Draft
Environmental Assessment
Space Control Squadron (SPCS) Beddown for the Fourth (SPCS #4) and Fifth (SPCS #5) Basing Actions
Pacific Missile Range Facility–Barking Sands, Hawaii
Joint Base Pearl Harbor–Hickam, Hawaii
Andersen Air Force Base, Guam

January 2022

United States Air Force
154th Wing, Hawaii Air National Guard
254th Air Base Group, Guam Air National Guard

LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFSPC	Air Force Space Command
ANG	Air National Guard
APE	Area of Potential Effects
APZ	Accident Potential Zone
AQCRs	Air Quality Control Regions
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CAB	Clean Air Branch
CFR	Code of Federal Regulations
CNRH	Commander Navy Region Hawaii
CO2e	carbon dioxide equivalent
dBA	A-weighted decibel
DLNR	Department of Land and Natural Resources
DoD	Department of Defense
DOE	Department of Education
DOH	Department of Health
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ESA	Endangered Species Act
ESP	Erosion and Sediment Control Plan
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
ft^2	square feet
FY	fiscal year
GHG	greenhouse gas
GUANG	Guam Air National Guard
Guam EPA	Guam Environmental Protection Agency
HAR	Hawaii Administrative Rules
HI	Hawaii
HIANG	Hawaii ANG
HQ	Headquarters
HQ CNIC/N54	U.S. Navy Installations Command
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
IAPs	initial accumulation points
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
IRP	Installation Restoration Program
JBPHH	Joint Base Pearl Harbor-Hickam
KIUC	Kaua‘i Island Utility Cooperative
km	kilometer
LBP	lead-based paint
MBTA	Migratory Bird Treaty Act
MILCON	military construction
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities Engineering Systems Command
NAVFACPAC	Naval Facilities Engineering Systems Command Pacific
NCSL	National Conference of State Legislatures
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NGLA	Northern Guam Lens Aquifer
NHPA	National Historic Preservation Act
NHO	Native Hawaiian Organization
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OP-CZM	Office of Planning, Coastal Zone Management Program
OSHA	Occupational Safety and Health Administration
PA	programmatic agreement
pCi/L	picocuries per liter
PCB	polychlorinated biphenyls
PM_{10}	particulate ≤10 micrometers
$PM_{2.5}$	particulate ≤2.5 micrometers
PMRF	Pacific Missile Range Facility
ppm	part(s) per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SHPO	State Historic Preservation Officer
SLR	sea-level rise
SOH	State of Hawaii
SPCS	Space Control Squadron
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
THAAD	Terminal High-Altitude Area Defense
tpy	tons per year
UFC	Uniform Facilities Criteria
U.S.	United States
USAF	U.S. Air Force
U.S.C.	U.S. Code
USCB	U.S. Census Bureau
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USINDOPACOM	U.S. Indo-Pacific Command
USSPACECOM	U.S. Space Command
UTC	Unit Type Code
WWF	World Wildlife Fund
yd^2	square yard

PRIVACY ADVISORY

This Draft Environmental Assessment is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality NEPA Regulations (40 Code of Federal Regulations [CFR] §§1500–1508), and 32 CFR § 989, Environmental Impact Analysis Process (EIAP).

The EIAP provides an opportunity for public input on National Guard Bureau (NGB) decisionmaking, allows the public to offer inputs on alternative ways for NGB to accomplish what it is proposing, and solicits comments on NGB's analysis of environmental effects. Public commenting allows NGB to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

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CHAPTER 1 PURPOSE AND NEED FOR PROPOSED ACTION

1.1 BACKGROUND

The 2011 National Security Space Strategy emphasized that the space domain "is vital to U.S. national security and our ability to understand emerging threats, project power globally, conduct operations, support diplomatic efforts, and enable global economic viability" (Department of Defense [DoD], 2011). Given the increased reliance on space systems to support military operations, access to space capabilities must be maintained. A key objective outlined in the 2014 Quadrennial Defense Review included the ability for the United States (U.S.) to advance space control technologies (DoD, 2014). In support of this goal, the second priority listed by the U.S. Air Force (USAF) Space Command (AFSPC) Commander for the 2015 Air Reserve Component Initiative was to generate four additional Air National Guard (ANG) unit-equipped Unit Type Codes (UTCs) to meet Combatant Command requirements for offensive space control (USAF, 2015). UTCs are units of capability that deploy to support mission objectives. The President's budget for fiscal year (FY) 2016 provided funding for the first two ANG Space Control Squadron (SPCS) basing actions to be established (SPCS #1 and SPCS #2). SPCS #1 placed the 216th SPCS at Vandenberg Air Force Base (AFB), California, while SPCS #2 located the 114th SPCS at Patrick AFB, Florida. In 2017, the Secretary of the Air Force basing decision placed SPCS #3 (the 138th SPCS) at Peterson AFB, Colorado. At present, the fourth ANG squadron for offensive space control has yet to be established in order to meet the 2015 AFSPC Commander Air Reserve Component Initiative. The number one priority of the 2018 AFSPC Commander Air Reserve Component Priority Memorandum was to generate eight ANG unit-equipped UTCs to meet Combatant Command requirements for defensive space control (USAF, 2018). Currently, there is no defensive SPCS in the ANG.

1.2 PURPOSE AND NEED FOR ACTION

The purpose of the Proposed Action is to identify specific locations meeting the criteria for placement of facilities associated with the beddown of two SPCS missions: one offensive and one defensive mission.

SPCS #4 offensive space control is needed to meet the 2015 AFSPC Commander Air Reserve Component Initiative priority to generate four additional ANG unit-equipped UTCs to meet Combatant Command needs. Offensive space control operations consist of offensive measures conducted for space negation, where negation involves measures to deceive, disrupt, deny, degrade, or destroy space systems or services, and includes actions targeting an enemy's space-related capabilities and forces. SPCS #1, #2, and #3 were previously established to execute the offensive mission. SPCS #4 would accomplish this goal by establishing the fourth ANG SPCS offensive mission.

SPCS #5 defensive space control is needed to meet the 2018 AFSPC Commander Air Reserve Component Priority Memorandum to generate eight ANG unit-equipped UTCs to meet Combatant Command requirements. Defensive space control operations consist of all active and passive measures taken to protect friendly space capabilities from attack, interference, or hazards. Currently, there is no defensive SPCS in the ANG. SPCS #5 would be a key initial step toward accomplishing the overall goal by establishing the first of eight ANG SPCS defensive missions.

1.3 LOCATION

1.3.1 PMRF-Barking Sands

Strategically situated on the island of Kaua'i, the U.S. Navy's Pacific Missile Range Facility (PMRF) provides integrated range services for multiple DoD and National Nuclear Security Administration activities (**Figure 1-1**). PMRF is the largest instrumented multi-environment weapons test range in the U.S. and includes land, sea, and air zones within the boundaries of the 2,060-acre installation, which is approximately 7 miles long and 0.5 mile wide. The range serves training, tactics development, and evaluation for air, surface, and subsurface weapons systems for DoD and other government agencies, foreign military forces, and private industry. PMRF maintains facilities and provides services to support Pacific Fleet underwater, surface, and air training exercises and other activities designed by the Chief of Naval Operations. The PMRF Main Base is at Barking Sands, which has activity areas for tracing and surveillance radars, data processing, communications networks, and an airfield. In addition to the Main Base, PMRF has support facilities on Kaua'i at Makaha Ridge (secondary range), Kokee (tracking radars, telemetry, communications, command, and control), Kamokala Ridge (munitions storage), Port Allen (pier for weapons recovery and Navy Seaborne Powered Targets boats), and Milolii Ridge (reflectors) (NAVFAC, 2010).

