 1 at NS Norfolk. These data show that even if all construction activities were to occur in one year and not two, their total air pollutant emissions would be well below the applicable PSD annual thresholds. As a result, construction of Alternative 1 would not result in any significant air quality impacts.

Table 7.4-1: Estimated Emissions from Construction of Alternative 1 - NS Norfolk

Source Activity	*Air Pollutant Emissions (tons)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
Construct Squadron Hangar	0.29	1.50	1.85	0.00	1.00	0.29	386
Expand Taxiway	0.00	0.00	0.01	0.00	0.01	0.00	4
Treat Parking Aprons	0.00	0.00	0.01	0.00	0.00	0.00	1
Re-Stripe Airfield	0.00	0.01	0.01	0.00	0.01	0.00	2
Construct CFTD Pad	0.01	0.03	0.03	0.00	0.03	0.01	6
Total Emissions	0.30	1.54	1.91	0.00	1.05	0.30	399
PSD Threshold	250	250	250	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes:
CFTD=containerized flight training device; CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NS=Naval Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; PSD= Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound

7.4.2.2 Operations

The operational impact analysis methodology for Alternative 1 at NS Norfolk is based on the net change in emissions that would occur from the replacement of existing C-2A activities with the proposed Navy V-22 activities in year 2028. Sources associated with operation of the proposed Navy V-22 mission at NS Norfolk would include: (1) Navy V-22 aircraft operations and on-wing engine maintenance/testing, (2) aerospace ground equipment, (3) on-site privately owned vehicles (POVs), and (4) off-site commuting of

POVs. Emissions from projected Navy V-22 aircraft activities were based on data developed for the project noise analyses and special studies on aircraft operations (Aircraft Environmental Support Office [AESO], 2015c and 2016). **Appendix C** includes data and assumptions used to calculate emissions from proposed operational activities.

Operations at secondary airfields are discussed in **Section 2.3.2.4** (Aircraft Operations under Alternative 1). Navy V-22 transits to and from the home and secondary airfields (refer to **Section 2.1.4.3** [Special Use Airspace and Transit Flights]) would occur at altitudes exceeding 3,000 feet above ground level. At that altitude, emissions are above the USEPA's presumed mixing height for criteria air pollutants (USEPA, 1999a). The minor increase in transits dispersed throughout the available airspace would have negligible impact to air quality.

Emissions from non-aircraft sources generated by Alternative 1 activities at NS Norfolk were estimated by the following methods:

- Emissions for the use of aerospace ground equipment by Navy-22 aircraft are based on usages developed for generic aircraft groups by the U.S. Air Force (Air Force Civil Engineer Center, 2016) and emission factors obtained from the USEPA MOVES2014a emissions model.
- Emissions from POVs are based on vehicle trip generation rates developed by the project traffic analysis. On- and off-site miles driven per vehicle trip were obtained from recent National Environmental Policy Act (NEPA) documents for NS Norfolk (Marine Corps, 2015). The analysis obtained emission factors from the USEPA MOVES2014a emissions model to estimate on-road vehicle emissions.

The air quality analysis focuses on the first year after full transition from the C-2A to Navy V-22 aircraft because it represents the highest net increase in aircraft and associated activities, which would result in peak annual emission increases. Emissions during the transition from C-2A to Navy V-22 would result in lower net increases in activities and resulting emissions.

Table 7.4-2 summarizes the annual operational emissions that would result under Alternative 1 in year 2028 at NS Norfolk. Navy V-22 aircraft operations and on-wing engine testing activities are the primary contributors to these emissions increases. The data in **Table 7.4-2** show that the net increase in emissions from the replacement of existing C-2A aircraft operations with the proposed Navy V-22 operations would be well below the applicable PSD annual thresholds. Therefore, implementation of Alternative 1 at NS Norfolk would not produce any significant impacts to air quality.

7.4.2.3 Climate Change

The potential effects of proposed GHG emissions are by nature global, as worldwide sources of GHGs contribute to climate change. The total annual emissions of CO_2e from construction activities would be 399 metric tons under Alternative 1 (**Table 7.4-1**). The increase in annual operational emissions of CO_2e from Alternative 1 at NS Norfolk would amount to 1,355 metric tons (**Table 7.4-2**). Adding these emissions increases to the global inventory of GHGs would produce a negligible contribution to future climate change, the effects of which are identified in **Section 6.4.2** (Air Quality Affected Environment) of this EA.

In an effort to reduce energy consumption, reduce GHGs, reduce dependence on petroleum, and increase the use of renewable energy resources, the Navy has established Fiscal Year (FY) 2020 GHG emissions reduction targets of 34 percent from a FY 2008 baseline for direct GHG emissions and 13.5 percent for indirect emissions. Examples of Navy-wide GHG reduction projects include

improvements in operational efficiencies, energy efficient construction, thermal and photovoltaic solar systems, geothermal power plants, and the generation of electricity with wind energy. These renewable energy initiatives are not emission reductions proposed to directly offset GHG emissions produced by the project alternatives, but rather demonstrate initial responses for the Navy to factor GHG management into Navy proposals and impact analyses.

Climate change could impact implementation of Alternative 1 at NS Norfolk and the adaptation strategies needed to respond to future conditions. For the region surrounding NS Norfolk, the main effect of climate change is increased temperature and sea level and coastal erosion, as documented by climate analyses presented in **Chapter 6**, **Section 6.4.2** (Air Quality Affected Environment) of this EA. Current operations at NS Norfolk have adapted to recent trends in increasing temperatures and sea level rise. However, exacerbation of these conditions in the future could impede proposed activities during extreme events. Therefore, additional measures at NS Norfolk could be needed to protect infrastructure and personnel from these effects. Regarding sea level rise and its potential to displace coastal operations and infrastructure, the DoD has an active program to develop measures for installations to adapt to this threat (DoD Strategic Environmental Research and Development Program, 2014 and 2016). The Navy has recently participated in working groups for the Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Pilot Project to coordinate sea level rise adaption with local communities. Also, the DoD recently launched a first-of-its-kind joint land use study with the cities of Norfolk and neighboring Virginia Beach in June 2016 to analyze how rising waters due to sea level rise will affect necessary services at NS Norfolk.

Table 7.4-2: Estimated Emissions from Operation of Alternative 1 – NS Norfolk

Source Activity	*Air Pollutant Emissions (tons per year)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
Navy V-22 Aircraft Operations	0.06	3.35	14.41	1.87	2.08	2.08	4,178
In-Frame Aircraft Engine Testing – Navy V-22	0.18	5.57	8.17	1.61	0.83	0.83	3,602
Aerospace Ground Support Equipment	0.31	0.58	1.10	0.00	0.07	0.07	829
POVs – On- and Off-Base	0.03	4.99	0.19	0.01	0.01	0.01	1,157
Total Annual Emissions - Alternative 1	0.58	14.49	23.87	3.49	2.99	2.99	9,766
Baseline C-2A Emissions	1.68	18.93	24.78	2.91	2.19	2.19	8,411
Net Emissions Change for Alternative 1 [1]	(1.10)	(4.44)	(0.91)	0.58	0.80	0.80	1,355
PSD Threshold	250	250	250	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes:
CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NS=Naval Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; POV=personal-owned vehicle; PSD = Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound
[1] Equal to Navy V-22 Alternative 1 emissions minus Baseline C-2A emissions.

7.4.3 ALTERNATIVE 2 POTENTIAL EAST COAST IMPACTS

7.4.3.1 Construction

Construction activities associated with Alternative 2 at NS Norfolk would be the same as those identified for Alternative 1, except they also include renovation and construction activities for the training squadron hangar. The methods used to estimate combustive and fugitive dust emissions from construction of Alternative 1 also were used to estimate emissions for construction of Alternative 2.

Table 7.4-3 summarizes the total emissions associated with two years of construction activities under Alternative 2 at NS Norfolk. These data show that even if all construction activities were to occur in one year and not two, their total air pollutant emissions would be well below the applicable PSD annual thresholds. As a result, construction of Alternative 2 would not result in any significant air quality impacts.

Table 7.4-3: Estimated Emissions from Construction of Alternative 2 - NS Norfolk

Source Activity	*Air Pollutant Emissions (tons)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
Squadron Hangars	0.45	2.33	2.88	0.00	1.57	0.44	604
Expand Taxiway	0.00	0.00	0.01	0.00	0.01	0.00	2
Treat Parking Aprons	0.00	0.00	0.01	0.00	0.00	0.00	1
Re-Stripe Airfield	0.00	0.01	0.01	0.00	0.01	0.00	2
Construct CFTD Pad	0.01	0.03	0.03	0.00	0.03	0.01	6
Total Emissions	0.46	2.37	2.94	0.00	1.62	0.45	615
PSD Threshold	250	250	250	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes: CFTD=containerized flight device; CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NS=Naval Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; PSD= Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound

7.4.3.2 Operations

Alternative 2 would include the same operational activities as Alternative 1. However, Alternative 2 would base more Navy V-22 aircraft, which would result in higher usages of the Navy V-22 aircraft and associated sources.

Table 7.4-4 summarizes the annual operational emissions that would result from Alternative 2 in year 2028 at NS Norfolk. Navy V-22 aircraft operations and on-wing engine testing activities are the primary contributors to these emissions increases. The data in **Table 7.4-4** show that the net increase in emissions from the replacement of existing C-2A aircraft operations with the proposed Navy V-22 operations would not exceed any PSD threshold. Therefore, implementation of Alternative 2 at NS Norfolk would not produce any significant air quality impacts.

Table 7.4-4: Estimated Emissions from Operation of Alternative 2 - NS Norfolk

Source Activity	*Air Pollutant Emissions (tons per year)*						*CO_2e (mt)*
	VOCs	*CO*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	
Navy V-22 Aircraft Operations	0.11	5.71	25.47	3.28	3.66	3.66	7,314
In-Frame Aircraft Engine Testing – Navy V-22	0.25	7.42	10.90	2.14	1.11	1.11	4,803
Aerospace Ground Support Equipment	0.52	0.95	1.86	0.01	0.12	0.12	1,397
POVs – On- and Off-Base	0.05	6.97	0.27	0.01	0.02	0.02	1,615
Total Annual Emissions - Alternative 2	0.93	21.05	38.50	5.44	4.91	4.91	15,129
Baseline C-2A Emissions	1.68	18.93	24.78	2.91	2.19	2.19	8,411
Net Emissions Change for Alternative 2[1]	(0.75)	2.12	13.72	2.53	2.72	2.72	6,718
PSD Threshold	250	250	250	250	250	250	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A

Notes: CO=carbon monoxide; CO_2e=carbon dioxide equivalent; mt=metric tons; N/A=not applicable; NS=Naval Station; NO_x=nitrogen oxides; $PM_{2.5}$=fine particulate matter less than or equal to 2.5 microns in diameter, PM_{10}=suspended particulate matter less than or equal to 10 microns in diameter; POV=personal-owned vehicle; PSD = Prevention of Significant Deterioration; SO_2=sulfur dioxide; VOC=volatile organic compound

[1] Equal to Navy V-22 Alternative 2 emissions minus Baseline C-2A emissions.

7.4.3.3 Climate Change

The potential effects of proposed GHG emissions are by nature global, as worldwide sources of GHGs contribute to climate change. Impacts to climate change from Alternative 2 would be similar, but greater than those described for Alternative 1. The total annual emissions of CO_2e from construction activities would be 615 metric tons under Alternative 2 (**Table 7.4-3**). The increase in annual operational emissions of CO_2e from Alternative 2 at NS Norfolk would amount to 6,718 metric tons (**Table 7.4-4**). Adding these emissions increases to the global inventory of GHGs would produce a negligible contribution to future climate change, the effects of which are identified in **Section 6.4.2** (Air Quality Affected Environment) of this EA.

In an effort to reduce energy consumption, reduce GHGs, reduce dependence on petroleum, and increase the use of renewable energy resources, the Navy has established FY 2020 GHG emissions reduction targets of 34 percent from a FY 2008 baseline for direct GHG emissions and 13.5 percent for indirect emissions to demonstrate initial responses for the Navy to factor GHG management into Navy proposals and impact analyses.

Climate change could impact implementation of Alternative 2 at NS Norfolk and the adaptation strategies needed to respond to future conditions. Therefore, additional measures at NS Norfolk could be needed to protect infrastructure and personnel from these effects. Regarding sea level rise and its potential to displace coastal operations and infrastructure, the DoD has an active program to develop measures for installations to adapt to this threat (DoD Strategic Environmental Research and Development Program, 2014 and 2016). The Navy has recently participated in working groups for the Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Pilot Project to coordinate sea level rise adaption with local communities. Also, the DoD recently launched a first-of-its-kind joint land use study with the cities of Norfolk and neighboring Virginia Beach in June 2016 to analyze how rising waters due to sea level rise will affect necessary services at NS Norfolk.

7.4.4 CONCLUSION

Under the No Action Alternative, a slight increase in future operations would result in only a minor increase in emissions compared to those generated by baseline operations. Total air pollutant emissions associated with construction activities under Alternative 1 and 2, even if all construction activities were to occur in one year and not two, would be well below the applicable annual significance thresholds. Therefore, construction of Alternatives 1 and 2 would not result in significant air quality impacts.

The net increase in emissions from the replacement of existing C-2A aircraft operations with the proposed Navy V-22 operations under Alternatives 1 and 2 would not exceed any significance threshold. Therefore, implementation of Alternatives 1 and 2 would not result in significant air quality impacts.

The potential effects of proposed GHG emissions are by nature global because worldwide sources of GHGs contribute to climate change. The total annual emissions of CO_2e from construction of Alternative 1 and Alternative 2 at NS Norfolk would be 399 and 615 metric tons, respectively. The increase in annual emissions of CO_2e from operations of Alternative 1 and Alternative 2 at NS Norfolk would amount to about 1,355 and 6,718 metric tons, respectively. Adding these emissions increases to the global inventory of GHGs would produce a negligible contribution to future climate change, the effects of which are identified in **Section 6.4.2** (Air Quality Affected Environment) of this EA.

7.5 TRANSPORTATION

Impacts to transportation are analyzed by considering the possible changes to existing traffic conditions and the available capacity of area roadways and other transportation modes to accommodate proposed increases in commuter and construction traffic.

TRANSPORTATION
POTENTIAL IMPACTS AT NS NORFOLK

Alternative 1:

- Short-term construction truck traffic (average of one truck trip per work day) and construction worker vehicles.
- Estimated decrease of 125 ADT with reduction of personnel; less than 1 percent of existing NS Norfolk daily traffic.

Alternative 2:

- Short-term construction truck traffic (average of one truck trip per work day) and construction worker vehicles.
- Estimated increase of 55 ADT with minor increase in personnel; less than 1 percent of existing NS Norfolk daily traffic.

7.5.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline transportation. Therefore, no significant impacts would occur with the No Action Alternative.

7.5.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

7.5.2.1 Construction

During the construction period, there would be a short-term increase in trucks delivering construction materials and vehicles carrying construction workers to/from NS Norfolk. It is estimated that there would be an average of one construction truck trip per work day (Monday through Friday) over a construction period of 24 months. There may be periods of increased truck trips followed by periods of decreased truck trips, depending on the work that is scheduled. The use of a concrete batch plant may be considered by the construction contractor, if feasible, but concrete materials would still be delivered by truck. A portion of the construction workers

would be expected to carpool, but worker's vehicles would add to traffic in the a.m. and the p.m. during work days.

Construction vehicles would be instructed to use specific routes that would minimize impacts on the main commuter routes and gate access at NS Norfolk. The additional truck and other construction vehicle traffic would result in a temporary minor impact on City of Norfolk and NS Norfolk roadways, but would not result in a significant traffic impact. To minimize construction traffic, the Navy would consider the establishment of truck routes and/or construction worker carpooling.

7.5.2.2 Operations

Under Alternative 1, there would be a reduction of 126 personnel compared with the baseline condition and the No Action Alternative. Most of these personnel commute to the base daily in personal vehicles. Of 126 personnel, 20 percent are estimated to reside in on-base housing. On any given day, 25 percent would be on duty (i.e., not leaving NS Norfolk); 10 percent would be on vacation, temporary assigned duty, or training at off-base locations; and 5 percent would use carpools, vanpools, or mass transit. Therefore, of 126 existing personnel, the reduced number of personnel estimated to use personal vehicles for travel to NS Norfolk on an average day is estimated to be 50 commuters.

Using a trip generation rate of 2.5 trips per day for each of the 50 commuters, the estimated reduction in traffic on an average day would be -125 average daily traffic (ADT). Therefore, Alternative 1 would result in a slight reduction in commuter traffic, which would have minor beneficial impact on traffic conditions at NS Norfolk and surrounding roadways.

7.5.2.3 Alternative Transportation

Approximately 6 of the 126 personnel that would be reduced at NS Norfolk under Alternative 1 would no longer travel by carpool, vanpool, or mass transit. This minor reduction under Alternative 1 would have a negligible impact on alternative transportation at NS Norfolk.

7.5.3 Alternative 2 Potential East Coast Impacts

7.5.3.1 Construction

Construction traffic impacts and impact minimization measures under Alternative 2 would be the same as described for Alternative 1.

7.5.3.2 Operations

An additional 54 personnel would be added to the base population at NS Norfolk under Alternative 2. Most of these personnel would commute to the base daily in personal vehicles. Of 54 personnel, 20 percent would be expected to reside in on-base housing. On any given day, 25 percent would be on duty (i.e., not leaving NS Norfolk daily); 10 percent would be on vacation, temporary assigned duty, or training at off-base locations; and 5 percent would use carpools, vanpools, or other alternative transportation. Therefore, the number of new personnel that would use personal vehicles for travel to NS Norfolk on an average day is estimated to be 22 commuters.

Using a trip generation rate of 2.5 trips per day for each of the 22 commuters, the estimated additional traffic on an average day would be 55 ADT. The additional 55 ADT under Alternative 2 would represent less than 1 percent of traffic on the major routes to NS Norfolk and would have a negligible effect on traffic.

7.5.3.3 Alternative Transportation

Approximately 3 of 54 additional personnel under Alternative 2 would be expected to travel by carpool, vanpool, or other alternative transportation. This additional ridership would have a minimal effect on the capacity of these services. Therefore, the impact of Alternative 2 on alternative transportation would be negligible. NS Norfolk, Hampton Roads Transit, and the Virginia Department of Transportation (VDOT) continue to work together to plan for the enhancement of the local and regional transportation system to provide residents and military personnel with increased options for transportation.

7.5.4 CONCLUSION

Implementation of Alternative 1 or Alternative 2 would not result in significant impacts to transportation at the East Coast Fleet Logistics Center, NS Norfolk.