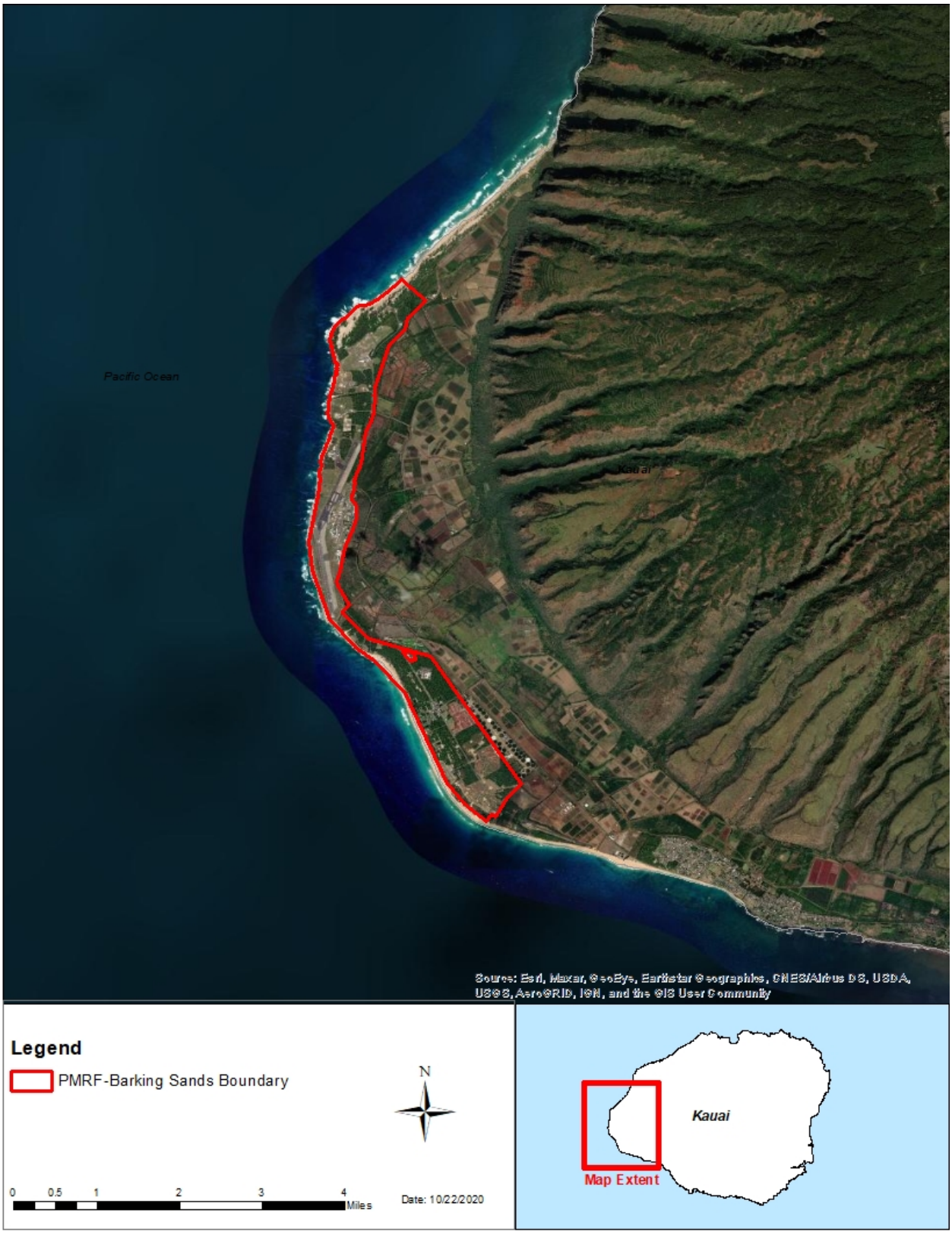

Figure 1-1 Pacific Missile Range Facility-Barking Sands Location Map

1.3.2 Joint Base Pearl Harbor-Hickam

As a result of the 2005 Base Realignment and Closure, Naval Station Pearl Harbor and Hickam AFB were merged into a single joint installation, Joint Base Pearl Harbor-Hickam (JBPHH), to support both USAF and U.S. Navy missions (**Figure 1-2**). At JBPHH, which is approximately 27,694 acres in size, all buildings and land are U.S. Navy real property, and the USAF manages the airfield. All supporting functions were transferred to the U.S. Navy. Weapons and flight safety are the responsibility of the USAF, while ground safety is the responsibility of the U.S. Navy. JBPHH is located on the island of O'ahu, Hawaii (HI) on the south coast near Honolulu and shares runways operated by the Daniel K. Inouye International Airport. JBPHH is the home to the 154th Wing, 15th Wing, and numerous tenant and associated units, as well as being the home of Commander, Pacific Air Forces. Combat Air Forces units assigned to JBPHH include the 199th Fighter Squadron, a unit of the 154th Wing, Hawaii ANG (HIANG) and the 19th Fighter Squadron, a unit of the 15th Wing (USAF Active Duty).

1.3.3 Andersen AFB

Andersen AFB is located in Yigo at the northern tip of Guam (**Figure 1-3**) and covers approximately 15,400 acres. Ownership of Andersen AFB land was transferred to the U.S. Navy in 2009 during transition of Andersen AFB to operate under Joint Region Marianas command. The main operations area of the Base is in the eastern third of the Installation at approximately 500 feet (152 meters) above sea level. This area includes the main active airfield and an array of operations, maintenance, and community support facilities. The central third of the Installation is a Munitions Storage Area. The western third is Northwest Field, which is used for helicopter training, various field exercises, bivouacs, and is the permanent location of the Pacific Air Forces Regional Training Center and the U.S. Army Terminal High-Altitude Area Defense (THAAD) ballistic missile defense battery. Two active hunting areas are located south of Northwest Field. As the host unit at Andersen AFB, the 36th Wing mission is to provide the President of the United States sovereign options to decisively employ airpower across the entire spectrum of engagement. In addition to the 36th Wing, tenant units at Andersen AFB include the 254th Air Base Group, 337th Air Support Flight – Australia, 497th Combat Training Squadron, 624th Regional Support Group, 69th Reconnaissance Group, Det. 1, 734th Air Mobility Squadron, Det. 2 21st Space Operations Squadron, and Det. 5 22nd Space Operations.

1.4 SCOPE OF THE ENVIRONMENTAL ANALYSIS

This EA evaluates the potential environmental consequences of implementing the Proposed Action or Alternatives to beddown one SPCS during the fourth basing action and beddown one SPCS during the fifth basing action. Based on the analysis in this EA, the USAF will make one of three decisions for SPCS #4 and one of three decisions for SPCS #5 regarding the Proposed Action: 1) if no significant impacts are anticipated to occur, choose the action alternative that best meets the purpose of and need for this project and sign a Finding of No Significant Impact, allowing implementation of the selected alternative; 2) initiate preparation of an Environmental Impact Statement if it is determined that significant impacts would occur through implementation of the Proposed Action; or 3) select the No Action Alternative, whereby the Proposed Action would not be implemented. As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project and be available to inform decision-makers of the potential environmental impacts.

Headquarters is responsible for all basing decisions for USAF squadrons. This environmental assessment (EA) analyzes the potential environmental consequences of the proposed SPCS #4 and SPCS #5 basing actions at PMRF-Barking Sands, JBPHH, and Andersen AFB, respectively, to provide USAF Headquarters with the information needed to make an informed decision about the proposed beddown.

This EA has been prepared in accordance with the *National Environmental Policy Act* (NEPA) (42 *United States Code* Sections [U.S.C. §§] 16 4321–4347), the Council on Environmental Quality Regulations (40 *Code of Federal Regulations* [CFR] Parts 1500–1508), and 32 CFR Part 989*, Environmental Impact Analysis Process (EIAP)*. NEPA ensures that environmental information, including the anticipated environmental consequences of a proposed action, is available to the public, federal and state agencies, and the decision-maker before decisions are made and before irreversible actions are taken.

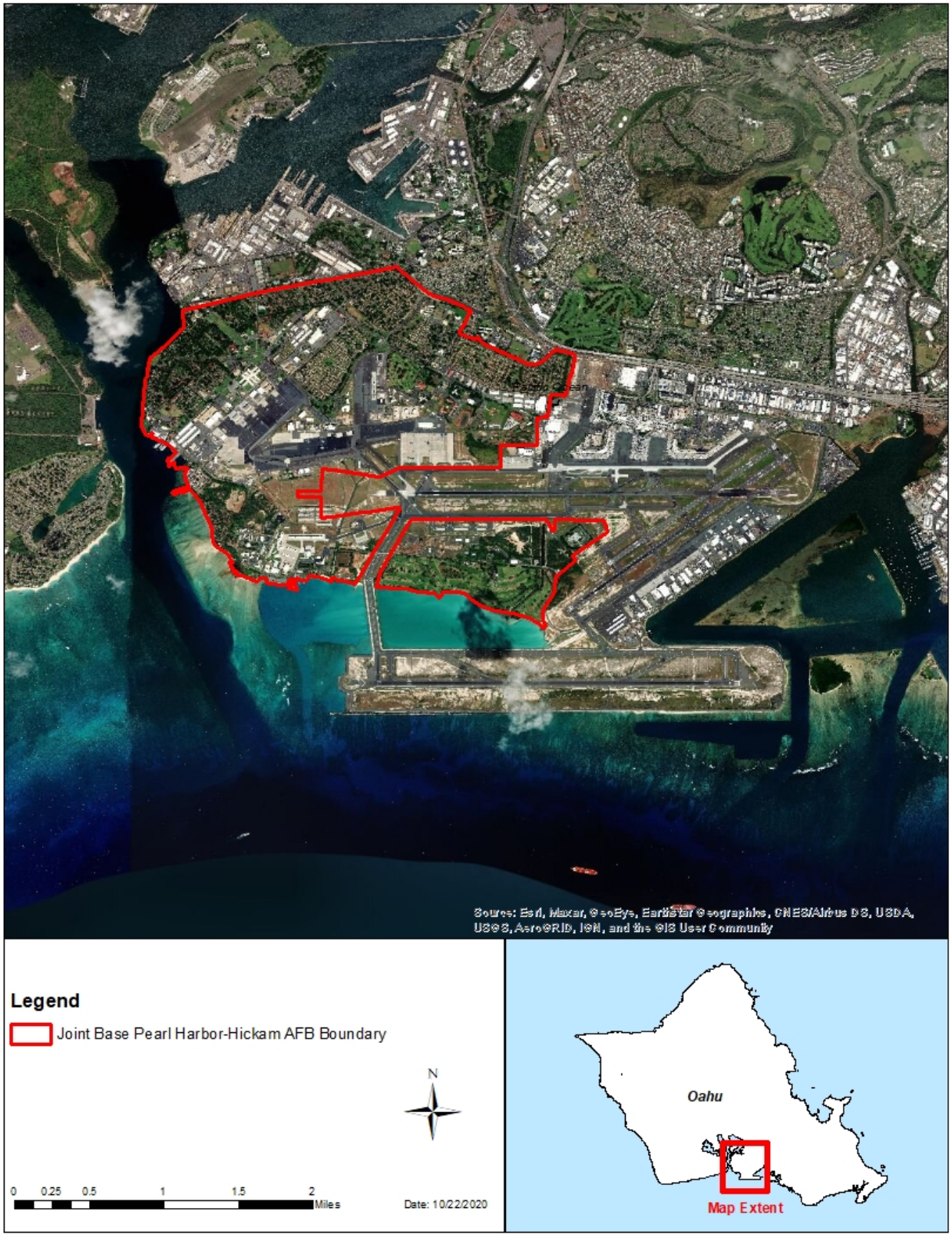

Figure 1-2 Joint Base Pearl Harbor-Hickam Location Map

Figure 1-3 Andersen Air Force Base Location Map

Issues Dismissed and Issues Carried Forward for Additional Analysis

NEPA, which is implemented through the Council on Environmental Quality regulations, requires federal agencies to consider alternatives to the Proposed Action and analyze potential impacts of action alternatives. Potential impacts of the Proposed Action and its alternatives described in this EA will be assessed in accordance with the USAF EIAP (32 CFR Part 989), which requires that impacts to resources be analyzed for context, duration, and intensity. To help the public and decision-makers understand the implications of impacts, they will be described in the short and long term, together with other planned actions, and within context. Environmental resources analyzed in the EA are summarized in **Table 1-1**.

The following resources were eliminated from detailed analysis: airspace management and use and aircraft noise and visual resources. The Proposed Action and Alternatives do not include aircraft operations and would not result in any restrictions to airspace while satellites are in use; therefore, there is no potential for impacts to airspace or noise associated with aircraft operations. Visual Resources were eliminated from detailed analysis for the Alternative locations because facility construction and/or would occur entirely within the Installation and consistent with existing visual landscapes.

Table 1-1
Environmental Resources Analyzed in the Environmental Assessment

Resource	PMRF-Barking Sands	JBPHH	Andersen AFB
Airspace Management and Use	**N/A**	**N/A**	**N/A**
Noise (construction only)	✓	✓	✓
Safety	✓	✓	✓
Air Quality	✓	✓	✓
Biological Resources	✓	✓	✓
Water Resources (including Coastal Zone Management Act [CZMA] considerations)	✓	✓	✓
Soils	✓	✓	✓
Land Use	✓	✓	✓
Socioeconomics	✓	✓	✓
Visual Resources	**N/A**	**N/A**	**N/A**
Environmental Justice and Protection of Children	✓	✓	✓
Cultural Resources	✓	✓	✓
Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites	✓	✓	✓
Infrastructure, Transportation, and Utilities	✓	✓	✓

AFB = Air Force Base; JBPHH = Joint Base Pearl Harbor-Hickam; N/A = not applicable; PMRF = Pacific Missile Range Facility

1.5 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

1.5.1 Interagency/Intergovernmental Coordination and Consultation

EIAP, in compliance with 32 CFR Part 989 and NEPA, includes public and agency review of information pertinent to the Proposed Action and Alternatives. Scoping is an early and open process for developing the breadth of issues to be addressed in an EA and for identifying significant concerns related to an action. Per the requirements of the Intergovernmental Cooperation Act of 1968 (42 U.S.C. § 4231[a]) and Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, federal, state, and local agencies with jurisdiction that could potentially be affected by the Proposed Action and Alternatives were notified during the development of this EA. Those Interagency and Intergovernmental Coordination for Environmental Planning letters and responses are included in **Appendix A**.

1.5.2 Agency Consultations

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the Endangered Species Act (ESA) and implementing regulations (50 CFR Part 402) requires communication with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The primary focus of this consultation is to request a determination of whether any protected species are known to occur or could possibly occur in the Region of Influence (ROI). If protected species are present, a determination would be made of any potential adverse effects on the species. Should no species protected by the ESA be affected

by the Proposed Action or Alternatives, no additional consultation is required. The Marine Mammal Protection Act (16 U.S.C. § 1371 et seq.) makes it illegal for a person to take a marine mammal, which includes significantly disturbing the habitat, unless it is done in accordance with regulations or a permit. The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801) requires federal agencies to consult with the NMFS when activities may have adverse impacts on designated essential fish habitat.

The National Guard Bureau (NGB) mailed consultation letters to USFWS on a) 6 August 2021 seeking concurrence with a *Not Likely To Adversely Affect* determination for impacts to protected species at PMRF – Barking Sands and JBPHH and b) 24 August 2021 seeking concurrence with a *Not Likely to Adversely Affect* determination for Andersen AFB. On 11 August 2021, NGB received an email from USFWS stating there is insufficient information to proceed with informal consultation at this time (see **Appendix A**). NGB provided additional information over the phone (20 August, 12 October, and 10 November) and via email (24 August, 30 September, 13 October, 25 October). NGB provided an updated consultation letter with additional information to USFWS on 19 November 2021 seeking concurrence on the determination of *Not Likely To Adversely Affect* for impacts to protected species. USFWS concurred with NGB's determination of *Not Likely to Adversely Affect* for impacts to protected species by letter dared 14 December 2021. Because the Proposed Action and Alternatives would not impact marine mammals, NGB did not send NMFS a consultation letter.

1.5.3 Government to Government Consultation

Section 106, DoD Instruction 4710.03, *Consultation with Native Hawaiian Organizations*, and Department of the Air Force Instruction 90-2002, *Air Force Interaction with Federally Recognized Tribes*, direct federal agencies to consult with federally recognized tribes and Native Hawaiian Organizations (NHOs) when a proposed undertaking may affect properties of religious or cultural significance. NHOs are organizations that serve and represent the interests of Native Hawaiians with a primary and stated purpose of providing services to Native Hawaiians and have expertise in Native Hawaiian affairs. The Hawaii ANG invited NHOs to consult on the proposed undertaking, but none of the NHOs contacted requested any additional information or consultation. A list of NHOs contacted by the ANG is provided in **Appendix A**. There are no federally recognized First Nations tribal groups or equivalent on Guam. All consultation is done through the SHPO, who communicates the concerns of the local Chamorro community with regard to cultural resources.

1.5.4 State Historic Preservation Officer Consultation

Section 106 of the *National Historic Preservation Act of 1966* (54 U.S.C. § 300101 et seq.) (NHPA) and its implementing regulations (36 CFR Part 800) directs federal agencies to afford the Advisory Council on Historic Preservation the opportunity to comment on any undertaking that has the potential to affect historic properties. Historic properties are cultural resources that an agency, in consultation with the State Historic Preservation Officer (SHPO), has determined to be eligible for inclusion in the National Register of Historic Places (NRHP). The Advisory Council on Historic Preservation has delegated its commenting responsibility to the SHPOs.

The ANG is a tenant at all three alternatives for the proposed undertaking. A host-tenant agreement exists for each location and outlines how the ANG should carry out Section 106 consultation. For JBPHH and PMRF-Barking Sands, the ANG works with the NAVFAC Cultural Resources Manager at the respective location. At Andersen, the NAVFAC Cultural Resources Manager is responsible for consultation.

NGB began coordination efforts with appropriate SHPO offices with the mailing of scoping letters on 29 January 2021 (see **Appendix A**). NGB did not receive comments from the HI SHPO. The Guam SHPO concurred on the determination of *No Historic Properties Affected* at Andersen AFB via letter dated 8 April 2021 (see **Appendix A**). NGB sent another consultation package to HI SHPO via the Hawaii Cultural Resource Information System (HCRIS) on 4 August 2021 and received a letter back on 31 August 2021 stating that it did not concur with a determination of *No Historic Properties Affected*. The HI SHPO then requested shovel testing in areas identified as fill at the JBPHH location and in a paved area at the PMRF-Barking Sands location (see **Appendix A**). NGB contacted the NAVFAC Cultural Resources Managers at JBPHH and Barking Sands to discuss the undertakings. NAVFAC informed NGB that the proposed undertakings fall under a Regional Programmatic Agreement (PA) signed by the Commander, Navy Region Hawaii; the Advisory Council on Historic Preservation; and the HI SHPO. The PA states that if Navy personnel determine that an undertaking does not have the potential to cause effects on listed, contributing, or eligible properties, no further review under the NHPA is required. As terms in the PA supersede standard consultation procedures outlined in Section 106 of the NHPA, no further consultation with the HI SHPO is

required. On 3 December 2021, NGB notified the HI SHPO of its intent to use the terms of the PA, thereby closing out consultation (see **Appendix A**).

1.6 APPLICABLE LAWS AND REGULATIONS

Implementation of the Proposed Action would involve coordination with several organizations and agencies. Adherence to the requirements of specific laws, regulations, best management practices, and necessary permits are described in detail in each resource section in Chapter 3.

1.6.1 National Environmental Policy Act

NEPA requires that federal agencies consider potential environmental consequences of their proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed federal decisions. The Council on Environmental Quality was established under NEPA to implement and oversee federal policies as they relate to this process. In 1978, the Council issued Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1500–1508). Implementation of the 2020 Council regulations will be conducted at the direction of NGB.

1.6.2 The Environmental Impact Analysis Process

The EIAP is the process by which the USAF facilitates compliance with environmental regulations (32 CFR Part 989, *Environmental Impact Analysis Process*), including NEPA.

1.7 PUBLIC AND AGENCY REVIEW OF ENVIRONMENTAL ASSESSMENT

The Notice of Availability was included in the SOH Office of Environmental Quality Control semi-monthly online publication of *The Environmental Notice* for public review on 23 January 2022. The Notice of Availability invited the public to review and comment on the Draft EA. The public and agency review period ended on 17 February 2022. The public and agency comments are provided in **Appendix A**.

On 18 January 2022, the Notice of Availability was published in *The Honolulu Star-Advertiser*, Honolulu, HI; *The Garden Island*, Kaua'i, HI; *Guam Daily Post*, Guam; and *Pacific Daily News*, Guam. Copies of the Draft EA and proposed Finding of No Significant Impact were also made available for review at the following locations:

- JBPHH Library, 990 Mills Boulevard, JBPHH, HI 96853
- HI State Library, 478 South King Street, Honolulu, HI 96813 47
- Waimea Public Library, 9750 Kaumualii Hwy, Waimea, HI 96796
- Lihue Public Library, 4344 Hardy St, Lihue, HI 96766
- Nieves M. Flores Memorial Library, 254 Martyr Street, Hagatna, Guam 96910
- University of Guam Robert F. Kennedy Memorial Library, UOG Station, Mangilao, Guam 96913

CHAPTER 2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action analyzes three candidate locations for ANG SPCS #4 and ANG SPCS #5: PMRF-Barking Sands and JBPHH, HI, and Andersen AFB, Guam. The USAF proposes to construct and operate facilities for the beddown of a total of two SPCS missions, one offensive and one defensive, at the three candidate locations. Under the Proposed Action, each SPCS would require the following facilities:

- 12,100-square-foot (ft^2) building that consists of 3,000 ft^2 of administration area, 3,600 ft^2 of operational area, 5,200 ft^2 of maintenance area, and 300 ft^2 of hazardous storage area
- Open floor plan with Secure Compartmented Information Facility space capable of accommodating personnel; facility and equipment require Protection Level 3
- 5,000 square yard (yd^2) equipment pad with an unobstructed view of geosynchronous satellites
- 2,500 yd^2 parking lot within 0.25 mile of facilities
- 50-foot security clearance setback throughout perimeter of equipment pad
- Infiltration basin or approved Low Impact Development solution pursuant to Uniform Facilities Criteria (UFC) 3-210-10, *Low Impact Development*
- 50-ton air conditioner unit

Each SPCS would require the relocation of additional personnel in order to support the SPCS mission, including a sufficient number of ANG space operators and operations support personnel. SPCS #4 would require between 88 and 115 new ANG personnel in support of an offensive mission, while SPCS #5 would require the addition of between 62 and 105 ANG personnel in support of a defensive mission.