Alternative 1 and Alternative 2 would result in a short-term increase in construction delivery trucks and construction worker vehicles that would have a temporary impact on City of Norfolk roadways. On average, approximately one truck trip per work day (Monday through Friday) would travel to NS Norfolk over a construction period of 24 months. To minimize construction traffic, the Navy would consider the establishment of truck routes and/or construction worker carpooling.

A reduction of 126 personnel under Alternative 1 would result in an estimated decrease of 125 ADT, less than 1 percent of existing NS Norfolk daily traffic. Under Alternative 2, an increase of 54 personnel would generate an estimated increase of 55 ADT, less than 1 percent of existing NS Norfolk daily traffic. These changes would have a negligible effect on traffic.

Alternatives 1 and 2 would have minimal impacts on the capacity of carpool, vanpool, or other alternative transportation. NS Norfolk, Hampton Roads Transit, and VDOT continue to work together to plan for the enhancement of the local and regional transportation system to provide residents and military personnel with increased options for transportation.

7.6 BIOLOGICAL RESOURCES

This analysis focuses on wildlife that are important to the function of the ecosystem or are protected under federal or state law or statute.

7.6.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline biological resources. Therefore, no significant impacts to biological resources would occur with the No Action Alternative.

7.6.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

7.6.2.1 Terrestrial Vegetation

Alternative 1 would occur in a developed area mainly devoid of natural habitat areas or plant communities. Therefore, no impacts to vegetation would be expected as a result of construction and operations of Alternative 1.

Construction equipment has the potential to introduce and spread invasive non-native plant species outside of the project area. Therefore, all vehicles, equipment, and footwear would be cleaned of dirt, debris, seeds, mud, and visible plant material prior to being brought onto and before leaving the project area. Vehicles would also be cleaned after construction prior to being used elsewhere on NS Norfolk. Any weeds removed would be placed in bags or dumpsters and hauled away. Adherence to these measures would prevent the introduction and spread of invasive non-native plant species.

BIOLOGICAL RESOURCES
POTENTIAL IMPACTS AT NS NORFOLK

Alternative 1:

- No change in aircraft operations or BASH impacts on migratory birds or bats.

Alternative 2:

- Minor increase in aircraft operations would have the potential to increase BASH. No changes to existing flight paths, procedures, or habitat. Operations would be conducted in accordance with BASH Plan to avoid impacts.
- Migratory bird takes would be in compliance with the MBTA, the MOU to promote the conservation of migratory birds, and the regulations authorizing incidental take of migratory birds from military readiness activities.
- Bat species may be subject to aircraft strikes at night; however, bat strikes by aircraft are a relatively rare occurrence, and current flight operations have resulted in no known effects to bat species.
- *No effect* on federally listed species.
- Alternative 2 impacts to biological resources would not be exacerbated under climate change conditions.

7.6.2.2 Terrestrial Wildlife

The project area for Alternative 1 is located within a developed area at NS Norfolk that provides little to no habitat for most wildlife species. Ground disturbing activities within the project area during construction would not occur in any sensitive habitat areas or natural plant communities, and wildlife habitats would not be removed.

Some common wildlife species (e.g., eastern cottontails, raccoons, and various bird species) occur in developed portions of the installation and could occur in the project area. Potential impacts to common terrestrial wildlife could result from construction and aircraft noise. Noise resulting from the proposed construction would be localized, short-term, and only during daylight hours. The project area is a developed military industrial land use subject to frequent elevated noise and activity levels. If present,

common wildlife in the areas proposed for construction and near the airfield are already exposed to elevated noise under baseline conditions, and the temporary addition of localized construction noise and activity would not further reduce the suitability of habitat in the area.

Impacts to wildlife from aircraft noise is not anticipated because Alternative 1 would result in about the same number of aircraft operations at NS Norfolk as the No Action Alternative and would not result in additional noise impacts above current levels (see **Section 7.2** [Noise]). Therefore, Alternative 1 would not result in significant impacts to wildlife.

7.6.2.3 Bird/Animal Aircraft Strike Hazards

Under Alternative 1, aircraft operations would be about the same as the No Action Alternative. There would be no changes to the existing flight paths or procedures. Aircraft operations would be conducted in accordance with the BASH Plan. Therefore, Alternative 1 would not impact bird/animal aircraft strikes. The existing BASH program would continue to monitor and manage BASH activity at NS Norfolk to minimize strikes to wildlife.

7.6.2.4 Migratory Birds

Construction

Alternative 1 would demolish buildings that may contain active bird nests within the buildings or on the rooftop. Pursuant to Executive Order (EO) 13186, the U.S. Fish and Wildlife Service (USFWS) and DoD entered into a Memorandum of Understanding (MOU) to promote the conservation of migratory birds. This MOU does not authorize take of migratory birds but specifically pertains to evaluating the likelihood of an action to affect migratory birds. This MOU means to protect against the take of birds for installation support functions, including utilities maintenance, construction, and demolition. The executing agent/contractor would coordinate with the NS Norfolk Wildlife Biologist to ensure that work would avoid impacting birds protected under the Migratory Bird Treaty Act (MBTA) (including Birds of Conservation Concern [BCC]). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season. If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. The qualified biologist would be hired by the project proponent and approved by the NS Norfolk natural resources manager. The qualified biologist must survey the area within 72 hours of commencing work to determine if active nests are present. If an active nest is found in the project area at any time during project work, work would be halted immediately and the NS Norfolk natural resources manager would be contacted. The contractor cannot take action to remove the bird or the nest from the area that is being used. Any removal action must be overseen by the NS Norfolk natural resources manager before construction work could resume. With implementation of these measures, construction activities associated with Alternative 1 would not result in a significant adverse effect on a migratory bird (including BCC) species or their active nests.

Operations

As described above, Alternative 1 would result in approximately the same total annual operations as the No Action Alternative. No significant impacts to migratory birds are anticipated. Accordingly, the Navy has determined that the Alternative 1 would have no effect on a population of migratory birds, including BCC.

7.6.2.5 Other Special Status Species

No bald eagles, which are protected under the Bald and Golden Eagle Protection Act (BGEPA), are known to occur within the project area. The closest bald eagle nest (NO1502) is located approximately 1,700 feet from the end of runway 10/28 and 1.25 miles from the proposed aircraft hangar (USFWS, 2017b). This nest was last occupied in 2016. Furthermore, the project area does not intersect with a bald eagle concentration area. Therefore, no BGEPA permit would be required.

The state-listed Rafinesque's eastern big-eared bat and tri-colored bat have been recorded at NS Norfolk. However, it is undetermined if these bats roost at NS Norfolk. Monitoring surveys for these species are currently proposed under the Integrated Natural Resource Management Plan (INRMP) management goals (Naval Facilities Engineering Command [NAVFAC], 2017).

Prior to implementation of the Proposed Action, the NS Norfolk natural resources manager would be consulted to identify buildings with potential roosting habitat and coordinate species surveys to be conducted by a permitted biologist. If Rafinesque's eastern big-eared bat, the tri-colored bat, silver-haired bat, and/or eastern red bat are found within the project site, the Navy would contact VDGIF to develop relocation plans prior to demolition and construction/rehabilitation of buildings within the project area.

Under Alternative 1, total aircraft and aircraft operations would be about the same as the No Action Alternative. Habitats for state-listed bat species would not be impacted during aircraft operations. Bat species within the project area may be subject to the same level of aircraft strikes at night as the No Action Alternative; however, bat strikes by aircraft are a relatively rare occurrence, and current flight operations have not resulted in significant impacts to these bat species (NAVFAC, 2015). Therefore, Alternative 1 would not result in significant impacts to other special status species.

7.6.2.6 Climate Change

Ecosystems can serve as natural buffers from extreme events such as flooding. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Climate change may influence the geographic distribution of species, bringing in additional species to the area while driving out others. However, it is not likely that any additional species would be significantly impacted by Alternative 1.

As part of the *2014 Climate Change Adaptation Roadmap*, the DoD is implementing a phased installation-level vulnerability assessment approach to develop methodologies for conducting consistent screening-level vulnerability assessments of military installations (starting with coastal and tidal installations), leveraging recent scientific advancements regarding coastal assessment, and providing a platform to build upon prior to conducting more comprehensive and detailed assessments. Data from these screening-level assessments will be used to identify areas and installations where more detailed vulnerability assessments may be needed. The Navy is actively participating in developing the planned installation-level vulnerability assessments. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

7.6.3 Alternative 2 Potential East Coast Impacts

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than NAS North Island. Therefore, the hangar construction and pavement renovation footprint under Alternative 2 would be slightly greater than proposed for Alternative 2. The total number of aircraft operations would increase under

Alternative 2 by approximately 16 operations per day (8 aircraft departures and 8 aircraft arrivals), an 8.5 percent annual increase. Under Alternative 2, noise levels would not significantly change from the conditions under the No Action Alternative.

7.6.3.1 Terrestrial Vegetation

Similar to Alternative 1, the Proposed Action under Alternative 2 would occur in a developed area mainly devoid of natural habitat areas or plant communities. Therefore, no impacts to vegetation would be expected as a result of construction and operations of Alternative 2.

To prevent the introduction and spread of invasive non-native plant species, all construction equipment, vehicles, and footwear would be cleaned of dirt, debris, seeds, mud, and visible plant material prior to being brought onto and before leaving the project area. Vehicles would also be cleaned after construction prior to being used elsewhere on NS Norfolk. Any weeds removed would be placed in bags or dumpsters and hauled away. Any removed vegetation would not be dumped on-site or off-site. Adherence to these measures would prevent the introduction and spread of invasive non-native plant species.

7.6.3.2 Terrestrial Wildlife

The project area for Alternative 2 is located within a developed area at NS Norfolk that provides little to no habitat for most wildlife species. Ground disturbing activities associated with constructing proposed facilities would not occur in any sensitive habitat areas or natural plant communities, and wildlife habitats would not be removed or modified. As described for Alternative 1, potential impacts to terrestrial wildlife could result from noise during construction of facilities and aircraft operations. Construction noise and activity would be localized, short-term, and only during daylight hours. As described in **Section 7.2** (Noise), additional aircraft operations proposed under Alternative 2 would have negligible effects on the existing the noise environment. Common wildlife in or immediately adjacent to the project area are exposed to elevated noise under baseline conditions, and the temporary addition of localized construction and aircraft noise would not further reduce the suitability of habitat in the area. Therefore, Alternative 2 would not result in significant impact to common wildlife species.

7.6.3.3 Bird/Animal Aircraft Strike Hazards

BASH strikes are also an inevitable hazard associated with military aircraft training. Under Alternative 2, aircraft operations would increase by approximately 5,700 annual flight operations at NS Norfolk compared to the No Action Alternative (approximately 8.5 percent), increasing the potential for BASH. However, there would be no changes to the existing flight paths or procedures. Aircraft operations would be conducted in accordance with avoidance and minimization measures outlined in the installation BASH Plan (Navy, 2012). The BASH Plan establishes procedures and actions to manage and minimize the hazard associated with collisions between wildlife and aircraft, including bird dispersal, bird removal, and airport wildlife hazard surveys. The program focuses on managing the airfields to reduce the quality and attractiveness as a habitat for wildlife, managing wildlife populations, and working with installation personnel to improve the reporting and communicating of wildlife activity and wildlife/aircraft strikes, both damaging and non-damaging, all in an effort to minimize the potential of wildlife/aircraft strikes. Continued adherence to the BASH Plan would minimize the risk of collision impacts to wildlife at NS Norfolk. Therefore, Alternative 2 would not result in significant impacts from bird/animal aircraft strikes.

7.6.3.4 Migratory Birds

Construction

Alternative 2 would demolish buildings that may contain active bird nests within the buildings or on the rooftop. Pursuant to EO 13186, the USFWS and DoD entered into a MOU to promote the conservation of migratory birds. This MOU does not authorize take of migratory birds but specifically pertains to evaluating the likelihood of an action to affect migratory birds. This MOU means to protect against the take of birds for installation support functions, including utilities maintenance, construction, and demolition. The executing agent/contractor would coordinate with the NS Norfolk Wildlife Biologist to ensure that work would avoid impacting birds protected under the MBTA (including BCC). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season. If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. The qualified biologist would be hired by the project proponent and approved by the NS Norfolk natural resources manager. The qualified biologist must survey the area within 72 hours of commencing work to determine if active nests are present. If an active nest is found in the project area at any time during project work, work would be halted immediately and the NS Norfolk natural resources manager would be contacted. The contractor cannot take action to remove the bird or the nest from the area that is being used. Any removal action must be overseen by the NS Norfolk natural resources manager before construction work could resume. With implementation of these measures, construction activities associated with Alternative 2 would not result in a significant adverse effect on a migratory bird (including BCC) species or their active nests.

Operations

As described in **Section 7.6.3.3**, an increase in aircraft operations under Alternative 2 could result in an increase in BASH potential. Accordingly, the Navy has determined that the Proposed Action may result in potential additional takes of migratory birds (including BCC), which would be recorded and managed under the existing BASH Plan and Wildlife Services Team. These takes would not result in a significant adverse effect on a population of a migratory bird species (including BCC). Aircraft operations under the Proposed Action are a military readiness activity; therefore, these takes are in compliance with the MBTA and Final Rule authorizing “take” or “takes” incidental to military readiness activities. Military readiness activities are exempt from the take prohibitions of the MBTA, provided they would not result in a significant adverse effect on a population of migratory bird species.

Continued adherence to the installation BASH Plan (Navy, 2012) and INRMP would minimize the risk of impacts to migratory birds (including BCC). No operations or maintenance may be performed on a structure if a nest is occupied, and no nest may be removed or damaged, except as permitted by the USFWS and VDGIF. The Virginia Administrative Code (4 VAC 15-30-10) provides general protection for all native birds and their nests, eggs, and young, with the exception of species subject to legal harvest. The natural resource manager will continue to monitor nest activity and will inform public works personnel of nesting status if maintenance is required on any of the light poles or platforms that are occupied, or if consultation with the USFWS and VDGIF is required for such activity (NAVFAC, 2017). Alternative 2 would not result in significant impacts to a population migratory birds (including BCC).

7.6.3.5 Other Special Status Species

No bald eagles, which are protected under the BGEPA, are known to occur within the project area. The closest bald eagle nest (NO1502) is located approximately 1,700 feet from the end of runway 10/28 and

1.25 miles from the proposed aircraft hangar (USFWS, 2017b). This nest was last occupied in 2016. Furthermore, the project area does not intersect with a bald eagle concentration area. Therefore, no BGEPA permit would be required.

The state-listed Rafinesque's eastern big-eared bat and tri-colored bat have been recorded at NS Norfolk. However, it is undetermined if these bats roost at NS Norfolk. Monitoring surveys for these species are currently proposed under the INRMP management goals (NAVFAC, 2017).

Prior to implementation of the Proposed Action, the NS Norfolk natural resource manager would be consulted to identify buildings with potential roosting habitat and coordinate species surveys to be conducted by a permitted biologist. If Rafinesque's eastern big-eared bat, the tri-colored bat, silver-haired bat, and eastern red bat are found within the project site, the Navy would contact VDGIF to develop relocation plans prior to demolition and construction/rehabilitation of buildings within the project area.

Although total flight operations are proposed to increase under Alternative 2, there would be a negligible change in noise levels as compared with the baseline and No Action Alternative. Operations flown at night would not significantly increase (**Section 7.2** [Noise]). Habitats for state-listed bat species would not be impacted during aircraft operations. Bat species within the project area may be subject to aircraft strikes at night; however, bat strikes by aircraft are a relatively rare occurrence, and current flight operations have resulted in no known effects to any of these species. If strikes were to occur in the future, they would be comparably rare, not subjecting the population to risk. Therefore, Alternative 2 would not result in significant impacts to other special status species.

7.6.3.6 Climate Change

As described under Alternative 1, climate change impacts to biological resources would not have significant impacts by implementing Alternative 2 at NS Norfolk.

7.6.4 CONCLUSION

Under Alternative 1 and Alternative 2 no significant impacts to biological resources would occur at NS Norfolk.

7.6.4.1 Terrestrial Vegetation

Under Alternatives 1 or 2, vegetation within the project area would not be significantly impacted by construction or operation activities.

7.6.4.2 Terrestrial Wildlife

Under Alternatives 1 or 2, terrestrial wildlife within the project area would not be significantly impacted by construction or operation activities.

7.6.4.3 Bird/Animal Aircraft Strike Hazards

No significant impacts to migratory birds are anticipated under Alternative 1 because aircraft operations would be about the same as the No Action Alterative.

Alternative 2 would result in an increase of 5,700 annual flight operations (8.5 percent of all aircraft operations) at NS Norfolk compared to the No Action Alternative, potentially increasing BASH events. Aircraft operations would be conducted in accordance with the BASH Plan and the INRMP, which would minimize the risk of collision impacts to wildlife at NS Norfolk. Therefore, implementation of Alternative 1 or Alternative 2 would not result a significant BASH impact.

7.6.4.4 Migratory Birds

Under Alternatives 1 and 2, construction activities would be conducted in accordance with EO 13186. The executing agent/contractor would coordinate with the NS Norfolk Wildlife Biologist to ensure that work would avoid impacting birds protected under the MBTA (including BCC). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season. If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. The qualified biologist would be hired by the project proponent and approved by the NS Norfolk natural resources manager. The qualified biologist must survey the area within 72 hours of commencing work to determine if active nests are present. If an active nest is found in the project area at any time during project work, work would be halted immediately and the NS Norfolk natural resources manager would be contacted. The contractor cannot take action to remove the bird or the nest from the area that is being used. Any removal action must be overseen by the NS Norfolk natural resources manager before construction work could resume. Therefore, impacts to MBTA-protected bird species and their active nests would be avoided during construction.

No significant impacts to migratory birds (including BCC) are anticipated under Alternative 1 because aircraft operations would be about the same as the No Action Alternative. The Navy has determined that the Alternative 1 would have no effect on a population of migratory birds.

Under Alternative 2, birds within the project area would not be significantly impacted by noise. Because of the proposed increase in total flight operations, the Navy has determined that Alternative 2 may result in potential additional takes of migratory birds. These takes would not result in a significant adverse effect on a population of a migratory bird species. Aircraft operations under Alternative 2 are a military readiness activity; therefore, these takes are in compliance with the MBTA.

7.6.4.5 Other Special Status Species

No bald eagles, which are protected under the BGEPA, are known to occur within the project area. The closest bald eagle nest (NO1502) is located approximately 1,700 feet from the end of runway 10/28 and 1.25 miles from the proposed aircraft hangar (USFWS, 2017b). This nest was last occupied in 2016. Furthermore, the project area does not intersect with a bald eagle concentration area. Therefore, no BGEPA permit would be required.