2.2 SELECTION STANDARDS

NEPA and Council on Environmental Quality regulations mandate the consideration of reasonable alternatives for the Proposed Action. “Reasonable alternatives” are those that also could be utilized to meet the purpose of and need for the Proposed Action. Per the requirements of 32 CFR Part 989, selection standards are used to identify alternatives for meeting the purpose and need for the action. In order to assess viable alternatives for the SPCS #4 and #5 basing actions, the following selection standards were applied based on identified requirements:

1. Mission:
    - ANG location requires the ability to access geosynchronous satellites over the Pacific theater and meet identified Combatant Command requirements (see **Section 2.3**)
    - Frequency spectrum must be available and compatible with C-band and Ku-band requirements
    - Aerial Port of Embarkation and Debarkation must allow for units to activate a 1:5 mobilization-to-dwell ratio. The mobilization period is calculated from the start date of involuntary activation to the date of demobilization, while the dwell period reflects period of time from the date of demobilization to the start date of the next involuntary activation.
    - Installation Deployment Readiness Cell must allow for the unit to have a maximum 72-hour deployment response time via C-17 aircraft (oversized assets cannot fit into a C-130)
    - A 15-minute External Security Response Team is required from the host Base
    - Counter Communication System federal security presence requires Protection Level 3 asset in-garrison
    - Must be collocated with a unit that has a complementary mission and operational synergies (e.g., Cyber, Space, Command and Control, Electronic Warfare, etc.)

2. Facilities for SPCS #4 and SPCS #5:

   The selected location should have sufficient space available for construction of the following facilities, or should have the following facilities already available:

   - 12,100-ft^2 building that consists of 3,000 ft^2 of administration area, 3,600 ft^2 of operational area, 5,200 ft^2 of maintenance area, and 300 ft^2 of hazardous storage area
   - Open floor plan with Secure Compartmented Information Facility space capable of accommodating personnel; facility and equipment require Protection Level 3
   - 5,000 yd^2 equipment pad with an unobstructed view of geosynchronous satellites
   - 2,500 yd^2 parking lot within 0.25 mile of facilities
   - 50-foot security clearance setback throughout perimeter of equipment pad
   - Infiltration basin or approved Low Impact Development solution pursuant to UFC 3-210-10
   - 50-ton air conditioner unit

3. Personnel: The mission requires sufficient ANG space operators and operations support personnel.
   - SPCS #4: To support an offensive mission, between 88 and 115 new ANG personnel would be required
   - SPCS #5: To support a defensive mission, between 62 and 105 new ANG personnel would be required
4. Cost: Sufficient operation and maintenance and military construction (MILCON) funds are required to provide for facility construction and upgrades to meet requirements.
5. Timing:
   - SPCS #4: Must be able to achieve Initial Operational Capability by FY22 and full operational capability by FY23
   - SPCS #5: Must be able to achieve initial operational capability by FY23 and full operational capability by FY24

     Initial operational capability is achieved when at least one UTC is equipped and trained.
     full operational capability is achieved when permanent facilities are complete.

6. U.S. Indo-Pacific Command (USINDOPACOM) and U.S. Space Command (USSPACECOM) require the unit(s) to be located within the INDOPACOM Area of Responsibility due to operational requirements for the reach of C-Band and Ku-Band communication satellites (**Figure 2-1**). This maximizes access to USINDOPACOM target sets from the Unit's home station and reduces the timeline to deploy the squadron.

2.3 SCREENING OF ALTERNATIVES

The ANG considered the following potential alternatives that might meet the purpose and need for agency action; that is, establishment of one SPCS for the offensive mission and one SPCS for the defensive mission. The candidate locations were selected based on their ability to meet identified Combatant Command requirements. Specifically, the candidate location needs to be located at an existing USINDOPACOM installation with an ANG real estate interest that has access to satellites in geosynchronous orbit over the Pacific theater, access to a C-17 capable airfield, an existing security presence, and support resources for mobilization and deployment. Subsequently, no other items were evaluated. Based on the aforementioned criteria, the following alternatives were considered on a preliminary basis (**Figure 2-2**):

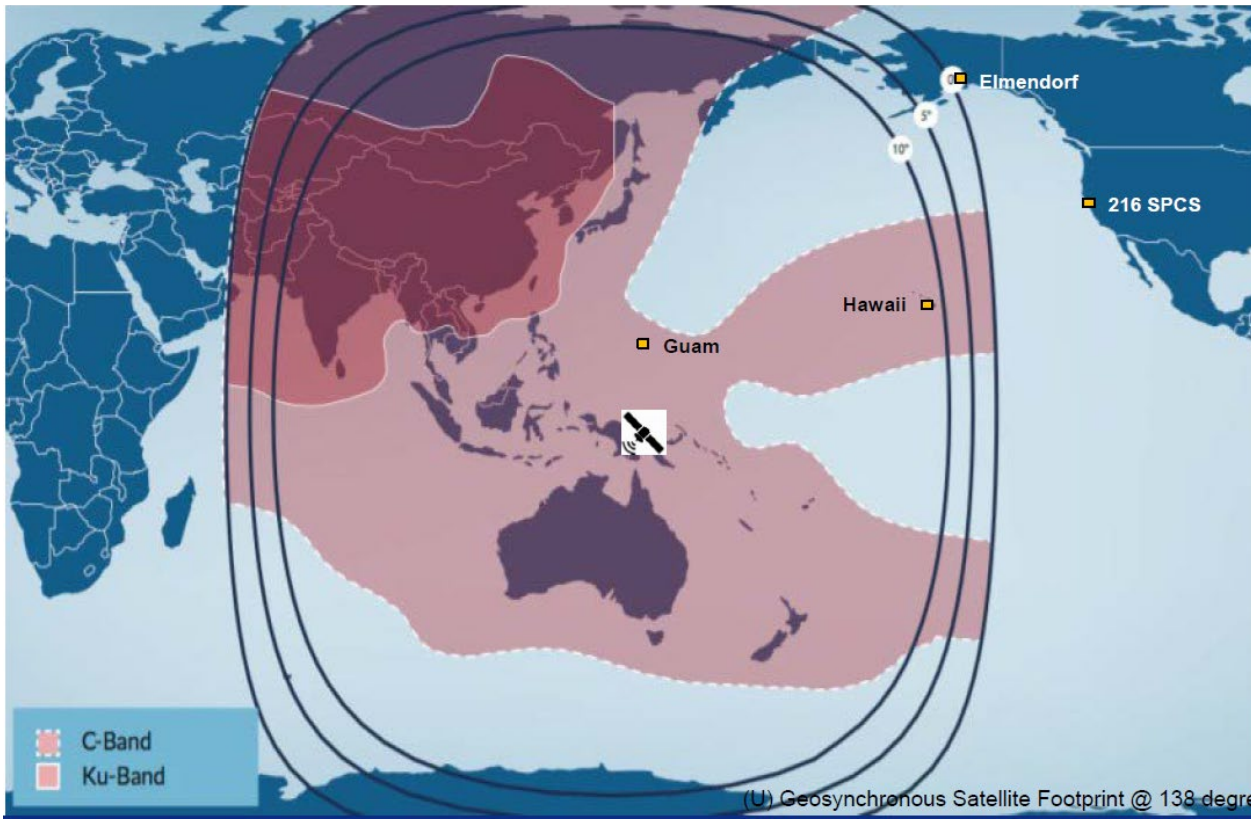

Figure 2-1 USINDOPACOM Communication Satellite Reach

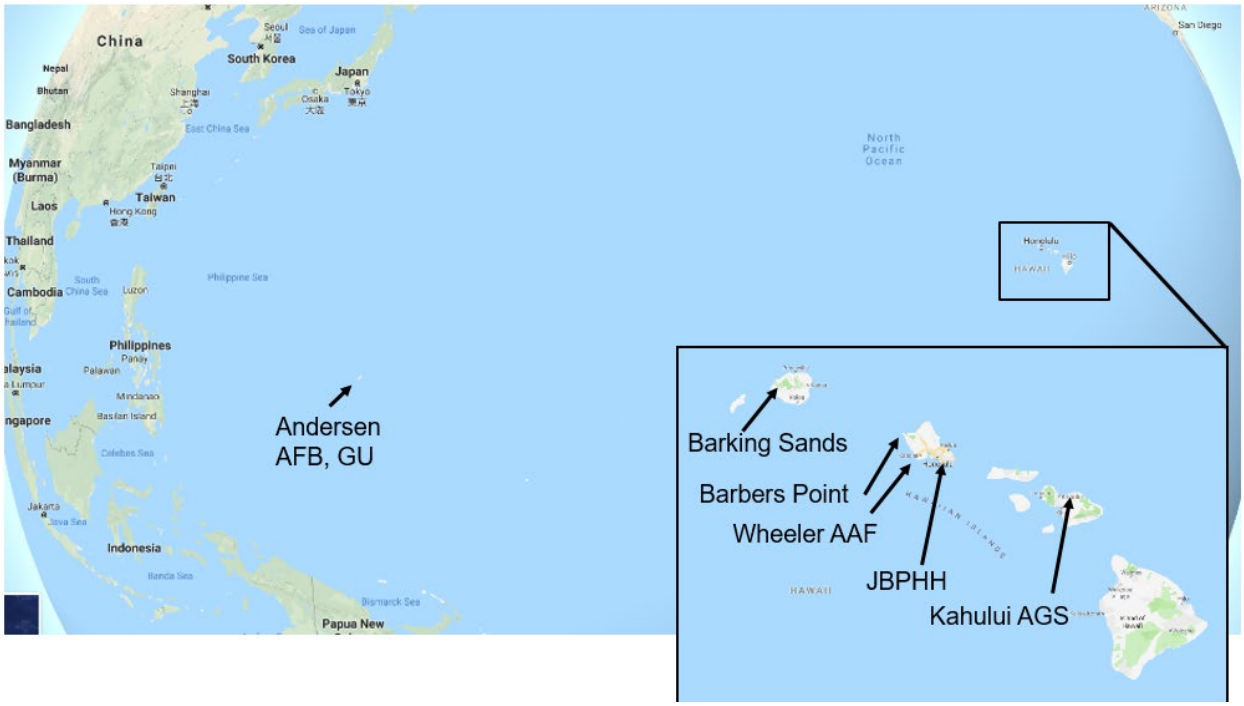

Figure 2-2 Preliminary Alternatives

- PMRF-Barking Sands (154th Wing), Kaua'i, Hawaii
- JBPHH (154th Wing), O'ahu, Hawaii
- Andersen AFB (254th Air Base Group), Guam
- U.S. Coast Guard Air Station Barbers Point, O'ahu (297th Air Traffic Control Squadron), Hawaii
- Kahului Air Guard Station, Maui (292nd Combat Communications Squadron), Hawaii
- Wheeler Army Air Field, O'ahu (169th Air Defense Squadron), Hawaii

Application of the screening criteria to the alternatives is presented in **Table 2-1**. A discussion of alternatives eliminated and carried forward are discussed in **Section 2.4** and **2.5**, respectively.

Table 2-1
Application of Selection Screening Criteria

Alternative Locations	Selection Standards						Meets Overall Requirements
	Mission	Facilities	Personnel	Cost	Timing	USINDOPACOM and USSPACECOM	
PMRF-Barking Sands	Yes	Yes	Yes	Yes	Marginal	Yes	Yes
JBPHH	Yes	Yes	Yes	Yes	Marginal	Yes	Yes
Andersen AFB	Yes	Yes	Yes	Yes	Marginal	Yes	Yes
AIRSTA Barbers Point	No	This location does not meet the criteria for the mission. Therefore, no additional selection standards were evaluated.					No
Kahului AGS	No	This location does not meet the criteria for the mission. Therefore, no additional selection standards were evaluated.					No
Wheeler Army AAF	Yes	No	This location does not meet the criteria for facilities. Therefore, no additional selection standards were evaluated.				No

AAF = Army Air Field; AFB = Air Force Base; AGS = Air Guard Station; AIRSTA = Air Station; PMRF = Pacific Missile Range Facility; JBPHH = Joint Base Pearl Harbor-Hickam; USINDOPACOM = United States Indo-Pacific Command; USSPACECOM = U.S. Space Command

2.3.1 PMRF-Barking Sands

2.3.1.1 Mission

PMRF-Barking Sands was found to meet the selection standards for mission as outlined in **Section 2.2** based on the following information:

- The PMRF-Barking Sands facility has a clear line of sight to geosynchronous satellites. The previous Combat Communications mission required the same access to geosynchronous satellites. The facility also has a built-up berm to allow access in extreme cases to low elevation satellites.
- Contact with the Base frequency manager indicates no issues with typical transmissions in the commercial satellite communications range. Detailed antenna information is available from U.S. Space Force Operations and Communications or on site at PMRF-Barking Sands.
- PMRF-Barking Sands has an airfield that is compatible with a C-17 but is limited by the number of landings per month. If necessary, the Lihue airport is available for use. The unit has its own unit deployment manager and would have support of the 154th Wing on O'ahu. The unit is equipped with necessary heavy equipment to move material and equipment to and from the airfield, and a vehicle authorization list is available.
- PMRF-Barking Sands security is mostly contract support. The local Master at Arms assured the security force is able to meet the requirement. Base security is federalized and meets the next requirement for a federal security presence.

- The HIANG has complementary missions to space control within the command in addition to existing active-duty missions on neighboring islands. Within the HIANG, there is an Intel unit on Oʻahu as well as Combat Command on Maui and the Big Island. There are also active-duty units on Oʻahu with complementary missions such as Intel and Cyber. Over drill periods, the HIANG commuting area is within the whole state.
- HIANG has supportability decision from U.S Navy Installations Command at this location. Supportability decision is a series of factors used to assess a candidate site. HIANG currently possesses real estate in the form of the former location of 293rd Combat Communications Squadron, which was deactivated in 2016.

2.3.1.2 Facilities

The HIANG requires an adequately sized and properly configured space to support a SPCS function per force structure changes identified in the FY19 Program Action Memorandum. The proposed site at PMRF-Barking Sands has sufficient land to accommodate the proposed mission. The site presently houses Combatant Command Unit layout that closed in 2016 as part of the FY13 National Defense Authorization Act divesture of the 293rd Combat Communications Squadron mission. As a result, the 25-year-old, 11,217-ft^2 facility needs repair. Renovation within the fence line is anticipated. Renovation of Building 1115 to accommodate new personnel would be necessary, including the construction of an addition of approximately 883 ft^2 to meet the facilities requirement of 12,100 ft^2. Upgrades are needed for electrical distribution system, interior/exterior lighting, fire protection system, roof and exterior envelope, interior finishes, restroom facilities, parking lot, sidewalks, fence and intrusion detection system. Construction of a hazardous materials storage facility with flammable storage locker and the addition of an air conditioning unit are also needed. Security fencing with three strands of barbed wire atop the fence would be required around the restricted area. The fence would be 640 ft long with a total of 1,920 ft of barbed wire.

2.3.1.3 Personnel

The PMRF-Barking Sands location previously housed a unit with a Unit Manpower Document of at least 105 personnel. The facility and surrounding property are adequately sized to allow modifications to ensure space for equipment and personnel.

The HIANG has successfully manned the 293rd Combat Communications Squadron at PMRF-Barking Sands utilizing full time technicians as well as Drill Status Guardsman. Recruiting and retention is unique to the HIANG compared to other states since much of their work force is geographically separated among the vast island chain. The PMRF-Barking Sands location offers an ideal location for HIANG members to be part of the space mission area. Manpower needs for SPCS #4 or #5 can be met by this location.

2.3.1.4 Cost

By using an existing facility that requires modification, there is an expected savings in both time and cost. A modest addition to the facility to accommodate the classified storage and working area for personnel and equipment is needed. When contrasted to building a new facility, cost and time dramatically increase due to several factors, such as expanded environmental, new materials, site approval, and installing utilities. With a prior tenant, operations and management is more easily planned and budgeted for future years.

2.3.1.5 Timing

Initial operational capability and full operational capability is determinate on the completion of the environmental analysis and final basing decision. All other actions can be accomplished within the proposed schedule timeline.

This location offers ample space to establish a temporary Secure Compartmented Information Facility in order to meet initial operational capability requirements while the sustainment, restoration and modernization and minor construction work is being completed. Base support services are already available to aid in unit training assembly and full-time workforce services.

2.3.1.6 USINDOPACOM and USSPACECOM

This location is within the INDOPACOM Area of Responsibility and can accommodate the operational requirements. Preliminary analysis of open-source information concludes the PMRF-Barking Sands location offers access to target satellites as well as staging capability for rapid intra-theater deployment.

2.3.2 JBPHH

2.3.2.1 Mission

HIANG has supportability decision from U.S. Navy Installations Command at this location. JBPHH offers standardized U.S. military Base support such as frequency management, airfield, and personnel support for contingency operations services needed to locate SPCS #4 or #5 at this location.

- The location has a clear line of sight to geosynchronous satellites. The previous Combat Communications mission required the same access to geosynchronous satellites. The facility also has a built-up berm to allow access in extreme cases to low elevation satellites.
- Contact with the Base frequency manager indicates no issues with typical transmissions in the commercial satellite communications range. Detailed antenna information is available from U.S. Space Force Operations and Communications.
- The location has an airfield that is compatible with a C-17 but is limited to the number of landings per month. If necessary, the Honolulu airport is available for use. The unit has its own unit deployment manager and would have support of the 154th Wing on O‘ahu. The unit is equipped with the necessary heavy equipment to move material and equipment to/from the airfield. A vehicle authorization list is available.
- JBPHH security is able to meet needs with active duty and contract support. Both also meet the need for federalized security.
- The HIANG has complementary missions to space control within the command in addition to existing active-duty missions on neighboring islands. Within the HIANG there is an Intel unit (O‘ahu) as well as Combat Comm (Maui and the Big Island) and Comm Squadron (O‘ahu). There are also active-duty units on O‘ahu with complementary missions such as Intel and Cyber. Over drill periods, the HIANG commuting area is within the whole state.

2.3.2.2 Facilities

The HIANG requires an adequately sized and properly configured space to support a SPCS function per force structure changes identified in the FY19 Program Action Memorandum. The HIANG has identified Hickam Softball Field on JBPHH as a suitable location for the proposed mission. It is bounded by Worchester Avenue/Mamala Bay Drive and in proximity of a runway operated by the Daniel K. Inouye International Airport. This site is owned by the U.S. Navy and would require a real property acquisition to allow the HIANG to beddown the proposed mission. Site surveys conducted indicated that no other facilities are available to support the proposed mission. New construction would be required to accommodate all aspects of the mission requirements as described above. Security fencing with three strands of barbed wire atop the fence would be required around the restricted area. The fence would be 640 ft long with a total of 1,920 ft of barbed wire.

2.3.2.3 Personnel

JBPHH is home to Headquarters HIANG and the 154th Wing. Over 1,900 full-time and Drill Status Guardsman are part of this organization and work on the Installation. SPCS #4 would beddown an offensive mission. To support a defensive mission, between 62 and 105 new ANG personnel would be required. SPCS #5 would beddown a defensive mission. To support an offensive mission, between 88 and 115 new ANG personnel would be required.

HIANG on JBPHH can meet the additional manpower requirements for both ANG SPCS #4 and #5.

2.3.2.4 Cost

Operations and management funds can be budgeted and planned for using existing units as a baseline. To build a new facility, cost estimate for a new facility is needed by the appropriate agency. In order for the JBPHH location to meet this requirement, MILCON funding must be secured to construct a new facility.

2.3.2.5 Timing

This site would create hurdles to complete initial operational capability by FY22 and full operational capability by FY23. A temporary location is required to minimize an impact to initial operational capability.

For new construction, a more realistic timeline places initial operational capability into 2025. Currently, there is no temporary location available to house and train personnel.

Additional space on JBPHH must be obtained to establish a temporary Secure Compartmented Information Facility while MILCON is performed. Initial operational capability requirements dictate a facility must be in place in order to conduct training operations at the appropriate classification level. Base support services are already available to aid in unit training assembly and full-time workforce services.