The state-listed Rafinesque's eastern big-eared bat and tri-colored bat have been recorded at NS Norfolk using manual call analysis. Prior to implementation of the Proposed Action, the NS Norfolk natural resource manager would be consulted to identify buildings with potential roosting habitat and coordinate species surveys to be conducted by a permitted biologist. If Rafinesque's eastern big-eared bat, the tri-colored bat, silver-haired bat, and eastern red bat are found within the project site, the Navy would contact VDGIF to develop relocation plans prior to demolition and construction/rehabilitation of buildings within the project area. Alternative 1 would result the same number of aircraft operations as the No Action Alternative, and Alternative 2 would result in an increase in aircraft operations when compared to the No Action Alternative. Bat species within the project area may be subject to aircraft strikes at night; however, bat strikes by aircraft are a relatively rare occurrence, and current flight operations have resulted in no known effects to any of these species. If strikes were to occur in the future, they would be comparably rare, not subjecting the population to risk. Therefore, implementation of Alternative 1 and 2 would not result in significant impacts to other special status species.

7.6.4.6 Climate Change

Ecosystems can serve as natural buffers from extreme events such as flooding. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. Climate change may influence the geographic distribution of species, bringing in additional species to the area while driving out others. However, it is not likely that any additional species would be significantly impacted by Alternative 1 or Alternative 2.

As part of the *2014 Climate Change Adaptation Roadmap*, the DoD is implementing a phased installation-level vulnerability assessment approach to develop methodologies for conducting consistent screening-level vulnerability assessments of military installations (starting with coastal and tidal installations), leveraging recent scientific advancements regarding coastal assessment, and providing a platform to build upon prior to conducting more comprehensive and detailed assessments. Data from these screening-level assessments will be used to identify areas and installations where more detailed vulnerability assessments may be needed. The Navy is actively participating in developing the planned installation-level vulnerability assessments. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

7.7 Water Resources

7.7.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline water resources. Therefore, no significant impacts to water resources would occur with the No Action Alternative.

7.7.2 Alternative 1 Potential East Coast Impacts

7.7.2.1 Groundwater

Under Alternative 1, the potential impact to groundwater would be minimal and would be associated with construction and demolition activities within the project area. Construction/renovation of the squadron hangar, aircraft parking apron/taxiway, and support facilities would occur within currently developed areas. Dewatering activities during construction may be needed because of the depth to groundwater within the project area. In the event groundwater is encountered during construction, the construction contractor would contact NS Norfolk environmental staff to determine if a permit is needed. If the groundwater is uncontaminated, it may be discharged to an authorized non-stormwater discharge under the Virginia Stormwater Management Program (VSMP) Construction General Permit as

Water Resources
Potential Impacts at NS Norfolk

Alternative 1 and Alternative 2:

- Potential encounter with groundwater during construction would require dewatering. Construction contractor would comply with applicable requirements.
- Surface water quality of nearby drainages and Willoughby Bay could potentially be impacted by construction activities; minimized through implementing a SWPPP and applicable construction BMPs.
- Increase of 2.4 acres of impervious surface would be expected to increase stormwater runoff.
- Wetlands adjacent to proposed taxiway expansion would be avoided.
- Existing taxiway is within the floodplain; floodplain modifications would be minimal.
- Potential for future sea level rise to contribute to 100-year event flooding that could impact the project site.

long as it has been filtered, settled, or similarly treated. By adhering to these requirements, Alternative 1 would not result in significant impacts to groundwater.

7.7.2.2 Surface Water

Under Alternative 1, new support facilities, including the squadron hangar, modified aircraft parking apron, taxiway expansion, and pilot training facilities would be constructed at NS Norfolk. Proposed facilities would be located within the project area near existing parking aprons, runways, hangars, and support facilities. An existing wash rack located east of the hangar site would be used for the Navy V-22. No additional wash rack construction would be required at NS Norfolk.

Surface water quality of nearby drainages and Willoughby Bay could potentially be impacted by fuel spills and surface water runoff associated with ground disturbance during construction-related activities. Possible oil or other material spills from construction vehicles and equipment would be minimized by implementing appropriate construction management best management practices (BMPs) such as requiring all construction equipment to be in good condition and properly maintained to avoid the potential for spills and leaks.

Construction activities under Alternative 1 would disturb more than 1 acre of land on NS Norfolk, which is federal land outside of the coastal zone but is land analogous to Resource Management Areas under the Chesapeake Bay Act. Therefore, the Navy would be required to obtain authorization under the VSMP Construction General Permit (VAR10) from the Virginia Department of Environmental Quality (VDEQ) before starting construction activities. The Construction General Permit requires that the permittee develop an SWPPP in accordance with Part II of the VAR10 General Permit to minimize water quality degradation through establishing project-specific BMPs, including implementing a Spill Prevention Control and Countermeasures plan. In addition, the Navy would comply with the general performance criteria (9 VAC 25-830-130) of the Chesapeake Bay Act by minimizing land disturbance (including access and staging areas), retaining existing vegetation, and minimizing impervious cover to the maximum extent practicable. Furthermore the Navy would comply with the enforceable policies of the Virginia Erosion and Sediment Control law, as part of the approved Virginia Coastal Zone Management Program. The construction contractor would be required to implement all appropriate BMPs for erosion and sedimentation, as outlined in the SWPPP and Virginia Erosion and Sediment Handbook. Construction-related erosion control measures could include, but not be limited to, erosion control blankets, soil stabilizers, silt fencing, sand bags, and storm drain inlet protection devices. Applicable BMPs would be included in the preliminary engineering design and construction of facilities. By implementing BMPs and stormwater management, construction activities associated with Alternative 1 would not result in significant impacts to surface waters.

Alternative 1 would result in an increase in impervious surfaces within the project area by 2.4 acres. Therefore, the amount of stormwater runoff would be expected to increase as a result of the operation of Alternative 1. Alternative 1 must incorporate proper post-construction stormwater management features into the project planning and site design to ensure compliance with the Energy Independence and Security Act (Section 438), Department of the Navy Low Impact Development Policy, and VSMP Law and Regulations, which are authorized by the Virginia Stormwater Management Act. The Navy has developed Post Construction Stormwater Management Instructions for its Regional Municipal Separate Stormwater Sewer System Program Plan, which covers NS Norfolk (NAVFAC Mid-Atlantic, 2013). Under these instructions, if the project area exceeds the average existing impervious cover at NS Norfolk (42.2

percent), the discharge after development must not exceed 10 percent less than the discharge of the existing condition or the discharge based on the average impervious cover (42.2 percent) at NS Norfolk.

Under Alternative 1, most construction standards would require that water quality BMPs (e.g., bioretention basins, infiltration facilities, or retention basins) be included in the project design to offset potential increases in runoff, to maintain the pre-project hydrology. To comply with the Virginia Pollutant Discharge Elimination System (VPDES) permit (permit #VA0004421), non-stormwater discharges from the wash rack would be required to be diverted into the sanitary sewer systems. Diverting the wash rack discharges to the sanitary sewer system would also need coverage under Hampton Roads Sanitation District Industrial Wastewater Discharge Regulations. NS Norfolk has several existing wash racks in operation that include valves to divert wash rack discharges to the Hampton Roads Sanitation District sanitary sewer system. Operational activities associated with Alternative 1, including post-construction stormwater management and non-storm diversion of wash rack water to the sewer system would not result in significant impacts to surface waters.

7.7.2.3 Wetlands

Under Alternative 1, the taxiway expansion is adjacent to an existing waterbody and surrounding wetland. The existing wetlands are contained on federal lands, are regulated under Section 404 of the CWA, and are subject to the enforceable policies contained within the Chesapeake Bay Act as part of the approved Virginia Coastal Zone Management Program. The taxiway expansion would be constructed to avoid direct impacts to wetlands. BMPs installed during construction activities (e.g., silt fences, fiber rolls, etc.) would be planned and managed for the construction areas to avoid indirect impacts to wetlands from surface water runoff and sedimentation. BMPs would be administered in compliance with the enforceable policies within the Chesapeake Bay Act (9 VAC 25-830-130) and Virginia's Erosion and Sediment Control Law (see **Section 7.7.2.2**, Surface Water). By avoiding the wetlands, the taxiway expansion would not result in significant impacts. Should project developments require any impact to wetlands, appropriate permits would be obtained and impacts would be mitigated.

7.7.2.4 Floodplains

Portions of the existing taxiway at NS Norfolk are within the storm-surge floodplain. Under Alternative 1, the taxiway expansion would result in more developed taxiway area susceptible to flooding in a 100-year event. EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. There is no practicable alternative to expanding the taxiway outside of the storm-surge floodplain in the runway's current configuration. In compliance with the EO 11988, the taxiway expansion would be designed to minimize potential harm within the floodplain. Because there is little upstream development in the area of the taxiway that would be affected by flooding and that the expansion would be designed to minimize harm, Alternative 1 would not result in significant floodplain impacts.

7.7.2.5 Climate Change

NS Norfolk is subject to flooding from storm surges associated with tropical storm events. However, most of the project area is located at 10 feet in elevation and outside of the 100-year floodplain. (Federal Emergency Management Agency, 2017). The expanded taxiway is the only portion of the proposed facilities within the project area that could be impacted by flooding under current mean sea level elevations. However, if the sea level were to rise by 2 meters (7 feet), as projected by modeling, additional project areas would be under water in a 100-year storm event (Li et al., 2013). Sea level rise

as low as 0.5 meters (2 feet) dramatically increases the risk to infrastructure and military operations at NS Norfolk. If sea level rises as projected (Li et al., 2013; Burkes-Copes et al., 2014), most of the project area could be subjected to flooding during a 100-year storm surge event.

As part of the 2014 *Climate Change Adaptation Roadmap*, the DoD is implementing a phased installation-level vulnerability assessment approach to develop methodologies for conducting consistent screening-level vulnerability assessments of military installations (starting with coastal and tidal installations), leveraging recent scientific advancements regarding coastal assessment, and providing a platform to build upon prior to conducting more comprehensive and detailed assessments. Data from these screening-level assessments will be used to identify areas and installations where more detailed vulnerability assessments may be needed. The Navy is actively participating in developing the planned installation-level vulnerability assessments. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

7.7.3 ALTERNATIVE 2 POTENTIAL EAST COAST IMPACTS

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than NAS North Island. Therefore, the hangar construction footprint under Alternative 2 would be slightly greater than proposed under Alternative 1.

7.7.3.1 Groundwater

Potential impacts to groundwater under Alternative 2 would be the same as Alternative 1. Alternative 2 could require the same dewatering activities during construction as described under Alternative 1 because of the depth to groundwater within the project area. In the event groundwater is encountered during construction, the construction contractor would contact NS Norfolk environmental staff to determine if a permit is needed. If the groundwater is uncontaminated, it may be discharged to an authorized non-stormwater discharge under the VSMP Construction General Permit as long as it has been filtered, settled, or similarly treated. With adherence to these requirements, Alternative 2 would not result in significant impacts to groundwater.

7.7.3.2 Surface Water

Alternative 2 would include the same planning and BMP implementation required in Alternative 1 for constructing facilities. In addition, post-construction stormwater management features would be incorporated into the project planning and site design as described for Alternative 1. Non-stormwater discharges from the wash rack would also be diverted to the sanitary system. Therefore, water quality impacts under Alternative 2 would be similar to and slightly greater than those described for Alternative 1, and would not result in significant water quality impacts.

7.7.3.3 Wetlands

Alternative 2 would avoid existing wetlands and include the same planning and BMP implementation required in Alternative 1 for constructing facilities. Therefore, wetland impacts under Alternative 2 would be the same as under Alternative 1, and would not be significant. Should project developments require any impact to wetlands, appropriate permits would be obtained and impacts would be mitigated.

7.7.3.4 Floodplains

Alternative 2 would also result in taxiway expansion of the existing taxiway where portions occur in the floodplain. As described under Alternative 1, the taxiway expansion would be designed to minimize potential harm within the floodplain. Alternative 2 floodplain modifications would be minimal and would not result in significant floodplain impacts.

7.7.3.5 Climate Change

Similar to Alternative 1, impacts to project facilities proposed under Alternative 2 due to flooding would be unlikely to occur under current sea levels. However, if sea level rises as projected, the project area would also be subject to flooding in a 100-year storm surge event.

As discussed under climate change for Alternative 1, as part of the 2014 *Climate Change Adaptation Roadmap*, the Navy is actively participating with the DoD in developing the planned installation-level vulnerability assessments. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

7.7.4 CONCLUSION

Implementation of Alternative 1 and Alternative 2 would not result in significant impacts to water resources at the East Coast Fleet Logistics Center, NS Norfolk.

7.7.4.1 Groundwater

Alternatives 1 and 2 could require dewatering activities during construction because of the depth to groundwater within the project area. In the event groundwater is encountered during construction, the construction contractor would contact NS Norfolk environmental staff to determine if a permit is needed. If the groundwater is uncontaminated, it may be discharged to an authorized non-stormwater discharge under the VSMP Construction General Permit as long as it has been filtered, settled, or similarly treated. Therefore, Alternatives 1 and 2 would not result in significant impacts to groundwater.

7.7.4.2 Surface Water

Under, Alternatives 1 and 2 the Navy would obtain authorization under the VSMP Construction General Permit (VAR10) from the VDEQ before starting construction activities. Impacts to surface water during construction would be minimized through implementing a site-specific SWPPP and applicable construction BMPs.

The operation of facilities proposed under Alternatives 1 and 2 would comply with applicable standards and policies for post-construction stormwater management under the Energy Independence and Security Act of 2007; Navy Low Impact Development standards; Chief of Naval Operation Instruction 4100.5E; EO 13834, *Efficient Federal Operations*; and the VPDES permit (permit #VA0004421). Post-construction stormwater management features would be incorporated into the project planning and site design. Non-stormwater discharges from the wash rack would be diverted to the sanitary system. Therefore, Alternatives 1 and 2 would not result in significant impacts to surface water.

7.7.4.3 Wetlands

Based on current plans for widening the runway, impacts to wetlands present adjacent to the Chambers Field runway would be avoided. Should project developments require any impact to wetlands, appropriate permits would be obtained and impacts would be mitigated. Therefore, Alternatives 1 and 2 would not result in significant wetland impacts.

7.7.4.4 Floodplains

Alternatives 1 and 2 include the taxiway expansion of the existing taxiway where portions occur in the floodplain. In compliance with the EO 11988, the taxiway expansion would be designed to minimize potential harm within the floodplain. Because there is little upstream development in the area of the taxiway that would be affected by flooding and that the expansion would be designed to minimize harm, Alternatives 1 and 2 would not result in significant floodplain impacts.

7.7.4.5 Climate Change

Project facilities under both alternatives could be impacted by flooding in the future if sea level rises by 7 feet. As part of the 2014 *Climate Change Adaptation Roadmap*, the Navy is actively participating with the DoD in developing the planned installation-level vulnerability assessments. As a result, the Navy plans to incorporate appropriate measures to address potential impacts from sea level rise.

7.8 INFRASTRUCTURE

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

7.8.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to the existing infrastructure of NS Norfolk. Therefore, no significant impacts to infrastructure would occur with the No Action Alternative.

7.8.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

Under Alternative 1, the training squadron and maintenance school would not be established on the East Coast at NS Norfolk. Squadron aircraft at NS Norfolk would decrease from 17 aircraft to 15 aircraft, and annual airfield operations would remain approximately the same as under the No Action Alternative. There would be a reduction of 126

INFRASTRUCTURE
POTENTIAL IMPACTS AT NS NORFOLK

Alternative 1:

- Increase in water demand and wastewater collection associated with the wash rack would generally be offset by the reduction of 126 personnel.
- Construction and operations would increase solid waste; area landfills have capacity to accept the additional waste.
- Existing electrical infrastructure and utilities would adequately handle the demand of proposed facilities.

Alternative 2:

- Personnel, families, and wash rack would increase water use in the City of Norfolk, but the increase would not be significant.
- Existing wastewater system at NS Norfolk would adequately handle the minor increase in wastewater that would result from additional personnel and operational activities.
- Construction and operations would increase solid waste. The waste flow would be minimized through mandatory recycling practices, and the existing landfill capacity would accommodate the waste.
- NS Norfolk electrical infrastructure has ample capacity to absorb the population and facilities operations increase.

personnel compared to the No Action Alternative. Assuming personnel would relocate out of the area, a total of 277 persons (126 Navy personnel and 151 family members) would be reduced at NS Norfolk and the surrounding area.

7.8.2.1 Water Distribution

Construction and operations activities associated with Alternative 1 would have minimal impacts on water supply. Under this alternative, there would be a reduction of 126 personnel and associated water usage compared to the No Action Alternative. In addition, a proposed wash rack would be used to wash approximately 1 aircraft per day (15 aircraft washed every 2 weeks). Potable water for the project area would continue to be derived from the City of Norfolk. The increase in water demand associated with the wash rack would be offset by the reduction of 126 personnel. Therefore, Alternative 1 would not result in significant impacts to the existing water supply.

7.8.2.2 Wastewater Collection

Alternative 1 would result in the reduction of 277 persons and associated wastewater generation (126 Navy personnel and 151 family members) at NS Norfolk and surrounding communities, when compared to the No Action Alternative. Proposed Alternative 1 facilities would not result in the use of a substantial portion of or cause an exceedance of wastewater collection capacity at NS Norfolk and usage would generally be offset by the reductions in personnel. Alternative 1 would not result in significant impacts to wastewater infrastructure.

7.8.2.3 Solid Waste Management

Demolition, construction, and renovation of the proposed facilities at NS Norfolk under Alternative 1 would result in the generation of solid waste (construction and demolition debris). The primary solid wastes generated from demolition activities would be building materials such as asphalt, concrete, metals (conduit, piping, and wiring), lumber, and soil piles. Area landfills that accept solid waste have capacity to accept construction and demolition debris resulting from Alternative 1. Furthermore, in accordance with Navy goals, construction and demolition debris would be recycled to the greatest extent possible, thereby diverting it from landfills.

Solid waste generation during operations would be decreased over existing conditions because of the decrease in personnel at NS Norfolk. In addition, the amount of municipal solid waste generated would be minimized through requiring recycling efforts. Disposing of solid waste would not be a significant impact because of existing landfill capacity, and the waste flow resulting from Alternative 1 would be minimized through mandatory recycling practices.

Alternative 1 would not result in a significant impact to local landfills, as the quantity of waste requiring disposal would be accommodated by the existing capacity and would be minimized to the greatest extent feasible.

7.8.2.4 Energy

The facilities proposed under Alternative 1 would comply with standards and policies for energy under EO 13834, *Efficient Federal Operations*. Unified Facilities Criteria (UFC) 1-200-02 High Performance and Sustainable Building Requirements and UFC 3-210-10 Low Impact Development would be used to design the facilities (DoD, 2016a; DoD, 2016b). UFC documents provide planning design, construction, sustainment, restoration, and modernization criteria to military departments.

Proposed facilities would be constructed within areas previously developed. The existing electrical infrastructure and services that currently serve the project area would adequately handle the demand of project facilities.

Alternative 1 would result in the reduction of 277 persons (126 Navy personnel and 151 family members) at NS Norfolk and surrounding communities when compared to the No Action Alternative. Therefore, because proposed facility energy demands would generally be offset by reduction in demand from personnel, Alternative 1 would not result in the use of a substantial portion of or cause an exceedance of electrical capacity and would not result in significant impacts to electrical infrastructure at NS Norfolk.

7.8.3 ALTERNATIVE 2 POTENTIAL EAST COAST IMPACTS

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Therefore, the hangar construction and pavement renovation footprint under Alternative 2 would be slightly greater than proposed under Alternative 1. The total number of aircraft at NS Norfolk would increase by three when compared to the No Action Alternative. In addition, Alternative 2 would result in an increase of 54 personnel accompanied by an estimated 70 family members (approximately 124 people total) at NS Norfolk and in the surrounding area when compared to the No Action Alternative.

7.8.3.1 Water Distribution

The increase in personnel and aircraft in Alternative 2 would result in a slight increase in the water demands at NS Norfolk and in the City of Norfolk compared to the No Action Alternative. However, the increase in water demand associated with Alternative 2 would not have a significant impact on projected water supplies.

7.8.3.2 Wastewater Collection

Impacts from constructing, renovating, and operating the Navy V-22 facilities and infrastructure would be similar to but slightly greater than those described for Alternative 1. As described for Alternative 1, the existing wastewater system at NS Norfolk would adequately handle the increase in wastewater that would result from additional personnel and operational activities that would be implemented under Alternative 2. Alternative 2 would not result in the use of a substantial portion of or cause an exceedance of wastewater collection capacity at NS Norfolk. Therefore, Alternative 2 would not result in significant impacts to wastewater infrastructure.

7.8.3.3 Solid Waste Management

Impacts to solid waste generation under Alternative 2 would be similar to those described for Alternative 1. However, additional personnel at NS Norfolk would result in slightly more solid waste. The amount of municipal solid waste generated under Alternative 2 would be minimized through requiring recycling efforts. Alternative 2 would not result in a significant impact to local landfills, as the quantity of waste requiring disposal would be accommodated by the existing capacity and would be minimized to the greatest extent feasible.

7.8.3.4 Energy

NS Norfolk electrical infrastructure has ample capacity to absorb the population increase proposed under Alternative 2. Therefore, Alternative 2 would not result in the use of a substantial portion of or cause an exceedance of energy infrastructure capacity at NS Norfolk.

7.8.4 CONCLUSION

Alternative 1 would construct/renovate a 62,000 square foot of hangar space and would result in the reduction of 2 aircraft and 277 persons (126 Navy personnel and 151 family members) at NS Norfolk and surrounding communities when compared to the No Action Alternative.

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Therefore, construction/renovation would include 96,100 square foot of hangar space under Alternative 2. The total number of aircraft at NS Norfolk would increase by three compared to the No Action Alternative. In addition, Alternative 2 would result in an increase in personnel and associated family members (approximately 124 people) at NS Norfolk and the surrounding area.

Alternatives 1 and Alternative 2 would not result in significant impacts to infrastructure at NS Norfolk. Capacity exists to accommodate both action alternatives for all infrastructure and utilities at NS Norfolk.

7.9 CULTURAL RESOURCES

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

CULTURAL RESOURCES
POTENTIAL IMPACTS AT NS NORFOLK

Alternative 1 and Alternative 2:

- No adverse effect to NRHP-eligible or NRHP-listed architectural resources are anticipated.
- There are no known NRHP-eligible archaeological resources within the APE.
- By adhering to design and construction considerations and standards, the proposed facilities would have no visual adverse effect on the nearby Naval Air Station Historic District or the more distant historic districts at NS Norfolk.
- There are no traditional cultural properties (TCPs) at NS Norfolk that are listed in the NRHP and no known sites that are considered potentially eligible for listing.

Commander, Navy Region Mid-Atlantic carries out its National Historic Preservation Act (NHPA) Section 106 responsibilities for actions affecting the built environment through implementing the terms of their Regional Programmatic Agreement (PA) for undertakings at certain Navy Region Mid-Atlantic installations located in Hampton Roads area of southeastern Virginia, which includes NS Norfolk and the National Register of Historic Places (NRHP)-listed and NRHP-eligible historic districts briefly described in **Section 6.9.2** (Cultural Resources Affected Environment) (Navy, 2013e).

7.9.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline cultural resources. Therefore, no significant impacts to cultural resources would occur with the No Action Alternative.

7.9.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

7.9.2.1 Construction

Under Alternative 1, total fleet logistics squadron aircraft at NS Norfolk would decrease from 17 to 15 aircraft compared to the No Action Alternative. Facilities that would be constructed to accommodate the Navy V-22 would include a squadron hangar facility, a 100,000 square foot pad and CFTD, renovation of the existing parking apron (coating with sodium silicate solution), and taxiway expansion as described in **Section 2.3.2.2** (Facilities and Infrastructure under Alternative 1).

7.9.2.1.1 Architectural Resources

There are four NRHP-eligible or NRHP-listed historic districts at NS Norfolk, all of which have preservation ratings of Category 1 or 2: the Jamestown Exposition Site Historic District, the Naval Administration/Recruit Training Station Historic District, the Naval Supply Depot Historic District, and the Naval Air Station Historic District (Navy, 2013e; Navy, 1999). No facilities in these districts would be modified or demolished, and no new facilities construction would occur within any of their boundaries. Thus, there would be no impacts to any NRHP-eligible or NRHP-listed architectural resources.

Portions of the Naval Air Station Historic District are within about 0.4 miles of the project area (i.e., where facilities construction would occur) (**Figure 6.9-1**), which would be within visual range of the proposed new squadron hangar facility. The other three historic districts are 0.8 miles or more from the project area and would not be within visual range. In accordance with the stipulations of the Regional PA (Stipulation III [B][5][a]), design and construction of the new squadron hangar adjacent to the Naval Air Station Historic District would take into account the recommended approaches in the *Setting* and *New Additions to Historic Buildings* sections of the *Secretary of Interior Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings* (U.S. Department of the Interior, National Park Service, 1995). In addition, the Navy will coordinate with the Virginia Department of Historic Resources during the new hangar design process. By adhering to these design and construction considerations and standards, and coordinating with Virginia Department of Historic resources during hangar design, the new facilities would have no adverse effect on the nearby Naval Air Station Historic District or the more distant historic districts at NS Norfolk. Therefore, facility construction under Alternative 1 would have no adverse effect to NRHP-eligible or NRHP-listed architectural resources.

7.9.2.1.2 Archaeological Resources

No adverse effect to archaeological resources is anticipated. As described in **Section 6.9.2.2** (Archaeological Resources), there are no known NRHP-listed or NRHP-eligible archaeological resources within the area of potential effect (APE) for ground disturbing activities.

It is not expected that undiscovered cultural resources would be found during implementation of Alternative 1; however, in the unlikely event of an inadvertent discovery of previously unrecorded or unevaluated cultural resources during ground disturbing construction, the Navy would manage these resources in accordance with the NHPA and other federal and state laws, Navy and DoD regulations and instructions, and DoD American Indian and Alaska Native Policy by implementing Standard Operating Procedure #12, *Project Specific Standard Treatment of Archaeological Resources*, of the Integrated Cultural Resource Management Plan (ICRMP), which contains procedures for inadvertent discovery of archaeological materials and for human remains.

Therefore, facility construction under Alternative 1 would have no adverse effect on archaeological resources.

7.9.2.1.3 Traditional Cultural Properties

There are no TCPs at NS Norfolk that are listed in the NRHP and no known sites that are considered potentially eligible for listing. Therefore, facility construction under Alternative 1 would have no impacts on TCPs.

7.9.2.2 Operations

Under Alternative 1, the Navy anticipates an average of approximately 7,000 annual Navy V-22 airfield operations at NS Norfolk, which would be approximately the same as C-2A operations under the No Action Alternative.

No impacts on the NRHP-eligible or NRHP-listed historic properties are expected to result from the proposed annual airfield operations at NS Norfolk. Scientific studies of the effects of noise and vibration on historic properties have considered potential impacts on historic buildings, prehistoric structures, water tanks, archaeological cave/shelter sites, and rock art. These studies have concluded that subsonic overflight were well below established damage thresholds (Sutherland, 1990; Sutherland, Brown, and Goerner, 1990; Committee on Hearing and Bio Acoustics, 1977). Alterative 1 would not noticeably alter the noise environment around NS Norfolk (see **Section 7.2** [Noise]) and would not impact historic properties under the installation airspace.

No impacts to the setting of the NRHP-eligible and NRHP-listed historic properties are expected to result from the proposed operations by Navy V-22 aircraft at NS Norfolk. Annual flight operations for Alternative 1 would be about the same as the No Action Alternative, and the Navy V-22 would operate very similarly to Marine Corps Reserve MV-22B aircraft already based at NS Norfolk. Therefore, while these training activities may be audibly and/or visibly noticeable, Alternative 1 would not impair the integrity of the potentially affected resources such that they would no longer meet the NRHP criteria for listing.

No adverse effect or significant impacts to cultural resources would occur with implementing Alternative 1.

7.9.3 Alternative 2 Potential East Coast Impacts

7.9.3.1 Construction

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Therefore, the hangar construction and pavement renovation footprint under Alternative 2 would be slightly greater than proposed for Alternative 2. Under Alternative 2, total fleet logistics squadron aircraft and training squadron aircraft at NS Norfolk would increase from 17 to 20 aircraft compared to the No Action Alternative.

7.9.3.1.1 Architectural Resources

Impacts to historic architectural resources would be the same as for Alternative 1. Design and construction of the new hangar would take into account the architectural style of the adjacent historic properties, primarily the Naval Air Station Historic District, in accordance with the stipulations of the Regional PA. In addition, the Navy will coordinate with the Virginia Department of Historic Resources

during the new hangar design process. Therefore, facility construction under Alternative 2 would have no adverse effect to NRHP-eligible or NRHP-listed architectural resources.

7.9.3.1.2 Archaeological Resources

Impacts to archaeological resources would be the same as for Alternative 1. There are no known NRHP-eligible or NRHP-listed archaeological resources within the APE. It is not expected that undiscovered cultural resources would be found during implementation of Alternative 2; however, in the unlikely event of an inadvertent discovery of previously unrecorded or unevaluated cultural resources during ground disturbing operations, the Navy would manage these resources as described for Alternative 1.

Therefore, facility construction under Alternative 2 would have no adverse effect on archaeological resources.

7.9.3.1.3 Traditional Cultural Properties

There are no TCPs at NS Norfolk that are listed in the NRHP and no known sites that are considered potentially eligible for listing. Therefore, facility construction under Alternative 2 would have no impacts on TCPs.

7.9.3.2 Operations

Under Alternative 2, the Navy anticipates 12,700 annual airfield operations by Navy V-22 aircraft at NS Norfolk, which represents an increase of 5,700 operations from the No Action Alternative operations.

No impacts on the NRHP-eligible and NRHP-listed historic properties are expected to result from the proposed increase in annual airfield operations at NS Norfolk. Scientific studies of the effects of noise and vibration on historic properties have considered potential impacts on historic buildings, prehistoric structures, water tanks, archaeological cave/shelter sites, and rock art. These studies have concluded that subsonic operations were well below established damage thresholds (Sutherland, 1990; Sutherland, Brown, and Goerner, 1990; Committee on Hearing and Bio Acoustics, 1977). Alterative 2 would not noticeably alter the noise environment around NS Norfolk (see **Section 7.2** [Noise]) and would not impact historic properties under the installation airspace.

No impacts to the setting of the NRHP-eligible and NRHP-listed historic properties are expected to result from the proposed increase in annual airfield operations at NS Norfolk. Alterative 2 would not noticeably alter the noise environment around NS Norfolk. In addition, the Navy V-22 would operate very similarly to Marine Corps Reserve MV-22B aircraft already based at NS Norfolk. Therefore, while these training activities may be audibly and/or visibly noticeable, Alternative 2 would not impair the integrity of the potentially affected resources such that they would no longer meet the NRHP criteria for listing.

No adverse effect or significant impacts to cultural resources would occur with implementing Alternative 2.

7.9.4 CONCLUSION

There are no known NRHP-eligible or NRHP-listed architectural or archaeological resources or TCPs within the APE for both alternatives. Therefore, no impacts to architectural or archaeological resources would occur from facilities construction under Alternatives 1 and 2. Design and construction of the new hangar facility would take into account the architectural style of the adjacent historic properties, primarily the Naval Air Station Historic District, in accordance with the stipulations of the Regional PA. In

addition, the Navy will coordinate with the Virginia Department of Historic Resources during the new hangar design process. Therefore, no impacts to the setting of NRHP-eligible or NRHP-listed architectural resources would occur from facilities construction with implementing Alternatives 1 or 2.

There would be no substantive change to the visual and noise setting at NS Norfolk, and thus no impacts on the NRHP-eligible or NRHP-listed historic properties, with the changes in aircraft and in annual airfield operations with implementing Alternatives 1 or 2.

Therefore, Alternatives 1 and 2 would not result in significant impacts to cultural resources at NS Norfolk.

In compliance with Section 106 of the NHPA, the Navy has consulted with the Virginia Department of Historic Resources, which acts as the SHPO; federally recognized tribes; and interested parties regarding its determination of effects for the proposed construction and flight operations activities at NS Norfolk (refer to **Appendix E**). In a letter dated January 3, 2018, the Virginia Department of Historic Resources concurred with the Navy's determination that implementing the Proposed Action will have no adverse effect on historic properties. It is not expected that undiscovered cultural resources would be found during implementation of the Proposed Action; however, in the unlikely event of an inadvertent discovery of previously unrecorded or unevaluated cultural resources during ground disturbing operations, the Navy would manage these resources in accordance with the NHPA and other federal and state laws, Navy and DoD regulations and instructions, and described in **Section 7.9.2**. Correspondence from the SHPO, tribes, and interested parties is included in **Appendix E**.

7.10 HAZARDOUS MATERIALS AND WASTE

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes as well as the presence and management of specific cleanup sites at NS Norfolk.

7.10.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline hazardous materials and wastes. Therefore, no significant impacts would occur with the No Action Alternative.

7.10.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

7.10.2.1 Hazardous Materials and Hazardous Waste

Construction activities proposed under Alternative 1 would require using certain hazardous materials (e.g., paints, welding gasses, solvents, preservatives, sealants). Hazardous materials and waste management for construction and renovation activities would be the

HAZARDOUS MATERIALS AND WASTE POTENTIAL IMPACTS AT NS NORFOLK

Alternative 1 and Alternative 2:

- Minor hazardous materials and wastes generated from demolition, construction, operations, and maintenance.
- Any identified ACM, LBP-, or PCB-containing materials would be removed before demolition or construction/renovation, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements.
- AFFF would be handled, stored, and disposed of in accordance with all applicable federal, state, and local requirements.
- Construction would be avoided in the boundaries of IRP Site 20 to the extent feasible. If construction cannot be avoided within the boundaries of IRP Site 20, then LUCs would be adhered to during construction activities.

responsibility of the contractor and requirements for the proper handling and disposal would be specified in the contract. It is anticipated that the quantity of products containing hazardous materials used during construction activities would be minimal and their use would be of short duration. The quantity of hazardous wastes generated from renovation activities would be minor and would not be expected to exceed the capacities of existing hazardous waste disposal facilities. The installation has established measures and programs for managing construction activities to ensure they are conducted in compliance with federal and state environmental laws and regulations.

Maintaining and operating the Navy V-22s would require using hazardous materials and would also generate hazardous wastes. These materials and wastes would be similar to those currently generated at NS Norfolk during fixed-wing and rotary-wing aircraft maintenance and operations, including for C-2A aircraft that the Navy V-22 would replace. No change in generator status would occur. Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous materials at NS Norfolk. The reduction of two aircraft under Alternative 1 would not result in significant changes in hazardous materials and wastes at NS Norfolk.

7.10.2.2 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyfluoroalkyl Substances)

Alternative 1 would require demolishing existing buildings and constructing and/or renovating facilities, including a squadron hangar facility, and renovating parking aprons. Given the age of the existing buildings within the project area, asbestos-containing material (ACM) materials and materials containing regulated levels of lead and polychlorinated biphenyls (PCBs) are assumed to be present. These hazardous materials would be characterized before starting construction and would require specialized techniques for their abatement, including recycling, separation, or removal before starting construction activities. Disturbing these materials would require engineering controls and other procedures required to comply with applicable regulatory requirements and to protect human health and the environment.

Any identified ACM and lead-based paint (LBP)- and PCB-containing materials would be removed before initiation of demolition or construction/renovation activities, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements. Where LBP is present, reasonable precautions would be taken to prevent particulate matter, such as fugitive dust, from becoming airborne during demolition and construction/renovation activities. In accordance with Occupational Safety and Health Administration requirements, construction contractors should assess the potential for employee exposure to lead during demolition and construction/renovation activities and implement necessary engineering controls and use of personal protective equipment.

The new hangar's AFFF fire-fighting system would conform to specifications found in Unified Facilities Criteria 4-211-01, *Aircraft Maintenance Hangars*. This would include an underground containment system for spent AFFF. The spent AFFF would be disposed of in accordance with applicable Navy, federal, state, and local laws and regulations. In addition, the Navy is switching over to non-PFOS and low PFOA formulations because Navy policy does not allow non-emergency use of AFFF. Therefore, impacts from AFFF releases would not be expected.

By incorporating the appropriate procedures for handling special hazards during demolition and construction/renovation, Alternative 1 would not result in significant impacts related to special hazards.

7.10.2.3 Defense Environmental Restoration Program

A portion of the project area for Alternative 1 in the northwest corner is located within the contaminant plume for Installation Restoration Program (IRP) Site 20. Construction would be avoided in the boundaries of IRP Site 20 to the extent feasible. If construction cannot be avoided within the boundaries of IRP Site 20, then the following land use controls (LUCs) would be adhered to during construction activities: the use of shallow groundwater and Yorktown aquifer groundwater would be prohibited, and concrete and asphalt pavement would be maintained to minimize exposure to site soils. Construction and renovation activities would not result in significant impacts from or to IRP Site 20 providing the site is avoided or the LUCs are followed.