2.3.2.6 USINDOPACOM and USSPACECOM

This location is within the INDOPACOM Area of Responsibility and is able to accommodate the operational requirements. Preliminary analysis of open-source information concludes the JBPHH location offers access to target satellites as well as staging capability for rapid intra-theater deployment.

2.3.3 Andersen AFB

2.3.3.1 Mission

Andersen AFB meets the mission requirements because it offers standardized U.S. military Base support such as frequency management, airfield, and personnel support for contingency operations services needed to locate SPCS #4 or #5 at this location.

2.3.3.2 Facilities

The Guam Air National Guard (GUANG) requires a large enough site on Andersen AFB to adequately beddown a SPCS function in accordance with force structure changes identified by the FY19 Program Action Memorandum. The 36th Wing Commander offered the GUANG a site that is approximately five acres in size to accommodate the proposed mission requirements. The site is on Andersen AFB proper near the Base Exchange, which is bounded by New York Avenue, 4th Street, Mobile Avenue, and 5th Street. The area has sufficient open space to allow for up to 10 acres in the event that additional space is required. New MILCON would be required to accommodate all aspects of the mission requirements as described above. Site surveys conducted indicate that no other facilities are available to support initial operational capability by FY22. Space Control MILCON has been submitted into the FY21 President's Budget Commitment to Congress of FY21 construction contract award. A new GUANG facility at Andersen AFB is required to accommodate proposed mission requirements. The proposed site is owned by the U.S. Navy and would require a real property acquisition to allow the GUANG to beddown the proposed mission.

2.3.3.3 Personnel

Andersen AFB is home to the GUANG and 254th Air Base Group. Given the current positive engagement by local civilian and military leaders who embrace a space mission as part of their organization, no significant impacts to manning either SPCS #4 or #5 are foreseen.

2.3.3.4 Cost

Space Control MILCON has been submitted into the FY21 President's Budget Commitment to Congress of FY21 construction contract award. A new GUANG facility at Andersen AFB is required to accommodate proposed mission requirements.

2.3.3.5 Timing

Additional space on Andersen AFB must be obtained to establish a TSIC facility while MILCON is performed. initial operational capability requirements dictate a facility must be in place in order to conduct training operations at the appropriate classification level. Base support services are already available to aid in unit training assembly and full-time workforce services. Training of initial cadre of weapon system operators may require travel to a Regular Air Force unit while Guam training capability is being stood up.

2.3.3.6 USINDOPACOM and USSPACECOM

This Installation is centrally located within the INDOPACOM Area of Responsibility and is able to accommodate the operational requirements. A look angle site survey was conducted for the proposed beddown location. No significant line-of-sight interference was documented which would prevent access to target satellites. Staging capability for rapid intra-theater deployment is confirmed.

2.3.4 U.S. Coast Guard Air Station Barbers Point, O'ahu, HI (297th Air Traffic Control Squadron)

U.S. Coast Guard Air Station Barbers Point is a non-DoD installation. The Installation is unable to accommodate a Protection Level 3 security presence and therefore does not meet the mission requirements.

2.3.5 Kahului Air Guard System, Maui, HI (292nd Combat Communications Squadron)

Kahului Air Guard System has a restricted geosynchronous belt view due to mountains located on both sides of the Installation and therefore does not meet the mission requirements.

2.3.6 Wheeler Army Air Field, O'ahu, HI (169th Air Defense Squadron)

2.3.6.1 Mission

Wheeler Army Air Field was found to meet the mission requirements. The Wheeler Army Air Field facility has a clear line of sight to geosynchronous satellites. There are no known issues with typical transmissions in the commercial satellite communications range. Wheeler Army Air Field is compatible with a C-17 landing and is equipped with necessary heavy equipment to move material and equipment to and from the airfield, and a vehicle authorization list is available. The existing security force is able to meet the requirement for a federal security presence. Wheeler Army Air Field has complementary missions currently at the Installation.

2.3.6.2 Facilities

Wheeler Army Air Field was determined not to have sufficient land area on the Installation to support the proposed basing actions and therefore does not meet the facilities requirements.

2.4 DETAILED DESCRIPTION OF THE SELECTED ALTERNATIVES

2.4.1 Alternative A: PMRF-Barking Sands (Preferred Alternative for SPCS #4)

The proposed SPCS location at HIANG is located completely within PMRF-Barking Sands. The site is bounded on three sides by PMRF-Barking Sands and on the other by Kawai'ele Bird Sanctuary (**Figure 2-3**). The site is located approximately 0.7 mile north of the intersection of Tartar Drive and North Sidewinder Road. In 2008, the HIANG's 293rd's Combat Communications Squadron's command element and half of its assigned manpower were transferred to the U.S. Navy's PMRF-Barking Sands to replace the inactivating 154th Air Control Squadron as the HIANG lead command and control element for any natural or human-caused disasters on the Island of Kaua'i. The 293rd Combat Communications Squadron was divested in the FY13 National Defense Authorization Act and inactivated in 2016. At present, the HIANG facility is not actively being used for mission activities. PMRF-Barking Sands is the preferred alternative for SPCS #4 offensive mission because it can support the higher manpower requirement associated with the offensive mission. It is the first reasonable alternative for SPCS #5 defensive mission.

2.4.2 Alternative B: JBPHH

JBPHH is home to Headquarters HIANG and the 154th Wing. Over 1,900 full time and Drill Status Guardsman are part of this origination and work on the Installation. The HIANG has identified Hickam Softball Field on JBPHH as a suitable location for the proposed mission (**Figure 2-4**). The site is bounded by Worchester Avenue/Mamala Bay Drive and in proximity of a runway operated by the Daniel K. Inouye International Airport. This site is owned by the U.S. Navy and would require a real property acquisition to allow the HIANG to beddown the proposed mission. Site surveys conducted indicated that no other facilities are available to support the proposed mission. JBPHH is the second reasonable alternative for both SPCS #4 offensive mission and SPCS #5 defensive mission because it is capable of supporting either mission but had some preliminary environmental concerns.

2.4.3 Alternative C: Andersen AFB (Preferred Alternative for SPCS #5)

The site on Andersen AFB identified by 36th Wing Command Center for the Proposed Action is approximately five acres in size and is located near the Base Exchange, which is bounded by New York Avenue, 4th Street, Mobile Avenue, and 5th Street on Andersen AFB proper (**Figure 2-5**). The area has sufficient open space to allow for up to 10 acres in the event that additional space is required. Site surveys conducted indicate that no other facilities are available to support initial operational capability by FY22. Space Control MILCON has been submitted into the FY21 President's Budget Commitment to Congress of FY21 construction contract award. A new GUANG facility at Andersen AFB is required to accommodate

Figure 2-3 Alternative A: Pacific Missile Range Facility-Barking Sands

Figure 2-4 Alternative B: Joint Base Pearl Harbor-Hickam

Figure 2-5 Alternative C: Andersen Air Force Base

proposed mission requirements. The proposed site is owned by the U.S. Navy and would require a real property acquisition to allow the GUANG to beddown the proposed mission. Andersen AFB is the preferred alternative for SPCS #5 defensive mission because it is better suited to support the lower manpower requirement associated with the defensive mission. It is the first reasonable alternative for SPCS #4 offensive mission.

2.4.4 No Action Alternative

Selection of the No Action Alternative would result in no basing decision resulting for either SPCS #4 or SPCS #5. NEPA requires an EA to analyze the No Action Alternative in accordance with 40 CFR 1502.14. Analysis of the No Action Alternative provides a benchmark, enabling decision-makers to compare the magnitude of the potential environmental effects of the Proposed Action. No action at each location would be expected to correspond with no environmental effect to each resource area.

2.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The potential impacts associated with the Proposed Action and the No Action Alternative are summarized in **Table 2-2**. The summary is based on information discussed in detail in Chapter 3 (Affected Environment and Environmental Consequences) of the EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each action alternative.

Table 2-2
Summary of Environmental Consequences

Resource Area	Alternatives			
	Proposed Action			No Action Alternative
	Alternative A PMRF-Barking Sands	Alternative B JBPHH	Alternative C Andersen AFB	
Noise	Negligible impacts	Negligible impacts	Negligible impacts	No change to noise setting at any installation
Safety	Negligible impacts	Negligible impacts	Negligible impacts	No change to ground or radiofrequency safety at any installation
Air Quality	Negligible impacts	Negligible impacts	Negligible impacts	No change to air quality at any installation
Biological Resources	The Proposed Action is not likely to adversely affect waterbirds, the Hawaiian hoary bat, Hawaiian seabirds, and the Hawaiian goose (nēnē) with adherence to the terms of the 2014 and 2018 biological opinions and implementation of mitigation measures. Negligible, short-term impacts to wildlife.	The Proposed Action is not likely to adversely affect waterbirds or the Hawaiian hoary bat. Negligible, short-term impacts to wildlife and vegetation.	The Proposed Action is not likely to adversely affect the Mariana fruit bat. Negligible, short-term impacts to wildlife and vegetation.	No change to biological resources at any installation
Water Resources	Negligible impacts to water resources would occur with the use of appropriate BMPs to control erosion and sedimentation. CZMA consistency determination is not required. No impacts to wetlands or floodplains.	Negligible impacts to water resources would occur with the use of appropriate BMPs to control erosion and sedimentation. CZMA consistency determination is not required. No impacts to wetlands or floodplains.	Negligible impacts to water resources would occur with the use of appropriate BMPs to control erosion and sedimentation. CZMA consistency determination is not required. No impacts to wetlands or floodplains.	No change to water resources at any installation
Geological Resources	Negligible impacts to geological resources would occur with the use of appropriate BMPs to control erosion and sedimentation.	Negligible impacts to geological resources would occur with the use of appropriate BMPs to control erosion and sedimentation.	Negligible impacts to geological resources would occur with the use of appropriate BMPs to control erosion and sedimentation.	No change to geological resources at any installation