A CFTD would be placed on a concrete pad within the boundaries of IRP Site 20. Because the CFTD is containerized, vapor intrusion risk would be limited. However, per the LUCs, vapor intrusion risks would be investigated and if necessary, mitigation measures would be employed.

7.10.3 Alternative 2 Potential East Coast Impacts

Alternative 2 is similar to Alternative 1 except that under Alternative 2, the training squadron and maintenance school would be established at NS Norfolk rather than at NAS North Island. Therefore, the hangar construction and building renovation footprint at NS Norfolk under Alternative 2 would be slightly greater than proposed under Alternative 1. Alternative 2 would also result in an increase of 3 additional aircraft, approximately 5,700 additional operations, and additional maintenance activities when compared to the No Action Alternative. Alternative 2 would result in 5,700 more operations at NS Norfolk than Alternative 1.

7.10.3.1 Hazardous Materials and Hazardous Waste

Impacts from hazardous materials and wastes resulting from the construction/renovation and operation of proposed facilities and infrastructure and operation and maintenance of the Navy V-22 at NS Norfolk would be similar to, but greater than, those described for Alternative 1. Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous materials at NS Norfolk. The addition of three aircraft under Alternative 2 would not result in a significant increase in hazardous materials and wastes at NS Norfolk. Therefore, Alternative 2 would not result in a significant increase in hazardous materials and wastes at NS Norfolk.

7.10.3.2 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyfluoroalkyl Substances)

Alternative 2 would require demolishing existing buildings and constructing and/or renovating facilities, including a squadron and training squadron hangar facility, and renovating parking aprons. As described for Alternative 1, ACM materials and materials containing regulated levels of lead and PCBs are assumed to be present and would be removed before starting demolition and construction/renovation activities. These activities would be conducted by a licensed contractor and disposed of in accordance with all applicable federal, state, and local requirements. In accordance with Occupational Safety and Health Administration requirements, construction contractors would assess the potential for employee exposure to lead during demolition and construction/renovation activities and implement necessary engineering controls and use of personal protective equipment.

The new hangar's AFFF fire-fighting system would conform to specifications found in Unified Facilities Criteria 4-211-01, *Aircraft Maintenance Hangars*. This would include an underground containment

system for spent AFFF. The spent AFFF would be disposed of in accordance with applicable Navy, federal, state, and local laws and regulations. In addition, the Navy is switching over to non-PFOS and low PFOA formulations because Navy policy does not allow non-emergency use of AFFF. Therefore, impacts from AFFF releases would not be expected.

With incorporation of the appropriate procedures for handling special hazards during demolition and construction/renovation, Alternative 2 would not result in significant impacts related to special hazards.

7.10.3.3 Defense Environmental Restoration Program

A portion of the project area for Alternative 2 in the northwest corner is located within the contaminant plume for IRP Site 20. As described for Alternative 1, construction would be avoided in the boundaries of IRP Site 20 to the extent feasible. If construction cannot be avoided within the boundaries of IRP Site 20, then LUCs would be adhered to during construction activities. Construction and renovation activities would not result in significant impacts from or to IRP Site 20 providing the site is avoided or the following LUCs are implemented: the use of shallow groundwater and Yorktown aquifer groundwater would be prohibited, and concrete and asphalt pavement would be maintained to minimize exposure to site soils.

7.10.4 CONCLUSION

Alternative 1 and Alternative 2 would not result in significant impacts to hazardous materials and waste at NS Norfolk.

7.10.4.1 Hazardous Materials and Hazardous Waste

It is anticipated that the quantity of products containing hazardous materials used during construction activities would be minimal and their use would be of short duration. The quantity of hazardous wastes generated from demolishing existing buildings and construction/renovation activities would be minor and would not be expected to exceed the capacities of existing hazardous waste disposal facilities. The installation has established measures and programs for managing construction activities to ensure they are conducted in compliance with federal and state environmental laws and regulations.

Maintaining and operating the Navy V-22s under both alternatives would require using hazardous materials and would also generate hazardous wastes. These materials and wastes would be similar to those currently generated at NS Norfolk during fixed-wing and rotary-wing aircraft maintenance and operations, including for C-2A aircraft that the Navy V-22 would replace. Existing facilities and established procedures are in place for the safe handling, use, and disposal of hazardous materials at NS Norfolk. Alternatives 1 and 2 would not result in a significant increase in hazardous materials and wastes at NS Norfolk.

7.10.4.2 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyl, Perfluorinated Compounds, Polyfluoroalkyl Substances)

Alternatives 1 and 2 would require constructing and/or renovating facilities, including a hangar facility, and renovating parking aprons. ACM materials and materials containing regulated levels of lead and PCBs are assumed to be present and must be removed before starting demolition and construction/renovation activities. These activities would be conducted by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements. In accordance with Occupational Safety and Health Administration requirements, construction contractors would assess the

potential for employee exposure to lead during construction/renovation activities and implement necessary engineering controls and use of personal protective equipment.

The new hangar's AFFF fire-fighting system would conform to specifications found in Unified Facilities Criteria 4-211-01, *Aircraft Maintenance Hangars*. This would include an underground containment system for spent AFFF. The spent AFFF would be disposed of in accordance with applicable Navy, federal, state, and local laws and regulations. In addition, the Navy is switching over to non-PFOS and low PFOA formulations because Navy policy does not allow non-emergency use of AFFF. Therefore, impacts from AFFF releases would not be expected.

By incorporating the appropriate procedures for handling special hazards during construction/renovation, Alternatives 1 and 2 would not result in significant impacts related to special hazards.

7.10.4.3 Defense Environmental Restoration Program

A portion of the project area for Alternatives 1 and 2 in the northwest corner is located within the contaminant plume for IRP Site 20. Construction would be avoided in the boundaries of IRP Site 20 to the extent feasible; however, the CFTD would be within the site. A concrete pad would be constructed for placement of the CFTD. If construction cannot be avoided within the boundaries of IRP Site 20, then LUCs would be adhered to during construction activities. Construction and renovation activities would not result in significant impacts from or to IRP Site 20 providing the site is avoided or the following LUCs are implemented: the use of shallow groundwater and Yorktown aquifer groundwater would be prohibited, and concrete and asphalt pavement would be maintained to minimize exposure to site soils. Because the CFTD is containerized and would be placed on a pad, vapor intrusion risk is limited. However, per the LUCs, vapor intrusion risks would be investigated and if necessary, mitigation measures would be employed.

7.11 SOCIOECONOMICS

Analysis of impacts to socioeconomics is focused on the effects of the alternatives on population, employment, housing, childcare, and environmental justice.

7.11.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline socioeconomics of the local area or region. Therefore, no significant impacts would occur with the No Action Alternative.

7.11.2 ALTERNATIVE 1 POTENTIAL EAST COAST IMPACTS

Alternative 1 would require construction and/or renovation of facilities at NS Norfolk totaling approximately $42.38 million. The proposed construction activities would have a slight, temporary benefit to the regional economy.

SOCIOECONOMICS
POTENTIAL IMPACTS AT NS NORFOLK

Alternative 1 and Alternative 2:

- Short-term, minor beneficial economic impacts from construction activities.
- Alternative 2: Minor impacts to population with minor increase in demand for housing, child care, and schools in the City of Norfolk and Hampton Roads.
- Alternative 2: Ample capacity of housing and child care in the City of Norfolk and the Hampton Roads region.
- No disproportionately high and adverse human health or environmental effects to minority or low-income populations.

Under Alternative 1, Navy V-22 aircraft would replace existing C-2A aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established at NAS North Island. The transition at NS Norfolk would be completed by 2028.

Under Alternative 1, there would be a decrease of 126 personnel at NS Norfolk. The reduction in personnel at NS Norfolk results from the movement of the fleet training squadron from NS Norfolk to NAS North Island. The 126 personnel represent 0.2 percent of the jobs at NS Norfolk. Given the scale of the regional economy, the loss of these jobs would not have a significant direct or indirect impact on local economic resources.

It is estimated that each of these affected personnel would be accompanied by an average of 1.2 family members. This planning factor is based on a DoD demographic survey and profile of the military community (DoD, 2014). Therefore, assuming the personnel relocate out of the area, an estimated 277 people would leave from the base, neighborhoods, and communities surrounding NS Norfolk. This would represent less than 1 percent of the population of the City of Norfolk and would not result in a significant direct or indirect impact.

Under Alternative 1, the decrease in 126 personnel would result in an estimated decrease of 58 school-aged children. This decrease would represent less than 1 percent of the current public school enrollment in Norfolk Public Schools and a negligible percent in the Hampton Roads region. This decrease would not adversely impact schools in any one area of the City of Norfolk or Hampton Roads and would not be a significant impact.

The environmental justice analysis considers minority and low-income populations in the City Norfolk that have the potential to be affected by any safety, noise, socioeconomic, or air emissions effects of Alternative 1 at NS Norfolk. The affected area is defined as the area encompassed by the 65 dB DNL noise contours (shown in **Figure 7.2-2**). Alternative 1 would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield (**Section 7.1** (Airfields and Airspace), and APZs would not change (**Section 7.3.2** [Public Health and Safety]). As discussed in **Section 7.2.2** (Noise), noise zones defined in the AICUZ Program would not be affected; therefore, home values would be unaffected as a result of Alternative 1. Likewise, no perceptible change to the existing noise environment at any off-base area would occur under Alternative 1. Air emissions would be below the applicable PSD thresholds (**Section 7.4.2** [Air Quality]). Therefore, implementation of this alternative would be seamless to the community and would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

7.11.3 Alternative 2 Potential East Coast Impacts

Alternative 2 would require construction and/or renovation of facilities at NS Norfolk totaling approximately $55.3 million. The proposed construction activities would have a slight, temporary benefit to the regional economy.

Under Alternative 2, Navy V-22 aircraft would replace existing C-2A aircraft at NAS North Island and NS Norfolk. The Navy V-22 training squadron and maintenance school would be established on the East Coast at NS Norfolk under Alternative 2. The transition at NS Norfolk would be completed by 2028.

Under Alternative 2, there would be an increase of 54 personnel at NS Norfolk. The 54 personnel represent 0.09 percent of the jobs at NS Norfolk. Given the scale of the regional economy, the gain of these jobs would not have a significant direct or indirect impact on local economic resources.

It is assumed that each of these new personnel would be accompanied by an average of 1.2 family members (DoD, 2014). Therefore, approximately 124 people would relocate to the base, neighborhoods, and communities surrounding NS Norfolk. This would represent less than 1 percent of the population of the City of Norfolk and would not result in a significant direct or indirect impact.

It is anticipated that all unaccompanied personnel would be housed in Navy facilities (Adelman, 2016). Wait lists may preclude new accompanied personnel associated with this alternative from being accommodated in Navy housing. However, even under a worst case scenario, assuming that all 54 new personnel seek community housing at the same time, this would represent less than 1 percent of the Norfolk housing units and would not result in a significant direct or indirect impact.

The 54 new personnel at NS Norfolk would be accompanied by an estimated 25 school-aged children. This increase would represent a negligible increase in the enrollment in Norfolk Public Schools and Hampton Roads and would not adversely impact schools. Therefore, Alternative 2 would not have a significant impact on schools.

Of the 25 school-aged children, 15 would be preschool-aged children. While some of these children would be accommodated in NS Norfolk provided child care, it is likely that some parents would utilize community child care facilities. This extremely minor increase would not result in a significant direct or indirect impact.

This environmental justice analysis considers minority and low-income populations in the City Norfolk that have the potential to be affected by any safety, noise, socioeconomic, or air emissions effects of Alternative 2 at NS Norfolk. The affected area is defined as the area encompassed by the 65 dB DNL noise contours (shown in **Figure 7.2-3**).

Alternative 2 would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield (**Section 7.1** (Airfields and Airspace), and APZs would not change (**Section 7.3.3** [Public Health and Safety]). As discussed in **Section 7.2.3** (Noise), noise zones defined in the AICUZ Program would not be affected; therefore, home values would be unaffected as a result of Alternative 2. Likewise, no perceptible change to the existing noise environment at any off-base area would occur under Alternative 2. Air emissions would be below the applicable PSD thresholds (**Section 7.4.3** [Air Quality]). Therefore, implementation of Alternative 2 would be seamless to the community and would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

7.11.4 CONCLUSION

It is anticipated that there would be both short- and long-term minor beneficial economic impacts from construction activities and employment/population increases under both Alternatives 1 and 2. No significant impacts are anticipated due to the minor population changes. While new Navy personnel may have to find housing and child care in the community, there is ample capacity in the Hampton Roads region.

The analysis determined that potential environmental impacts would be negligible. Therefore, Alternatives 1 and 2 would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

7.12 SUMMARY OF POTENTIAL EAST COAST IMPACTS TO RESOURCES AND IMPACT AVOIDANCE AND MINIMIZATION

A summary of the potential impacts associated with each of the action alternatives and impact avoidance and minimization measures are presented in **Table 7.12-1** and **Table 7.12-2**, respectively. The No Action Alternative does not meet the purpose and need for the action and is not a viable alternative; however, as described in **Section 2.3.1** (No Action Alternative), it serves as reference point for describing and quantifying the potential impacts of Alternatives 1 and 2.

Table 7.12-1: Summary of Potential Impacts to Resource Areas at NS Norfolk

Resource Area	*Alternative 1*	*Alternative 2*
Airfields and Airspace	No impact. Number and type of operations are about the same as No Action Alternative.	Negligible impact from 8.5% increase in operations. Would not adversely affect airspace management, local air traffic, or noise contours.
Noise	No perceptible change to DNL noise contours, sound exposure, or vibration effects at POIs.	No perceptible change to DNL noise contours, sound exposure, or vibration effects at POIs from minor increase in operations.
Public Health and Safety	Negligible impact to safety. No change to AICUZ Program. All regulations and plans that pertain to airfield and other flight safety considerations would continue to be followed. Existing management strategies would continue to minimize risk. No change to environmental health risks or safety risks that may disproportionately affect children.	Negligible impact to safety with minor increase in operations and potential BASH events. No change to AICUZ Program. All regulations and plans that pertain to airfield and other flight safety considerations would continue to be followed. Existing management strategies would continue to minimize risk. No change to environmental health risks or safety risks that may disproportionately affect children.
Air Quality	Since Hampton Roads Intrastate AQCR is in attainment of all NAAQS, the Proposed Action would not require a General Conformity evaluation. Emissions would be below the applicable PSD thresholds.	Impacts would be the same as Alternative 1, except emissions would be slightly higher with increase in operations.
Transportation	Minor beneficial impact from reduction of 125 ADT. Temporary minor impact from construction delivery trucks and construction worker vehicles.	Minor direct impact from additional 55 ADT (less than 1% of total ADT). Temporary minor impact from construction delivery trucks and construction worker vehicles.

Table 7.12-1: Summary of Potential Impacts to Resource Areas at NS Norfolk (cont.)

Resource Area	*Alternative 1*	*Alternative 2*
Biological Resources	No impacts to biological resources associated with construction or climate change. Number and type of operations are about the same as No Action Alternative; therefore, no increased take of migratory birds and bats. Existing BASH management strategies would continue to minimize risk. Impacts to MBTA-protected bird species and their active nests would be avoided during construction. Potential for takes during operations would not result in significant adverse effects on a population of migratory birds and would continue to be in compliance with MBTA as military readiness activities.	No impacts to biological resources associated with construction or climate change. Negligible increase in potential BASH strikes of birds and bats, including potential state listed species. Existing BASH management strategies would continue to minimize risk. Impacts to MBTA-protected bird species and their active nests would be avoided during construction. Potential for takes of migratory birds during operations would not result in significant adverse effects on a population of migratory birds and would be in compliance with the MBTA as military readiness activity.
Water Resources	Minimal impacts to groundwater and surface water with impact minimization measures. Increase of 2.4 acres of impervious surface would be expected to increase stormwater runoff. Wetlands adjacent to proposed taxiway expansion would be avoided. Existing taxiway is within the floodplain; floodplain modifications would be minimal. Potential for future sea level rise to contribute to 100-year event flooding of the project area.	Impacts would be the same as Alternative 1.
Infrastructure	Additional solid waste and energy demand from construction and demolition. Solid waste and energy capacities sufficient to meet additional demand. Minor reduced water demand/wastewater, energy, and solid waste with reduced personnel.	Additional solid waste and energy demand from construction, demolition and operations. Minimal increases in water demand/wastewater. Water, wastewater, solid waste, and energy capacities sufficient to meet additional demand.
Cultural Resources	No adverse effect to historic properties.	No adverse effect to historic properties.
Hazardous Materials and Wastes	Minor hazardous materials and wastes generated from demolition construction, operations, and maintenance. Potential ACM, LBP, and PCB from demolition. Impacts would be minimized with implementation of appropriate and established handling procedures. Potential PFAS/PFC generated from AFFF during operations. Construction of CFTD within IRP Site 20 would adhere to LUCs. Vapor intrusion risks would be limited; however, per the LUCs would be investigated, and if necessary, measures would be employed to minimize the risk.	Impacts would be the same as Alternative 1.

Table 7.12-1: Summary of Potential Impacts to Resource Areas at NS Norfolk (cont.)

Resource Area	*Alternative 1*	*Alternative 2*
Socioeconomics	Minor beneficial economic impacts. Minor reduction in to population (277 personnel and family) with minor associated reduction in housing, child care, and schools in City of Norfolk and Hampton Roads. No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.	Minor beneficial economic impacts. Minor increase in population (124 personnel and family) with minor associated increase in demand for housing, child care, and schools in City of Norfolk and Hampton Roads. No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
Coastal Consistency	Coastal Consistency Determination (**Appendix F**) documents effects on a coastal use or resources of the Commonwealth of Virginia's coastal zone and consistency to the maximum extent practicable with the applicable enforceable policies of the Virginia Coastal Zone Management Program. VDEQ concurred with this determination (**Appendix F**).	Same as Alternative 1.

Note: The No Action Alternative does not meet the purpose and need for the action and is not a viable alternative; however, it serves as reference point for describing and quantifying the potential impacts of Alternatives 1 and 2.

Table 7.12-2: Summary of Impacts Avoidance and Minimization Measures at NS Norfolk

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsibility*	*Compliance Schedule*	*Verification of Compliance*
Airfields and Airspace	Navy V-22 operations would be managed in accordance with existing procedures and established local approach and departure patterns.	Avoid conflicts.	NS Norfolk Air Operations	During operations	NS Norfolk Air Operations
Noise	Continue to implement noise abatement procedures published in 2009 AICUZ Study for NS Norfolk Chambers Field.	Minimize community noise impact.	NS Norfolk Air Operations	During operations	NS Norfolk Air Operations
Public Health and Safety	Compliance with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield.	Minimize safety risks.	NS Norfolk Air Operations	During operations	NS Norfolk Air Operations
Transportation	Consider establishment of construction truck routes and construction worker carpooling.	Minimize construction truck and construction worker vehicle traffic.	NS Norfolk	During construction	NS Norfolk
Transportation	NS Norfolk, Hampton Roads Transit, and VDOT would continue to work together to plan for the enhancement of the local and regional transportation system to provide residents and military personnel with increased options for transportation.	Reduce commuter traffic on City of Norfolk and Hampton Roads region roadways.	NS Norfolk	During operations	NS Norfolk
Biological Resources	All vehicles, equipment, and footwear would be cleaned of dirt, debris, seeds, mud, and visible plant material prior to being brought onto and before leaving the project area. Vehicles would also be cleaned after construction prior to being used elsewhere on NS Norfolk. Any weeds removed would be placed in bags or dumpsters and hauled away.	Prevent the introduction and spread of invasive non-native species.	Construction contractor	During construction	NS Norfolk Natural Resources
Biological Resources	Continued implementation of avoidance and minimization measures outlined in the installation BASH Plan and INRMP (Navy, 2012 and NAVFAC, 2017).	Minimize the risk of collision impacts to wildlife, including migratory birds, during aircraft operations.	NS Norfolk Natural Resources	During operations	NS Norfolk Natural Resources

Table 7.12-2: Summary of Impacts Avoidance and Minimization Measures at NS Norfolk (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsibility*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	No operations or maintenance may be performed on a structure within the project site if a nest of an MBTA-bird is occupied, and no nest may be removed or damaged, except as permitted by the USFWS and VDGIF. The natural resource manager would continue to monitor nest activity and would inform public works personnel of nesting status if maintenance is required on any of the light poles or platforms that are occupied, or if consultation with the USFWS and VDGIF is required for such activity (NAVFAC, 2016).	Minimize impact to migratory birds during construction and facility maintenance.	Construction contractor (during construction) Maintenance personnel (during operations)	During construction and operations	NS Norfolk Natural Resources
Biological Resources	The executing agent/contractor would coordinate with the NS Norfolk natural resources manager to ensure that work would avoid impacting birds protected under the Migratory Bird Treaty Act (MBTA) (including Birds of Conservation Concern [BCC]). Building demolition work and tree removal (if any) would, to the extent feasible, take place outside of the breeding season. If this work must be conducted during the bird breeding season, a qualified biologist must confirm that no active nest would be impacted by these actions. The qualified biologist would be hired by the project proponent and approved by the NS Norfolk natural resources manager. The qualified biologist must survey the area within 72 hours of commencing work to determine if active nests are present. If an active nest is found in the project area at any time during project work, work would be halted immediately and the NS Norfolk natural resources manager would be contacted. The contractor cannot take action to remove the bird or the nest from the area that is being used. Any removal action must be overseen by the NS Norfolk natural resources manager before construction work could resume.	Minimize impacts to MBTA species.	Construction contractor	During construction/demolition	NS Norfolk Natural Resources

Table 7.12-2: Summary of Impacts Avoidance and Minimization Measures at NS Norfolk (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsibility*	*Compliance Schedule*	*Verification of Compliance*
Biological Resources	Prior to implementation of the Proposed Action, the NS Norfolk natural resource manager would be consulted to identify buildings with potential roosting habitat and coordinate species surveys to be conducted by a permitted biologist. If Rafinesque's eastern big-eared bat, the tri-colored bat, silver-haired bat, and eastern red bat are found within the project area, the Navy would contact VDGIF to develop relocation plans prior to demolition and construction/rehabilitation of buildings within the project area.	Minimize impacts to federally-listed bat species.	Construction contractor	During construction/demolition	NS Norfolk Natural Resources
Water Resources	In the event groundwater is encountered during construction, the construction contractor would contact NS Norfolk environmental staff to determine if a permit is needed. If the groundwater is uncontaminated, it may be discharged to an authorized non-stormwater discharge under the VSMP Construction General Permit as long as it has been filtered, settled, or similarly treated.	Minimize impacts to groundwater, if encountered during construction.	Construction contractor	During construction	NS Norfolk Environmental
Water Resources	Implement appropriate construction management BMPs, such as requiring all construction equipment to be in good condition and properly maintained to avoid the potential for spills and leaks.	Minimize potential impacts to surface water quality form inadvertent spills and leaks from equipment during construction.	Construction contractor	During construction	NS Norfolk Environmental

Table 7.12-2: Summary of Impacts Avoidance and Minimization Measures at NS Norfolk (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsibility*	*Compliance Schedule*	*Verification of Compliance*
Water Resources	Obtain authorization under the VSMP Construction General Permit (VAR10) from the VDEQ before starting construction activities. The Construction General Permit requires that the permittee develop an SWPPP in accordance with Part II of the VAR10 General Permit to minimize water quality degradation through establishing project-specific BMPs, including implementing a Spill Prevention Control and Countermeasures plan. The construction contractor would be required to implement all appropriate BMPs for erosion and sediment as outlined in the SWPPP. Construction-related erosion control measures could include, but not be limited to, erosion control blankets, soil stabilizers, silt fencing, sand bags, and storm drain inlet protection devices. Applicable BMPs would be included in the preliminary engineering design and construction of facilities.	Minimize impacts to surface water during construction.	Construction contractor	Prior to construction	NS Norfolk Environmental
Water Resources	Incorporate proper post-construction stormwater management features into the project planning and site design to ensure compliance with the Energy Independence and Security Act (Section 438), Department of the Navy Low Impact Development Policy, and VSMP Law and Regulations. The Navy has developed Post Construction Stormwater Management Instructions for its Regional MS4 Program Plan, which covers NAVSTA Norfolk (NAVFAC Mid-Atlantic, 2013). Under these instructions, if the project area exceeds the average existing impervious cover at NS Norfolk (42.2 percent), the discharge after development must not exceed 10 percent less than the discharge of the existing condition or the discharge based on the average impervious cover (42.2 percent) at NS Norfolk.	Minimize impacts to surface water from proposed facilities.	Project proponent	During facility design	NS Norfolk Environmental

Table 7.12-2: Summary of Impacts Avoidance and Minimization Measures at NS Norfolk (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsibility*	*Compliance Schedule*	*Verification of Compliance*
Water Resources	To comply with the VPDES permit (permit #VA0004421), non-stormwater discharges from the wash rack would be required to be diverted into the sanitary sewer systems. Obtain coverage under Hampton Roads Sanitation District Industrial Wastewater Discharge Regulations for diverting the wash rack discharges to the sanitary sewer system would also need coverage.	Minimize impacts to surface water from proposed facilities.	NS Norfolk Environmental	Before the start of project operations	NS Norfolk Environmental
Cultural Resources	In accordance with the stipulations of the Regional PA (Stipulation III [B][5][a]), design and construction of the new hangar adjacent to the Naval Air Station Historic District would take into account the recommended approaches in the *Setting* and *New Additions to Historic Buildings* sections of the *Secretary of Interior Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings* (U.S. Department of the Interior, National Park Service, 1995).	Avoid adverse effects to the Naval Air Station Historic District.	NS Norfolk Environmental	During facility design	NS Norfolk Cultural Resources Manager
Cultural Resources	In the unlikely event of an inadvertent discovery of previously unrecorded or unevaluated cultural resources during ground disturbing construction, the Navy would manage these resources in accordance with the NHPA and other federal and state laws, Navy and DoD regulations and instructions, and DoD American Indian and Alaska Native Policy by implementing Standard Operating Procedure #12, *Project Specific Standard Treatment of Archaeological Resources*, of the ICRMP, which contains procedures for inadvertent discovery of archaeological materials and for human remains.	Minimize adverse effects on archaeological resources due to inadvertent discovery during ground disturbing activities.	Construction contractor	During ground disturbing construction activities	NS Norfolk Cultural Resources Manager

Table 7.12-2: Summary of Impacts Avoidance and Minimization Measures at NS Norfolk (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsibility*	*Compliance Schedule*	*Verification of Compliance*
Hazardous Materials and Waste	ACM and LBP materials would be characterized before starting construction/demolition and would require specialized techniques for their abatement, including recycling, separation, or removal before starting construction activities. Disturbing these materials would require engineering controls and other procedures required to comply with applicable regulatory requirements and to protect human health and the environment. Any identified ACM and LBP- and PCB-containing materials would be removed before initiation of demolition or construction/renovation activities, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements. Where LBP is present, reasonable precautions would be taken to prevent particulate matter, such as fugitive dust, from becoming airborne during demolition and construction/renovation activities. In accordance with Occupational Safety and Health Administration requirements, construction contractors should assess the potential for employee exposure to lead during demolition and construction/renovation activities and implement necessary engineering controls and use of personal protective equipment.	Minimize impacts from special hazards during construction.	Construction contractor	Before and during construction/demolition	NS Norfolk Environmental

Table 7.12-2: Summary of Impacts Avoidance and Minimization Measures at NS Norfolk (cont.)

Applicable Resource Area	*Impact Avoidance/Minimization Measure*	*Anticipated Benefit/ Evaluating Effectiveness*	*Responsibility*	*Compliance Schedule*	*Verification of Compliance*
Hazardous Materials and Waste	Construction would be avoided in the boundaries of IRP Site 20 to the extent feasible. If construction cannot be avoided within the boundaries of IRP Site 20 then LUCs would be adhered to during construction activities: the use of shallow groundwater and Yorktown aquifer groundwater would be prohibited, and concrete and asphalt pavement would be maintained to minimize exposure to site soils. Per the LUCs, vapor intrusion risks within the CFTD would be investigated and if necessary, mitigation measures would be employed.	Minimize impacts to Defensive Environmental Restoration Program (DERP) sites.	Construction contractor	During construction	NS Norfolk Environmental

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8 CUMULATIVE IMPACTS AT EAST COAST FLEET LOGISTICS CENTER

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

8.1 DEFINITION OF CUMULATIVE IMPACTS

The approach taken in the analysis of cumulative impacts follows the objectives of the National Environmental Protection Act (NEPA), Council on Environmental Quality (CEQ) regulations, and CEQ guidance. Cumulative impacts are defined in 40 Code of Federal Regulations (CFR) section 1508.7.

The impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

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

In addition, CEQ and United States (U.S.) Environmental Protection Agency (USEPA) have published guidance addressing implementation of cumulative impact analyses—Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) and Consideration of Cumulative Impacts in EPA Review of NEPA Documents (USEPA, 1999b). CEQ guidance entitled Considering Cumulative Impacts Under NEPA (1997) states that cumulative impact analyses should "…determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

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

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

8.2 SCOPE OF CUMULATIVE IMPACTS ANALYSIS

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this Environmental Assessment (EA), the study area delimits the geographic extent of the cumulative impacts analysis. In general, the study area will include those areas previously identified in **Chapter 7**, East Coast Fleet Logistics Center Environmental Consequences for the respective resource areas. The time frame for cumulative impacts centers on the timing of the Proposed Action.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the Proposed Action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for Environmental Impact Statements (EISs) and EAs, management plans, land use plans, and other planning related studies. Additionally, NS Norfolk staff provided information on local and regional actions, as well as previously completed, currently ongoing, and reasonably foreseeable future actions. Finally, websites for state, city, county, and other local agencies were searched for information pertaining to actions that would need to be included in this analysis.

8.3 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

This section will focus on past, present, and reasonably foreseeable future projects at and near Naval Station (NS) Norfolk. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in **Section 8.1**, it was determined if a relationship exists such that the affected resource areas of the Proposed Action (included in this EA) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative impacts analysis. In accordance with Council on Environmental Quality guidance (CEQ, 2005), these actions considered but excluded from further cumulative effects analysis are not catalogued here as the intent is to focus the analysis on the meaningful actions relevant to inform decision-making. Projects included in this cumulative impacts analysis are listed in **Table 8.3-1** and briefly described in the following subsections.

8.3.1 PAST ACTIONS

8.3.1.1 Military

8.3.1.1.1 Airfield Obstruction Management Plan

This action included implementation of an Airfield Obstruction Management Plan (formerly Clear Zone Management Plan) for NS Norfolk, Chambers Field that provided management recommendations to eliminate vegetation height obstructions and reduce safety risks to aircraft operations. Management is ongoing.

Table 8.3-1: Cumulative Action Evaluation

Action	*Level of NEPA Analysis Completed*
Past Actions	
Military	
Airfield Obstruction Management Plan	EA
Establish Concrete Pads for CFTDs	CATEX
Non-Military	
Hampton Boulevard Grade Separation	EA
Present and Reasonably Foreseeable Future Actions	
Military	
Gerald R Ford Homeporting	EIS
Transition of HMM-774 to VMM-774	EA
Z312 Cogeneration-Retrofit Facility (MILCON P-506)	EA
MH-60 AVET Training Facility (MILCON P-518)	CATEX
Facility Energy Operating Center (MILCON P-554)	CATEX
Electrical Repairs to Piers 2, 6, 7 and 11 (MILCON P-610)	CATEX
Commercial Vehicle Inspection Station (MILCON P-652)	CATEX
Naval Computer and Telecommunications Area Master Station Communications Facility (MILCON P-913)	CATEX
Non-Military	
Central Hampton Boulevard Area Plan	Study Plan
Interstate (I-)564 Intermodal Connection	EA
Boush Creek Interchange	EA
I-64 Hampton Roads Bridge-Tunnel Expansion	SEIS

Notes:
CATEX=Categorical Exclusion; CFTD=containerized flight training device; MILCON=military construction; SEIS=Supplemental Environmental Impact Statement

8.3.1.1.2 Establish Concrete Pads for Containerized Flight Training Devices

This action included construction of concrete pads to secure flight simulator equipment vans with electrical power, security alarms, security fencing with gates and communications infrastructure for the installation of two Aircrew Trainers CFTDs adjacent to Hangar LP-49 in support of required training for VMM-774 MV-22 squadron. This action is complete.

8.3.1.2 Non-Military

8.3.1.2.1 Hampton Boulevard Grade Separation

This action was the second step in the four step process of completing improvements recommended in the Navy Triangle Influence Area Master Transportation Plan, Naval Station Norfolk and included depressing Hampton Boulevard below the existing railroad tracks to eliminate the need to interrupt vehicular traffic for railway movement in and out of the port terminals (Naval Facilities Engineering Command [NAVFAC], 2014b). This action was completed in 2015.

8.3.2 PRESENT AND REASONABLY FORESEEABLE ACTIONS

8.3.2.1 Military

8.3.2.1.1 Gerald R Ford Nuclear-Powered Aircraft Carrier (CVN) Homeporting

This action includes the homeporting of the Gerald R Ford CVN at NS Norfolk. The ship was commissioned into the Navy in 2017.

8.3.2.1.2 Transition of HMM-774 to VMM-774

This action includes the transition the existing HMM-774 (CH-46E helicopters) to VMM-774 (MV-22B tilt-rotor aircraft) at NS Norfolk. The proposed action included replacing 12 CH-46E aircraft with 12 MV-22B aircraft; accommodating and maintaining MV-22B aircraft; continuing to conduct approximately 4,752 annual operations at NS Norfolk airfield utilizing MV-22B aircraft in place of the CH-46E aircraft; and the addition of 30 personnel. The first MV-22B aircraft arrived in 2016 and the transition is expected to be fully operational by 2019.

8.3.2.1.3 Z312 Cogeneration-Retrofit Facility (MILCON P-506)

This action includes the installation and operation of a multi-fuel (natural gas/biofuel/fuel oil) capable combustion electrical-generating turbines that would provide heat recovery steam-generating capacity (i.e., cogeneration) as an expansion of the existing utility infrastructure at steam plant Building Z312. The 15-megawatt station would enable NS Norfolk to align itself with the Navy-wide ashore goals to reduce non-tactical petroleum use and increase the use of alternative energy sources to meet the Navy's target of net-zero. Construction is in process with an anticipated completion date by the end of 2018.

8.3.2.1.4 MH-60 AVET Training Facility (MILCON P-518)

This action includes the construction of a 10,900 square foot addition to SP250 to support two MH-60S AVET trainers at NS Norfolk. This action was evaluated in a CATEX signed on April 10, 2014. Construction is underway with an anticipated completion date by September 2018.

8.3.2.1.5 Facility Energy Operating Center (MILCON P-554)

This action includes construction of a new Facility Energy Operating Center (12,000 square feet) that will use high speed fiber optic communications network to interface, communicate, and control systems within 73 existing facilities along with specific building and major utility systems (electric, water, wastewater, and steam systems). Construction is anticipated to begin in by September 2017 and completed by March 2019.

8.3.2.1.6 Electrical Repairs to Piers 2, 6, 7 and 11 (MILCON P-610)

This action includes demolition of existing electrical distribution systems and construction of a new 480-volt power system on Piers 2, 6, 7, and 11 to include the connectors, receptacle stations, conduits, and cables to protect duct banks located between the upper and lower decks. Construction is anticipated to begin by the end of 2017 and completed by June 2019.

8.3.2.1.7 Commercial Vehicle Inspection Station (MILCON P-652)

This action includes construction of a new anti-terror/force protection and ballistic compliant structure to house the administrative function of the commercial vehicle inspection station as well as construct a building for commercial inspection. Construction is in process with anticipated completion date by September 2018.

8.3.2.1.8 Naval Computer and Telecommunications Area Master Station Communications Facility (MILCON P-913)

This action is demolition of seven existing buildings (MB28, MB29, MB43, M51, M52, M113, and M125) and the construction of a 160,000 square foot communication center including necessary security and parking. Construction is anticipated to begin in 2017 and last approximately 3 years.

8.3.2.2 Non-Military

8.3.2.2.1 Central Hampton Boulevard Area Plan

This action provides a long-range, phased implementation framework to conserve existing neighborhoods and optimize development opportunities within the Central Hampton Boulevard area including the neighborhoods of Kensington, Highland Park, University Village, and portions of Lamberts Point, several traffic corridors including the Hampton Boulevard corridor, Colley Avenue corridor, and 26th Street Industrial corridor. Projects implemented under this plan would occur in the short-term (3 to 5 years), mid-term (5 to 8 years), and long-term (greater than 8 years). Applicable traffic-related project includes the Hampton Boulevard Improvement project (improved traffic flow, turning movement, pedestrian crossings, recreation mobility and commercial parcel access), which is in process and anticipated to occur over a long-term period.