Resource Area	Alternatives			
	Proposed Action			No Action Alternative
	Alternative A PMRF-Barking Sands	Alternative B JBPHH	Alternative C Andersen AFB	
Land Use	Negligible impacts	Negligible impacts	Negligible impacts	No changes to land use at any installation
Socioeconomics	Based on current personnel projections, sufficient housing currently exists on PMRF-Barking Sands for the relocation of personnel associated with the proposed SPCS.	Negligible impacts	Negligible impacts	No change to socioeconomic conditions at any installation
Environmental Justice and Protection of Children	Negligible impacts. Vacancy rates in Kaua'i County are sufficient to support housing additional personnel off-post, preventing disproportionate impacts to minorities, low-income populations, and children.	Negligible impacts. Vacancy rates in Honolulu County are sufficient to support housing additional personnel off-post, preventing disproportionate impacts to minorities, low-income populations, and children.	Negligible impacts. Vacancy rates in Yigo and Guam are sufficient to support housing additional personnel off-post, preventing disproportionate impacts to minorities, low-income populations, and children.	No disproportionate impacts for minority, low-income, or children in the community at any installation
Cultural Resources	Negligible impacts	Negligible impacts	Negligible impacts	No change to cultural resources at any installation
Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances	Negligible impacts	Negligible impacts. The proposed SPCS site borders a closed IRP site, but no impacts are anticipated.	Andersen AFB is classified as a Superfund site and is located in an area with elevated radon levels. Facilities constructed on the site would likely require radon mitigation measures.	No change to hazardous materials and wastes, contaminated sites, or toxic substances at any installation
Infrastructure, Transportation, and Utilities	Negligible impacts	Negligible impacts	Negligible impacts	No change to infrastructure, transportation, or utilities at any installation

AFB = Air Force Base; BMP = best management practice; CZMA = Coastal Zone Management Act; IRP = Installation Restoration Program; PMRF = Pacific Mission Range Facility; SPCS = Space Control Squadron

2.6 ENVIRONMENTAL COMMITMENTS

This EA was prepared under the assumption that the following management actions would be followed in order to avoid and minimize impacts to environmental resources. The appropriate personnel at each installation would be responsible for ensuring that the following management actions are implemented.

2.6.1 Air Quality

- Employ standard management measures such as watering of graded areas, covering soil stockpiles, and contour grading (if necessary) to minimize temporary generation of fugitive dust and particulate matter during construction activities.
- Limit idling time for diesel-powered highway and nonroad vehicles and engines used in construction except as necessary for safety, security, or to prevent damage to property.

2.6.2 Biological Resources

- Obtain approval by the Navy before bringing and planting vegetation on Installation to avoid the introduction of invasive species.
- Avoid approaching, feeding, or otherwise disturbing nēnē.
- Survey for nēnē nests if nēnē are observed within the project area during breeding season (September through April).
- Ensure all equipment brought on and/or removed from PMRF-Barking Sands is free of all dirt, debris, straw, and other such materials.
- Adhere to the terms of the PMRF-Barking Sands Biological Opinion (BO) and do not plant new grass or water existing grass.
- Adhere to all the terms of all applicable BOs in order to minimize potential impacts to threatened and endangered species.
- Clean off-site equipment and vehicles prior to use on site in order to limit the potential for introduction of invasive species to the ROI. Fill dirt, straw, and any plantings must also be checked for evidence of invasive non-native plants.
- Check drainage inlets and outlets before and after storm events to remove any debris that would prevent water from flowing off site in order to minimize ponding of water on the parcel. In the rare cases where standing water may occur, employ a leaf blower or other such equipment to move the water. If needed, place a tarp over the ponding water to remove any possible attraction to the area.
- Train all project personnel on the presence of ESA-listed species on PMRF-Barking Sands and the importance of adhering to posted speed limits to avoid collision with protected species.
- Inform contractors and personnel of the potential presence of endangered waterbirds on site. Notify Natural Resources staff if endangered waterbirds are observed on site.
- Cease outside work if a Hawaiian waterbird or Hawaiian goose nest is discovered within a radius of 46 meters (150 feet) of proposed construction work or a previously undiscovered nest is found within that radius after work begins.
- Develop a vegetation maintenance plan, including a mowing schedule, for PMRF-Barking Sands, paying specific attention to the vegetated areas along the northeastern boundary to ensure the vegetation does not grow to a height that is attractive to the nēnē for nesting.

2.6.3 Water Resources

- Follow recommended best management practices (BMPs) for soil erosion and sedimentation prevention as required by each installation's specific requirements.
- Install and maintain entrenched silt fencing and straw bales or straw/coconut husk waddles along the perimeter of the construction site prior to any ground-disturbing activities and

maintain them in effective working order through the construction process to prevent fill material, pollutants, and runoff from entering wetlands or other surface waters.

- Incorporate a stormwater pollution prevention plan (SWPPP) to observe the effectiveness of silt fencing, straw bales or straw/coconut husk waddles, and other erosion and sedimentation control devices and address deficiencies accordingly.

2.6.4 Geological Resources

- Implement a site-specific SWPPP to minimize any unnecessary soil erosion that could occur during construction.

2.6.5 Cultural Resources

In the unlikely event of an inadvertent discovery of human remains or cultural resources, the ANG would take the following actions:

- Leave in place and immediately report to the installation Cultural Resources Management team any archaeological artifacts discovered. Construction or demolition activities would cease and efforts to protect the resource from further impact would be taken.
- Cease construction and operational activities and immediately notify the Cultural Resources Management team in the event of the discovery of potential Native Hawaiian artifacts and/or remains.
- Conduct archaeological monitoring during construction activities as needed.
- Follow existing historic preservation agreements.

2.6.6 Hazardous Materials and Hazardous Waste

- Manage hazardous materials/waste in accordance with all applicable environmental compliance regulations and installation environmental management plans.
- Adhere to Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention*, and existing tracking and reporting requirements as presented in the *Hazardous Waste Management Plan*.
- Recycle nonhazardous solid waste generated from construction activities to the extent possible.
- Equip all construction sites with adequate waste disposal receptacles for solid, liquid, and hazardous wastes to prevent construction and demolition debris from leaving the work site.

2.7 MITIGATION MEASURES

NGB would implement the following mitigation measures at PMRF-Barking Sands to ensure that the Proposed Action meets commitments identified during consultation with USFWS:

- Set up a program to provide training to construction and ANG personnel when during onboarding and then annually regarding Hawaiian waterbirds, Hawaiian seabirds, and the nēnē.
- Develop a mowing plan to ensure vegetation does not grow to a height that is attractive to the nēnē for nesting.
- Implement the lighting design plan (described in Section 3.3.4.2) to reduce impacts to Hawaiian seabirds.
- During construction of the SPCS facility, do not disturb, remove, or trim woody plants or trees greater than 15 feet tall during the Hawaiian hoary bat birthing and pup-rearing season (June 1 through September 15).

CHAPTER 3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

3.1 DEFINITIONS OF THE RESOURCES

3.1.1 Noise

Noise is undesirable sound that interferes with verbal communication and hearing or is otherwise annoying (unwanted sound). Sound pressure level, described in decibels, is used to quantify sound intensity. Sound level measurements used to characterize sound levels sensed by the human ear are designated "A-weighted" decibels (dBA). **Table 3-1** outlines noise levels used to characterize community noise effects from activities.

Table 3-1
Noise Levels of Common Locations and Items

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway Train
Tractor	90	Garbage Disposal
Noisy Restaurant	85	Blender
Downtown (large city)	80	Ringing Telephone
Freeway Traffic	75	TV Audio
Very Noisy Urban Residential Area	70	Hair Dryer
Noisy Urban Residential Area	65	Vacuum
Normal Conversation	60	Sewing Machine
Suburban Residential Area	55	Coffee Pot
Rainfall	50	Refrigerator
Quiet Residential Area	40	Library

dBA = A-weighted decibel

The *Noise Control Act of 1972* (Public Law 92-574) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the U.S. Environmental Protection Agency (USEPA) provided information suggesting continuous and long-term noise levels greater than 65 dBA are normally unacceptable for noise-sensitive receptors such as residences, schools, churches, and hospitals.

3.1.2 Safety

This section considers safety concerns related to ground activities and electromagnetic radiation and radiofrequency (RF). Ground safety considers issues associated with ground operations and maintenance activities that support unit operations, including arresting gear capability, jet blast/maintenance testing, and safety danger. Aircraft maintenance testing occurs in designated safety zones. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. Clear Zones and Accident Potential Zones (APZs) around the airfield restrict the public's exposure to areas where there is a higher accident potential.

Ground safety includes several categories, such as ground and industrial operations, operational activities, and motor vehicle use. Mishaps can occur from using equipment or materials and maintenance functions. Day-to-day operations and maintenance activities are performed in accordance with applicable USAF safety regulations, published USAF Technical Orders, and standards prescribed by Air Force Occupational Safety and Health requirements identified within Air Force Instruction (AFI) 91-202 (2019), *The U.S. Air Force Mishap Prevention Program*, and AFMAN 91-203 (2018), *Air Force Occupational Safety, Fire, and Health Standards*.

3.1.3 Air Quality

3.1.3.1 Air Quality Program Overview

Under the authority of the Clean Air Act of 1963 (42 U.S.C. § 7401) (CAA) and subsequent amendments, the USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Based on the limited

geographic size of the State of Hawaii, the entire state has been designated as State of Hawaii (SOH) AQCR (40 CFR § 81.76). Similarly, due to its limited geographic size, the entire Territory of Guam has been designated as Guam AQCR 246 (40 CFR Part 81, Appendix A).

3.1.3.2 Criteria Pollutants

In accordance with CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. Measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). Regional air quality is a result of the types and quantities of atmospheric pollutants and pollutant sources in an area as well as surface topography and prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards (i.e., NAAQS) for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA. The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. NAAQS are currently established for the criteria air pollutants ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulate matter (including coarse particulates equal to or less than 10 microns in diameter [PM_{10}] and fine particulates equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead.

The USEPA has recognized that particulate matter emissions can have different health effects depending on particle size; therefore, USEPA developed separate NAAQS for coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). The pollutant $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter, typically forming nitrate and sulfate compounds. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there, and thus which precursors are considered significant for $PM_{2.5}$ formation and identified for ultimate control.