8.3.2.2.2 I-564 Intermodal Connection

This action includes construction of a new 2.82-mile, four-lane limited access highway that will connect the existing I-564 through NS Norfolk to the Norfolk International Terminals at the Port of Virginia. The new roadway will terminate near Hampton Boulevard (Route 337) and will provide a safer high-speed highway that will decrease congestion, redirect heavy truck traffic from city streets, and provide improved access for vehicles entering/exiting NS Norfolk. The project includes construction of multiple new bridges and local connectors; reconfiguration of Commercial Vehicle Inspection Station at NS Norfolk; relocation of Gate 6 and patrol roads at NS Norfolk; and construction of a new access road to the Virginia Port Authority's North Gate Terminal. The project is a collaborative partnership between the Federal Highway Administration, Eastern Federal Lands Highway Division, Virginia Department of Transportation, and the Navy. Construction is in process and is expected to be completed in 2018.

8.3.2.2.3 Boush Creek Interchange

This action is a second phase to the I-564 Intermodal Connection project and would include construction of an interchange over Boush Creek to provide access to NS Norfolk and Naval Support Activity Hampton Roads and allow traffic movements in all directions to access the major highway networks including I-564 and I-64. NS Norfolk would use the Boush Creek Interchange to access the proposed Gate 6. Construction is expected to be completed by the end of 2018.

8.3.2.2.4 I-64 Hampton Roads Bridge-Tunnel Expansion

This action will ease congestion of I-64 by widening the existing four-lane segments to a six-lane facility between I-564 in Norfolk and I-664 in Hampton. The action is anticipated to begin in 2019 and last five years.

8.4 CUMULATIVE IMPACT ANALYSIS

Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data is not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not

been completed, assumptions were made regarding cumulative impacts related to this EA where possible. The analytical methodology presented in **Chapter 7** (East Coast Fleet Logistics Center Environmental Consequences), which was used to determine potential impacts to the various resources analyzed in this document, was also used to determine cumulative impacts. It is important to note that this analysis presents and discusses the impacts individually for each cumulative impact project for those resources where the potential impacts are more appreciable or where quantitative data are known (as it pertains to the projects identified in **Table 8.3-1**). Conversely, the cumulative impacts to those resources with less appreciable potential impacts are presented in a more qualitative analysis.

8.4.1 AIRFIELDS AND AIRSPACE

The Proposed Action would not result in adverse impacts to airfields or airspace; operations would fall within the same general types as those that have historically occurred at NS Norfolk, and current management and safety procedures would continue to be emphasized. Therefore, there would be no cumulative impacts to airfields and airspace.

8.4.2 NOISE

8.4.2.1 Description of Geographic Study Area

The region of influence (ROI) for noise cumulative impacts is the area affected by the Day-Night Average Sound Level (DNL) noise contours for proposed aircraft operations, areas along commuter access roads, and areas in proximity to the proposed hangar construction site. Aircraft operations, commuter traffic, and construction contribute to the noise environment at NS Norfolk.

8.4.2.2 Relevant Past, Present, and Future Actions

Operations of the Proposed Action would have negligible noise impacts, and noise from construction would have no impact on sensitive receptors or other points of interest. Past and present use of the NS Norfolk airfield has generated a noise environment surrounding NS Norfolk that is represented by noise contours last published in the 2009 Air Installations Compatible Use Zones (AICUZ) Study for NS Norfolk Chambers Field (NAVFAC, 2009).Operations of the MV-22B aircraft associated with Transition of HMM-774 to VMM-774 at NS Norfolk would be additive with operations of the Proposed Action. These operations have been analyzed as part of the No Action Alternative in this EA. There are no past, present, or reasonably foreseeable actions listed in **Table 8.3-1** that would interact with noise from operations or construction at the project site of the Proposed Action.

Cumulative noise may be generated by trucks delivering materials to future action project sites if construction timeframes overlap.

8.4.2.3 Cumulative Impact Analysis

Cumulative noise impacts associated with past, present, and future aircraft operations actions within the ROI would be less than significant because noise impacts of the Proposed Action would be negligible and imperceptible in the ROI. Operations associated with the Transition of HMM-774 to VMM-774 are analyzed as part of the No Action Alternative in this EA. The analysis determined the cumulative impact would be negligible. Therefore, noise impacts would not be additive with noise impacts from past, present, and future actions, and would not result in cumulative operations noise impacts within the ROI.

Cumulative construction noise may be generated by trucks delivering materials for the Proposed Action and other multiple construction sites when construction schedules are concurrent. These noise impacts would be temporary and would be consistent with noise in an urban environment; therefore, the impact

would not be significant. Minimization measures such as limiting truck traffic to regular daytime working hours would reduce these impacts.

Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant noise impacts within the ROI.

8.4.3 PUBLIC HEALTH AND SAFETY

The Proposed Action would have no or negligible impacts to public health and safety in the vicinity of NS Norfolk; therefore, there would be no cumulative impact to public health and safety.

8.4.4 AIR QUALITY

8.4.4.1 Description of Geographic Study Area

The ROI for assessing cumulative air quality impacts of criteria pollutants is primarily the Hampton Roads Intrastate Air Quality Control Region, and more specifically, in proximity to NS Norfolk. This region is in attainment of all criteria pollutants regulated under the National Ambient Air Quality Standards (NAAQS).

8.4.4.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact air quality primarily include projects that would increase or decrease activities at NS Norfolk and vehicle traffic in the ROI. These include the Transition of HMM-774 to VMM-774, Central Hampton Boulevard Area Plan, I-564 Intermodal Connection, Boush Creek Interchange, Patriots Crossing, and I-64 Hampton Roads Bridge-Tunnel Expansion.

In addition, the Hampton Roads Intrastate Air Quality Control Region has the potential for future development and growth, including actions listed in **Table 8.3-1**. This future growth, combined with the addition of the cumulative projects identified above in **Section 8.3**, could contribute to a net increase in overall cumulative emissions in the project region compared to existing conditions. However, the Virginia State Implementation Plan implemented by the Virginia Department of Environmental Quality (VDEQ) includes emission reduction strategies that would further progress towards maintenance of the NAAQS in the region.

8.4.4.3 Cumulative Impact Analysis

8.4.4.3.1 Criteria Pollutants

As described in **Section 7.4** (Air Quality), proposed construction and operational activities under Alternatives 1 and 2 at NS Norfolk would produce emissions that would remain below all Prevention of Significant Deterioration emission thresholds (see **Tables 7.4-1** through **7.4-4** in **Section 7.4**). Emissions associated with the Transition of HMM-774 to VMM-774 would be minor (Marine Corps, 2015) and are included in the emissions for the baseline and No Action Alternative in this EA. Emissions from these activities would mainly originate from mobile and intermittent sources within the site that encompasses the proposed aircraft hangar, parking areas, and taxiways, in addition to the NS Norfolk runway. Release of these proposed emissions over such a large area would result in dispersed ambient impacts. Emissions from cumulative projects would potentially contribute to ambient pollutant impacts generated from proposed activities. However, these emissions would occur far enough away from the locations of proposed construction and operational activities such that they would produce low ambient pollutant impacts in proximity to proposed sources. Therefore, air quality impacts from proposed construction and operational emissions, in combination with emissions from cumulative projects, would

not be substantial enough to contribute to an exceedance of an ambient air quality standard. As a result, proposed construction and operational activities under Alternatives 1 and 2 at NS Norfolk would not result in cumulatively significant impacts on criteria pollutant levels.

8.4.5 TRANSPORTATION

8.4.5.1 Description of Geographic Study Area

The ROI for transportation cumulative impacts is the Navy Triangle Influence Area (NTIA). NS Norfolk and Naval Support Activity Hampton Roads together comprise the NTIA as one of the major employment centers in the south side of the Hampton Roads region, which consists of the cities of Chesapeake, Norfolk, Portsmouth, Suffolk, and Virginia Beach.

8.4.5.2 Relevant Past, Present, and Future Actions

Past, present, and reasonably foreseeable future actions affecting traffic in the ROI generally include annual traffic growth and alternative transportation. Past increases in traffic attributed to projects listed in **Table 8.3-1** resulted from the Gerald R Ford Homeporting, which increased personnel at NS Norfolk, and from non-military commercial and residential development. Past, present, and future actions to increase the use of alternative modes of transportation (i.e., carpool, vanpool, mass transit) seek to offset, to some degree, the past and future annual traffic growth on the ROI roadway network (military and non-military).

The majority of commuters to NS Norfolk come from the surrounding cities of Virginia Beach, Norfolk, and Chesapeake. Of those, most come from Virginia Beach or Chesapeake via I-64 and I-564 through Gates 3A and 4. The major roadways serving NS Norfolk are also routes for the Virginia Port Authority, Old Dominion University, commercial developments, and neighborhoods within the City of Norfolk. All routes to NS Norfolk experience travel delays during peak hours, most notably, bridge and tunnel crossings used by a portion of commuters coming from Hampton, Newport News, Poquoson, Suffolk, and other points on the north side of Hampton Roads.

Several regional transportation projects completed or anticipated in the vicinity of the NTIA would interact with the ROI. These include: Hampton Boulevard Grade Separation, I-564 Intermodal Connection, Boush Creek Interchange (formerly known as Air Terminal Interchange), and the I-64 Hampton Roads Bridge-Tunnel Expansion.

Under the Proposed Action, Alternative 1 would result in a slight reduction in commuter traffic, which would have minor beneficial impact on traffic conditions at NS Norfolk. Alternative 2 would result in an increase of 55 ADT, resulting in a less than 1 percent increase in traffic on the major routes to NS Norfolk. The Proposed Action would have a negligible effect on traffic.

8.4.5.3 Cumulative Impact Analysis

Cumulative transportation impacts from past, present, and future actions within the ROI would be less than significant because they represent a small percentage of total traffic on access roads to NS Norfolk. The Proposed Action would either reduce commuters to NS Norfolk (Alternative 1) or minimally increase commuters by less than 1 percent (Alternative 2).

Cumulative transportation impacts that would occur with implementation of the Proposed Action would include incremental increases in traffic combined with improvements to traffic conditions through the planned regional transportation improvement projects and the increase in the use of alternative

transportation. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant impacts within the ROI.

8.4.6 BIOLOGICAL RESOURCES

8.4.6.1 Description of Geographic Study Area

The ROI for cumulative biological resource impacts consists of the portions of NS Norfolk where construction and operations would occur.

8.4.6.2 Relevant Past, Present, and Future Actions

One present action, the Transition of HMM-774 to VMM-774 has potential to interact with the Proposed Action and cumulatively impact biological resources as a result of an increase in aircraft operations. There are no past, present, or reasonably foreseeable actions that would interact with the biological resources during construction at the project site of the Proposed Action.

8.4.6.3 Cumulative Impact Analysis

The Proposed Action under Alternative 2, when considered with the Transition of HMM-774 to VMM-774 would result in a minor, additive increase of aircraft operations at NS Norfolk. Potential cumulative effects to wildlife could include noise impacts and Bird/Animal Aircraft Strike Hazard (BASH) to birds protected under the Migratory Bird Treaty Act (MBTA) and Birds of Conservation Concern, and special status species of bats.

The noise study (see **Section 8.4.2**) determined that noise impacts of the Proposed Action would be negligible and imperceptible in the ROI. Operations associated with the Transition of HMM-774 to VMM-774 are analyzed as part of the No Action Alternative in this EA. The analysis determined the cumulative noise impact would be negligible. Flight operations at NS Norfolk under the Proposed Action would be conducted in accordance with the installation's existing BASH Plan and no attractants would be created under that would increase the concentration of birds at the airfield. In addition, current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. Therefore, the Proposed Action would not result in a significant cumulative impacts to birds or bat species as a result of noise or BASH.

Construction activities for those actions listed in **Section 8.3** would occur within the developed areas of NS Norfolk that generally are devoid of biological resources. The Proposed Action would have no effect on aquatic resources or marine wildlife, and minor impacts to terrestrial species would not be additive with those of the current and foreseeable future projects; therefore, no cumulative construction-related effects would occur.

The Proposed Action would have no effect on threatened and endangered species habitat, vegetation terrestrial wildlife, marine wildlife, or aquatic biological resources.

Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects would not result in significant biological resources impacts within the ROI.

8.4.7 WATER RESOURCES

8.4.7.1 Description of Geographic Study Area

The ROI for water resources for the Proposed Action is Willoughby Bay, Hampton Roads, and the City of Norfolk.

8.4.7.2 Relevant Past, Present, and Future Actions

There are several relevant past, present, or reasonably foreseeable future actions listed in **Table 8.3 1** that involve construction and redevelopment and have the potential to impact surface water quality. The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the Proposed Action and cumulatively impact water resources and wetlands include the seven MILCON projects (P-500, P-506, P-518, P-554, P-610, P-652, and P-913) which could result in soil disturbance, changes in impervious area, and changes in drainage patterns. In addition, there are three non-military transportation construction projects (I-564 Intermodal Connection, Boush Creek Interchange, and I-64 Hampton Roads Bridge-Tunnel Expansion) which would also involve construction and redevelopment that could impact surface water quality.

For the military and non-military projects, the project proponent would be required to obtain authorization under the VSMP Construction General Permit (VAR10) from the VDEQ before starting construction activities. Impacts to surface water during construction would be minimized through implementing a site-specific SWPPP and applicable construction best management practices (BMPs).

In additional, for military projects, Navy would be required to comply with applicable standards and policies for post-construction stormwater management under the Energy Independence and Security Act of 2007; Navy Low Impact Development standards; Chief of Naval Operation Instruction 4100.5E; Executive Order (EO) 13834, *Efficient Federal Operations*; and the VPDES permit (permit #VA0004421). Non-military projects would be required to implement post-construction stormwater management under state and federal statutes and guidelines.

8.4.7.3 Cumulative Impact Analysis

The Proposed Action, when taken into consideration with past, present, and reasonably foreseeable future actions within the ROI would not be anticipated to have a significant cumulative increase in turbidity because the Navy would obtain authorization under the VSMP Construction General Permit (VAR10) from the VDEQ before starting construction and demolition activities and would be required to implement a site-specific SWPPP along with applicable construction BMPs. Impacts would be minimized with the adherence to erosion and stormwater management practices and best management practices (BMPs) according the site-specific SWPPP developed for the projects as required by state and federal statutes and guidelines.

In addition, infrastructure improvements would be required to follow post-construction state and federal guidelines to ensure water quality is protected and potential increases in runoff are minimized. In additional, for military projects, the Navy would be required to comply with applicable standards and policies for post-construction stormwater management under the Energy Independence and Security Act of 2007; Navy Low Impact Development standards; Chief of Naval Operation Instruction 4100.5E; EO13834, *Efficient Federal Operations*; and the VPDES permit (permit #VA0004421). Non-military projects would be required to implement post-construction stormwater management under state and federal statutes and guidelines.

With implementation of BMPs and compliance with permits, construction and operations activities from the Proposed Action and present and foreseeable projects are not anticipated to degrade the water quality or affect beneficial uses of surface water resources.

Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects would not result in a significant cumulative impact to water resources.

8.4.8 INFRASTRUCTURE

8.4.8.1 Description of Geographic Study Area

The ROI for cumulative infrastructure impacts consists of NS Norfolk.

8.4.8.2 Relevant Past, Present, and Future Actions

The majority of the identified projects in **Table 8.3-1** consist of various improvements throughout the ROI including the updating of facilities and infrastructure. These improvements generally improve the condition and lifespan of infrastructure as well as potentially reduce energy and water consumption because they would comply with the Energy Independence and Security Act of 2007, Navy Low Impact Development standards, Chief of Naval Operation Instruction 4100.5E, and EO 13834, *Efficient Federal Operations*, all of which set standards and goals for energy and water efficiency for federal construction and renovation projects.

Relevant actions include those that would increase the population or mission at NS Norfolk and thereby affect the capacity of available infrastructure as well as those that would result in the generation of construction and demolition debris. One action was identified that would increase the population and mission at NS Norfolk, the Transition of HMM-774 to VMM-774. This action, nearing completion by 2018, will not increase the number of helicopters based at NS Norfolk, but will result in an increase of 30 personnel. The majority of the identified actions entail construction, renovation, or demolition, all of which would result in the generation of construction and demolition debris.

8.4.8.3 Cumulative Impact Analysis

When past, present, and reasonably foreseeable projects are analyzed together with the Proposed Action, there would be a slight overall increase to the demand on utilities that service NS Norfolk and the surrounding communities. Cumulative infrastructure impacts that would occur with implementation of the Proposed Action would include potential increases in energy use, water consumption, and wastewater generation from the added population as well as generation of construction and demolition debris from the numerous construction and demolition actions. However, there remains ample capacity to absorb the cumulative increases in utility consumption and generation of construction and demolition debris. In addition, based on improvements planned for these utilities, it is anticipated that these utilities would continue to expand and be upgraded as needed to accommodate the future growth and development of the region. None of the proposed projects involve excessive construction/paving activities that would drastically increase impervious surface at NS Norfolk. Therefore, based on the planned utility improvements likely to be implemented along with the future projects, there would be no significant cumulative impact to utilities.

8.4.9 CULTURAL RESOURCES

The Proposed Action would have no adverse effect on cultural resources; therefore, there would be no cumulative impacts to cultural resources.

8.4.10 HAZARDOUS MATERIALS AND WASTES

8.4.10.1 Description of Geographic Study Area

The ROI for cumulative infrastructure impacts consists of NS Norfolk.

8.4.10.2 Relevant Past, Present, and Future Actions

The past, present, and reasonably foreseeable future actions that have a potential to use hazardous materials or generate hazardous waste at NS Norfolk include those projects that require building demolition/modification that may require the disposal of small quantities of asbestos containing materials or lead-based paint. Projects with the potential for cumulative impacts to hazardous materials and waste include those with ground disturbance and demolition/modification. The majority of projects identified in **Table 8.3-1** consist of various improvements throughout the ROI including the updating of facilities and infrastructure and introduction of new aircraft.

8.4.10.3 Cumulative Impact Analysis

When past, present, and reasonably foreseeable future projects are analyzed together, there may be an overall increase of the amount of hazardous materials handled and amounts of hazardous wastes generated from the construction, renovation, and demolition of facilities, and the operation and maintenance of new aircraft. The Proposed Action would result in minor hazardous materials and wastes generated from demolition, construction, operations, and maintenance. Any identified asbestos-containing material (ACM), lead-based paint (LBP), or PCB-containing materials would be removed before demolition or construction/renovation activities, handled by a licensed contractor, and disposed of in accordance with all applicable federal, state, and local requirements. However, the Proposed Action would not result in a significant impact to the hazardous materials and the waste management program at NS Norfolk and would not require new EPCRA reporting requirements. Similarly, any hazardous materials and wastes associated with the other construction and demolition projects planned would continue to be collected and managed on site in accordance with the installation's Hazardous Waste Management Plan. In addition, existing procedures for the safe handling, use, and disposal of hazardous substances and waste would be followed. Therefore, there would be no significant cumulative impacts to hazardous materials and wastes.

8.4.11 SOCIOECONOMICS

8.4.11.1 Description of Geographic Study Area

The ROI for cumulative socioeconomic impacts is the City of Norfolk and the Hampton Roads region.

8.4.11.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that might interact with the socioeconomic impacts of the Proposed Action include all the projects listed in **Table 8.3-1**. The Navy's total contribution to the Hampton Roads regional economy includes approximately 114,000 jobs, including 62,000 at NS Norfolk, over $7.8 billion in annual military and civilian payroll expenditures, and approximately $1.3 billion in procurement for goods and services in the Hampton Roads region (Naval Station Norfolk Community Plans and Liaison Office, 2014).

One relevant past action that increased personnel and has socioeconomic impacts is the Gerald R Ford Homeporting, and one present action Transition of HMM-774 to VMM-774 has a minor increase in personnel and socioeconomic impacts.

8.4.11.3 Cumulative Impact Analysis

Cumulative socioeconomic impacts from past, present, and future actions within the ROI would be less than significant because the economic benefits of construction for the Proposed Action would be minor and temporary, and the increase or decrease in population resulting from reduced (Alternative 1) or

additional (Alternative 2) personnel would be a small percentage of total NS Norfolk personnel and the population of the City of Norfolk and Hampton Roads.

The Proposed Action construction activities would have a minor, temporary benefit to the economy of the City of Norfolk and Hampton Roads that would be cumulative with beneficial economic impacts of the past, present, and reasonably foreseeable construction projects.

The Proposed Action would have a minor increase to population, employment, housing, schools, and child care of the City of Norfolk and Hampton Roads that would be additive with past and present actions at NS Norfolk. Given the past, present, and future level of socioeconomic impact that NS Norfolk has in the region, the cumulative actions would not represent a major shift in population or associated socioeconomic effects in the City of Norfolk and Hampton Roads.

Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant socioeconomic impacts within the ROI.

8.5 CONCLUSION

Based on the preceding analysis of each resource potentially impacted by the Proposed Action, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects, would not result in significant cumulative impacts.

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9 OTHER CONSIDERATIONS REQUIRED BY NEPA

9.1 CONSISTENCY WITH OTHER FEDERAL, STATE, AND LOCAL LAWS, PLANS, POLICIES, AND REGULATIONS

In accordance with 40 Code of Federal Regulations (CFR) section 1502.16(c), analysis of environmental consequences shall include discussion of possible conflicts between the Proposed Action and the objectives of federal, regional, state and local land use plans, policies, and controls. **Table 9.1-1** identifies the principal federal and state laws and regulations that are applicable to the Proposed Action, and describes briefly how compliance with these laws and regulations would be accomplished.

Table 9.1-1: Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	***Status of Compliance***
National Environmental Policy Act (NEPA) (42 United States (U.S.) Code [U.S.C.] section 4321 et seq.); Council on Environmental Quality (CEQ) NEPA implementing regulations (40 CFR parts 1500-1508; Navy procedures for Implementing NEPA (32 CFR part 775 and Office of the Chief of Naval Operations Instruction [OPNAVINST] 5090.1D)	This Environmental Assessment (EA) has been prepared in accordance with the Council on Environmental Quality regulations implementing NEPA, and Navy NEPA procedures. The appropriate public participation and review are being conducted in compliance with NEPA.
Clean Air Act (42 U.S.C. section 7401 et seq.)	The applicable regulatory setting is discussed in Sections 3.4 and 6.4 (Air Quality) and impact analysis is in Sections 4.4 and 7.4 (Air Quality). The Proposed Action would not cause or contribute to a violation of any National Ambient Air Quality Standards or State Ambient Air Quality Standards. Emissions would be below the applicable General Conformity *de minimis* thresholds. The General Conformity Record of Non-Applicability is provided for NAS North Island in **Appendix C**.
Clean Water Act (33 U.S.C. section 1251 et seq.)	The applicable regulatory setting is discussed in Sections 3.7 and 6.7 (Water Resources) and impact analysis is in Sections 4.7 and 7.7 (Water Resources). There would not be an increase of impervious surfaces at Naval Air Station (NAS) North Island as a result of the Proposed Action; therefore, no long-term impacts to stormwater quality would be expected. There would be an increase of impervious surfaces of 2.4 acres at NS Norfolk and proper post-construction stormwater management features would be incorporated into the project planning and site design to offset potential increases in runoff, to maintain the pre-project hydrology. When completed, the Proposed Action would not result in a net increase in stormwater volume and sediment or nutrient loading to area water bodies.

Table 9.1-1: Principal Federal and State Laws Applicable to the Proposed Action (cont.)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Status of Compliance*
Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 et seq.)	The applicable regulatory setting is discussed in **Section 9.1.1.** For NAS North Island, the Navy has determined that the Proposed Action, based on similar past actions and on the analysis presented in this EA, would have no effect on coastal use or resources of the State of California's coastal zone. The Navy consulted with the California Coastal Commission on this determination. During consultation with the Commission, the Navy reiterated its commitment to continued cooperation with the City of Coronado on planning efforts to monitor and, where feasible and practicable, examine ways to reduce effects of aircraft and traffic on residents, recreation, and wildlife. The Coastal Consistency Negative Determination and California Coastal Commission concurrence are provided in **Appendix F**. For Naval Station (NS) Norfolk, the Navy has determined, based on similar past actions and on the analysis presented in this EA, that the proposed federal agency action may have an effect on a coastal use or resource of the Commonwealth of Virginia's coastal zone and would be consistent to the maximum extent practicable with the applicable enforceable policies of the Virginia Coastal Zone Management Program. The Coastal Consistency Determination and the Virginia Department of Environmental Quality concurrence are provided in **Appendix F**.

Table 9.1-1: Principal Federal and State Laws Applicable to the Proposed Action (cont.)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Status of Compliance*
National Historic Preservation Act (NHPA) (Section 106, 16 U.S.C. section 470 et seq.)	The applicable regulatory setting is discussed in Sections 3.9 and 6.9 (Cultural Resources) and impact analysis is in Sections 4.9 and 7.9 (Cultural Resources). There are no historic properties located within the area of potential effect (APE) for NAS North Island. Design and construction of the new hangar would take into account the architectural style of the installation in accordance with the Naval Base Coronado (NBC) Installation Appearance Plan for the Airfield Functional District. Although unlikely, it is possible that the remains of an unrecorded archaeological resource may be uncovered during ground disturbing activities associated with facility construction. Due to this potential archaeological sensitivity, the Commander of NBC would provide for archaeological monitoring of ground disturbing activities associated with facility construction, in accordance with Stipulation IX of the NBC Programmatic Agreement (PA). Therefore, the Navy makes a finding of *no adverse effect* on historic properties by the Proposed Action. Therefore, in accordance with Stipulation VIII-A of the NBC PA, NBC has satisfied its Section 106 responsibilities for the Proposed Action, and no further NHPA Section 106 review is required. Implementation of the undertaking in accordance with the finding as documented fulfills the Navy's responsibilities under Section 106. There are no historic properties located within the APE for NS Norfolk. Design and construction of the new hangar would take into account the architectural style of the adjacent historic properties, primarily the Naval Air Station Historic District, in accordance with the stipulations of the Regional PA. Therefore, the Navy makes a finding of *no adverse effect* on historic properties by the Proposed Action. In compliance with Section 106 of the NHPA, the Navy initiated consultation with the Virginia Department of Historic Resources, which acts as the State Historic Preservation Officer, federally recognized tribes, and interested parties, regarding its determination of effects for the Proposed Action (refer to **Appendix E**). The findings of the State Historic Preservation Office are included in **Appendix E**. Implementation of the undertaking in accordance with the findings as documented will fulfill the Navy's responsibilities under Section 106.

Table 9.1-1: Principal Federal and State Laws Applicable to the Proposed Action (cont.)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Status of Compliance*
Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.)	The applicable regulatory setting is discussed in 3.6 and 6.6 (Biological Resources) and impact analysis is in Sections 4.6 and 7.6 (Biological Resources). The Navy has determined that the Proposed Action may affect, but is not likely to adversely affect the California least tern and the western snowy plover at NAS North Island; therefore, informal consultation with the U.S. Fish and Wildlife Service (USFWS) was conducted. A letter of concurrence from USFWS is included in **Appendix D**. For all other federally listed species identified with potential to occur within the action areas, the Navy has determined that the Proposed Action would have no effect.
Migratory Bird Treaty Act (MBTA) (16 U.S.C. sections 703-712)	The applicable regulatory setting is discussed in 3.6 and 6.6 (Biological Resources) and impact analysis is in Sections 4.6 and 7.6 (Biological Resources). Impacts to MBTA-protected species and their active nests would be avoided during construction. The Navy has determined that the Proposed action would result in the take of migratory birds through aircraft strikes at NAS North Island and NS Norfolk. However, these takes would not result in a significant adverse effects on a population of a migratory bird species. The Proposed Action is a military readiness activity; therefore, these takes are in compliance with the MBTA and the regulations authorizing incidental take of migratory birds from military readiness activities.
Executive Order (EO) 11988, Floodplain Management	The applicable regulatory setting is discussed in Sections 3.7 and 6.7 (Water Resources) and impact analysis is in Sections 4.7 and 7.7 (Water Resources). No 100-year or 500-year floodplains are located within the boundary of the project areas for NAS North Island. Portions of the proposed taxiway expansion at NS Norfolk are within the 100-year floodplain. However, as the existing taxiway is located within the floodplain, no practicable alternative to development within the floodplain exists. In compliance with this EO, the taxiway expansion would be designed to minimize potential harm within the floodplain.
Toxic Substances Control Act	The applicable regulatory setting is discussed in Sections 3.10 and 6.10 (Hazardous Materials and Waste) and impact analysis is in Sections 4.10 and 7.10 (Hazardous Materials and Wastes). Management of any listed chemicals would be conducted in accordance with the Toxic Substances Control Act.

Table 9.1-1: Principal Federal and State Laws Applicable to the Proposed Action (cont.)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Status of Compliance*
Resources Conservation and Recovery Act (RCRA)	The applicable regulatory setting is discussed in Sections 3.10 and 6.10 (Hazardous Materials and Waste) and impact analysis is in Sections 4.10 and 7.10 (Hazardous Materials and Wastes). Management of any hazardous wastes would be conducted in accordance with the RCRA.
Comprehensive Environmental Response and Liability Act	The applicable regulatory setting is discussed in Sections 3.10 and 6.10 (Hazardous Materials and Waste) and impact analysis is in Sections 4.10 and 7.10 (Hazardous Materials and Wastes). Construction/renovation would be conducted in accordance with the Comprehensive Environmental Response and Liability Act.
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations	The applicable regulatory setting is discussed in Sections 3.11 and 6.11 (Socioeconomics) and impact analysis is in Sections 4.11 and 7.11 (Socioeconomics). The Proposed Action would have no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
EO 13045, Protection of Children from Environmental Health Risks and Safety Risks	The applicable regulatory setting is discussed in Sections 3.11 and 6.11 (Socioeconomics) and impact analysis is in Sections 4.11 and 7.11 (Socioeconomics). The Proposed Action would not result in environmental health risks or safety risks that may disproportionately affect children.

Table 9.1-1: Principal Federal and State Laws Applicable to the Proposed Action (cont.)

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Status of Compliance*
EO 13175, Consultation and Coordination with Indian Tribal Governments	The applicable regulatory setting is discussed in Sections 3.9 and 6.9 (Cultural Resources) and impact analysis is in Sections 4.9 and 7.9 (Cultural Resources). The Navy consults with federally recognized Indian tribes on actions with the potential to significantly affect protected tribal resources, tribal treaty rights, or Indian lands. In the case of NAS North Island, the Kumeyaay Indian Tribes are the federally recognized tribe. The 12 Kumeyaay Indian Tribes established a common consultation entity, the Kumeyaay Cultural Repatriation Committee that is comprised of members representing each tribe and sanctioned by all 12 tribal governments to consult in their interests (Naval Facilities Engineering Command [NAVFAC], 2012). The Kumeyaay Indian Tribes did not identify any Traditional Cultural Properties at NAS North Island during consultation for the 2014 NBC PA. In the case of NS Norfolk, until the Pamunkey Indian Tribe of Virginia received federal recognition in January 2016, there had been no federally recognized Indian tribes located in the Commonwealth of Virginia. However, in the past, two federally recognized tribes have requested to review federal projects located in the Hampton Roads area: the Catawba Indian Nation and the United Keetoowah Band of the Cherokee Indians in Oklahoma. The Navy sent letters to the Tribes on November 30, 2017, requesting information about any traditional cultural properties (refer to **Appendix E**). Responses from the Tribes are included in **Appendix E**.
EO 13834, Efficient Federal Operations	Regardless of the alternative implemented, the Navy would implement environmental management systems to ensure integrated, continuously improving, efficient, and sustainable practices in federal facility operation.

Note: Applies to both bases and alternatives.

9.1.1 COASTAL ZONE MANAGEMENT

Through the CZMA, Congress established national policy to preserve, protect, develop, restore, or enhance resources in the coastal zone. The CZMA encourages coastal states to properly manage use of their coasts and coastal resources, prepare and implement coastal management programs, and provide for public and governmental participation in decisions affecting the coastal zone. To this end, CZMA imparts an obligation upon federal agencies whose actions or activities affect any land or water use or natural resource of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. However, Federal lands, which are "lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agents," are statutorily excluded from the State's "coastal uses

or resources." If, however, the proposed federal activity affects coastal uses or resources beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies. As a federal agency, the Navy is required to determine whether its proposed activities would affect the coastal zone. This takes the form of a consistency determination, a negative determination, or a determination that no further action is necessary.

9.1.1.1 Coastal Zone Management West Coast Fleet Logistics Center

NAS North Island is located within the coastal zone of California. The California Coastal Commission is the lead agency for coastal management and is responsible for enforcing the State's federally approved coastal management plan. California's Coastal Management Program was established in 1978 to protect and manage California's coastal zone and the resources that lie within. The California Coastal Act, the foundation of the California Coastal Management Program, has six enforceable policies on which conservation and development decisions in the coastal zone are based: public access, recreation, marine environment, land resources, development, and industrial development.

California's coastal zone is defined as the land and water area of the state extending seaward to the state's outer limit of jurisdiction, including all offshore islands, and extending inland generally 3,000 feet from the mean high tide line. Compliance with California's coastal zone management policies, to the maximum extent practicable, is accomplished and recorded through the development of a Federal Coastal Consistency Determination or a Coastal Consistency Negative Determination, which analyzes the Proposed Action and its effects to coastal resources, as outlined by California's enforceable coastal zone policies.

The Navy has determined that the Proposed Action (Alternative 1 or Alternative 2) would have no effect on coastal use or coastal resources. The Navy consulted with the California Coastal Commission on this determination. During consultation with the Commission, the Navy reiterated its commitment to continued cooperation with the City of Coronado on planning efforts to monitor and, where feasible and practicable, examine ways to reduce effects of aircraft and traffic on residents, recreation, and wildlife. A copy of the Coastal Consistency Negative Determination and concurrence from the California Coastal Commission are provided in **Appendix F**.

9.1.1.2 Coastal Zone Management East Coast Fleet Logistics Center

NS Norfolk is located within the coastal zone of Virginia. The Virginia Department of Environmental Quality (VDEQ) is the lead agency for coastal management and is responsible for enforcing the State's federally approved coastal management plan. The Virginia Coastal Zone Management Program was established in 1986 to protect and manage Virginia's coastal zone and the resources that lie within. The Virginia Coastal Zone Management Program has nine applicable enforceable policies: fisheries management, subaqueous lands management, wetlands management, primary coastal sand dunes management, point source pollution control, non-point source pollution control, shoreline sanitation, air pollution control, and coastal lands management. NS Norfolk is owned and operated by the Navy and, therefore, is excluded from the coastal zone. However, actions outside the coastal zone may affect land or water uses or natural resources within the coastal zone and, therefore, are subject to the provisions of the CZMA.

The Navy has determined that the proposed federal agency action may have an effect on a coastal use or resource of the Commonwealth of Virginia's coastal zone and would be consistent to the maximum extent practicable with the applicable enforceable policies of the Virginia Coastal Zone Management

Program. The Navy has consulted with VDEQ on this determination. A copy of the Coastal Consistency Determination and concurrence from VDEQ are provided in **Appendix F**.

9.2 Irreversible or Irretrievable Commitments of Resources

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

Implementing the Proposed Action would not result in significant irreversible or irretrievable commitment of resources.

Implementation of the Proposed Action (Alternative 1 or Alternative 2) would involve irretrievable commitments of non-renewable and renewable resources. The Proposed Action would not cause the unavoidable destruction of natural resources.

Proposed Action construction, demolition, and renovation activities would consume capital, human labor, fuels, and construction materials. The total amount of construction materials (e.g., concrete, insulation, wiring, etc.) required for the Proposed Action is relatively small when compared to the resources available in the regional areas of San Diego County, California, and Hamptons Roads, Virginia. The construction materials and energy required for construction and operations are not in short supply; their use would not have an adverse impact on the continued availability of these resources, and the energy resource commitment is not anticipated to be excessive in terms of region-wide use.

All infrastructure upgrades would comply with EO 13834, *Efficient Federal Operations* and Chief of Naval Operation Instruction 4100.5E. EO 13834 requires federal departments and agencies to enact specific actions and operations outlined within the EO to achieve environmental performance and federal sustainability by reducing energy use and cost. Pursuing clean sources of energy will improve energy and water security. Instruction 4100.5E outlines the Secretary of the Navy's vision for shore energy management. The focus of this instruction is establishing the energy goals and implementing strategy to achieve energy efficiency.

9.3 Unavoidable Adverse Impacts

This EA has determined that the alternatives considered would not result in any significant impacts. Implementing the alternatives would potentially result in negligible impacts to airspace, noise, safety, air quality, transportation, migratory birds, groundwater, surface water, utilities demand, hazardous materials/wastes, and socioeconomics. Potential future sea level rise may contribute to 100-year event flooding in a portion of the project areas.

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

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development

site reduces future flexibility in pursuing other options, or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

In the short-term, effects to the human environment with implementation of the Proposed Action would primarily relate to the construction activity itself. Air quality and traffic would be impacted in the short-term. In the long-term, the Proposed Action would result in both short- and long-term environmental effects. However, implementing Alternative 1 or 2 is not expected to result in the types of impacts that would reduce environmental productivity, affect biodiversity, or narrow the range of potential long-term beneficial uses of the environment

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10 REFERENCES

Chapter 1 Purpose and Need and Chapter 2 Proposed Action and Alternatives

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