Ozone is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides and volatile organic compounds (VOCs) that are directly emitted from a wide range of emission sources. For this reason, regulatory agencies limit atmospheric ozone concentrations by controlling volatile organic compound pollutants (also identified as reactive organic gases) and nitrogen oxides.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states, territories, and local agencies. As such, each state or territory must develop air pollutant control programs and promulgate rules and regulations that must be equivalent to, or more stringent than, the federal NAAQS. Under this authority, Guam EPA oversees Guam's air pollution control program, and the SOH Department of Health (DOH) Clean Air Branch (CAB) oversees SOH's air pollution control program. Guam EPA and DOH CAB have adopted local ambient air quality standards that are more stringent than the federal NAAQS for some criteria pollutants. The federal and local standards for the SOH and Territory of Guam are shown in **Table 3-2**.

When a region or area meets a NAAQS for a criteria pollutant, that region or area is classified as "attainment" for that pollutant. When a region or area fails to meet a NAAQS for a criteria pollutant, that region or area is classified as "nonattainment" for that pollutant. In cases of nonattainment, the affected state, territory, or local agency must develop a state implementation plan that is subject to USEPA review and approval. A state implementation plan is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, or controls) must be incorporated into the state implementation plan and approved by USEPA.

Table 3-2
National and Local Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS		Local Standards	
		Primary Standard	Secondary Standard	State of Hawaii	Guam
Carbon monoxide	8-hour[a]	9 ppm	-	4.4 ppm	NAAQS
	1-hour[a]	35 ppm	-	9 ppm	NAAQS
Nitrogen dioxide	Annual[c]	0.053 ppm	0.053 ppm	0.04 ppm	0.05 ppm
	1-hour[d]	0.100 ppm	-	NAAQS	NAAQS
Ozone	8-hour[e]	0.070 ppm	0.070 ppm	0.075 ppm	NAAQS
	1-hour[f]	-	-	-	0.12 ppm
Lead	3-month[g]	0.15 µg/m^3	0.15 µg/m^3	NAAQS	NAAQS
PM_{10}	Annual[h]	-	-	50 µg/m^3	-
	24-hour[i]	150 µg/m^3	150 µg/m^3	NAAQS	NAAQS
$PM_{2.5}$	Annual[j]	12 µg/m^3	15 µg/m^3	NAAQS	NAAQS
	8-hour	-	-	-	24.3 µg/m^3
	24-hour[k]	35 µg/m^3	35 µg/m^3	NAAQS	NAAQS
Sulfur dioxide	1-hour[l]	0.075 ppm	-	NAAQS	NAAQS
	3-hour[a]	-	0.5 ppm	NAAQS	NAAQS
	4-hour[m]	-	-	-	0.25 ppm
	24-hour[n]	-	-	0.14 ppm	0.12 ppm
	Annual	-	-	0.03 ppm	0.02 ppm
Hydrogen sulfide[i]	1-hour	-	-	0.025 ppm	-

Sources: USEPA 2021a; DOH CAB, 2021; 22 Guam Administrative Rule, Division II, Chapter 1
Notes:
a. Second highest non-overlapping 8-hour average not to be exceeded more than once in a year.
b. Maximum 1-hour concentration not to be exceeded more than once in a year.
c. Annual arithmetic mean.
d. In February 2010, the USEPA established a new 1-hour standard for nitrogen dioxide at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.
e. In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas.
f. In November 2008, USEPA revised the primary lead standard to 0.15 µg/m^3. USEPA revised the averaging time to a rolling 3-month average; the SOH 3-month averaging time is based on calendar quarter.
g. Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the USEPA revoked the annual PM_{10} standard effective 2006 December 17; however, the SOH has retained an annual PM_{10} standard.
h. In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standard to 35 µg/m^3 and retained the level of the annual $PM_{2.5}$ standard at 15 µg/m^3. In 2012, USEPA split standards for primary and secondary annual $PM_{2.5}$. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM_{10}.
i. Territory of Guam maximum 8-hour concentration not to be exceeded more than once in a year.
j. In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, the USEPA established a new 1-hour sulfur dioxide standard at a level of 75 ppb based on the 3-year average of the annual 99th percentile.
k. Maximum 4-hour concentration not to be exceeded more than once in a year.
l. Maximum 24-hr concentration not to be exceeded more than once in a year.
NAAQS = National Ambient Air Quality Standards; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; µg/m^3 = microgram(s) per cubic meter; ppb = part(s) per billion; ppm = part(s) per million; SOH = State of Hawaii; USEPA = United States Environmental Protection Agency

The CAA required that USEPA draft general conformity regulations that are applicable in nonattainment areas or in designated maintenance areas (i.e., attainment areas that were reclassified from a previous nonattainment status and are required to prepare a maintenance plan for air quality). Alternatives A, B, and C are all in attainment areas of all NAAQS.

Title I of the CAA Amendments of 1990 (Public Law 101-549) requires the federal government to reduce emissions from the combustion of fuels for transportation, utilities, and industries as well as to curb emissions from industrial and commercial sources to address urban air pollution problems of ozone, carbon monoxide, and PM_{10}. Under Title I, the federal government is tasked with developing the technical guidance that states need to control stationary sources of pollutants. Title I also allows the USEPA to define

boundaries of nonattainment areas. Title V of the CAA Amendments of 1990 requires state and local agencies to implement permitting programs for major stationary sources.

Title V of the CAA Amendments of 1990 requires state and local agencies to implement permitting programs for major stationary sources. A major stationary source is defined under Title V as a facility (e.g., plant, Base, activity) that has the potential to emit more than 100 tons annually of any one criteria air pollutant, 10 tons per year (tpy) of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants; however, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if a proposed project's net emission increase meets or exceeds the rate of emissions listed in 40 CFR § 52.21(b)(23)(i); or (1) a proposed project is within 10 kilometers (km) of any Class I area (wilderness area greater than 5,000 ac or national park greater than 6,000 ac).

3.1.3.3 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and contribute to global climate change. GHGs include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential, which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The global warming potential of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. Carbon dioxide has a global warming potential of 1 and is therefore the standard by which all other GHGs are measured. The GHGs are multiplied by their global warming potential, and the resulting values are added together to estimate the total CO_2e.

On Guam and in the SOH, the USEPA regulates GHG primarily through a permitting program called the GHG Tailoring Rule. This rule applies to GHG emissions from larger stationary sources. Also, the USEPA promulgated a rule for large GHG emission stationary sources, fuel and industrial gas suppliers, and carbon dioxide injection sites if they emit 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2[a][2]).

3.1.4 Biological Resources

3.1.4.1 Endangered Species Act

The ESA of 1973 (16 U.S.C. § 1531 et seq.) established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by the USFWS and the NMFS. Under the ESA (16 U.S.C. § 1536), an "endangered species" is defined as any species in danger of extinction throughout all, or a large portion, of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS maintains a list of species considered to be candidates for possible listing under the ESA. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection under the ESA.

3.1.4.2 Migratory Bird Treaty Act

The *Migratory Bird Treaty Act of 1918* (MBTA) (16 U.S.C. § 703) makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR § 10.12). Birds protected under the MBTA include nearly all species in the U.S. with the exception of non-native/human-introduced species and some game birds.

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires all federal agencies undertaking activities that may negatively impact migratory birds to follow a prescribed set of actions to further implement MBTA. EO 13186 directs federal agencies to develop a memorandum of understanding with the USFWS that promotes the conservation of migratory birds.

The *National Defense Authorization Act for Fiscal Year 2003* (Public Law 107-314, 116 Stat. 2458) provided the Secretary of the Interior the authority to prescribe regulations to exempt the armed forces from the incidental take of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the U.S. armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Further, in October of 2012, the Authorization of Take Incidental to Military Readiness Activities was published in the *Federal Register* (50 CFR § 21.15), authorizing incidental take during military readiness activities unless such activities may result in significant adverse effects on a population of a migratory bird species.

3.1.4.3 Invasive Species

EO 13751, *Safeguarding the Nation from the Impacts of Invasive Species*, defines an invasive species, with regard to a particular ecosystem, as "a non-native organism whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health." Invasive species are highly adaptable and oftentimes displace native species. The characteristics that enable them to do so include high reproduction rates, resistance to disturbances, lack of natural predators, efficient dispersal mechanisms, and the ability to out-compete native species.

3.1.5 Water Resources

The water resource discussed in this section is surface water, which includes all lakes, ponds, rivers, streams, and coastal zones; groundwater; stormwater; wetlands; and floodplains within a defined area. Because each of the Alternatives is located on an island, this section also describes water resources pertaining to the ocean environment, including storms, tides, and potential flooding, as applicable. Floodplains are included in the discussion due to their relationship to surface water quality, and groundwater quality and quantity. Surface water may be affected by stormwater infiltration and runoff generated during precipitation events. Water resources are vulnerable to contamination and quality degradation. For this reason, the *Federal Water Pollution Control Act*, as amended by the CWA, was enacted to protect these valuable, irreplaceable resources. The *Water Pollution Prevention and Control Act* (33 U.S.C. § 26), also known as the CWA Amendments, set the national policy objective to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA provides the authority to establish water quality standards, control discharges into surface and subsurface waters (including groundwater), develop waste treatment management plans and practices, and issue permits for discharges.

3.1.5.1 Surface Water

USEPA defines surface waters as waters of the U.S., which are primarily lakes, rivers, estuaries, coastal waters, and wetlands. Jurisdictional waters, including surface water resources, as defined in 33 CFR § 328.3, are regulated under Sections 401 and 404 of the CWA and Section 10 of the *Rivers and Harbors Act*. Man-made features not directly associated with a natural drainage, such as upland stock ponds and irrigation canals, are generally not considered jurisdictional waters.

3.1.5.2 Coastal Zones

The CZMA (16 U.S.C. §§ 1451–1464 [Public Law 92-583]) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Section 307 of the CZMA stipulates that where a federal actions with reasonably foreseeable effects to any coastal use or resource (land or water use, or natural resource) must be consistent to the maximum extent practicable with enforceable policies of the state's federally approved coastal management plan. Hawaii and Guam are considered to be part of the coastal zone and are subject to the requirements of the CZMA.

3.1.5.3 Groundwater

Groundwater is water that exists in the saturated zone beneath the earth's surface in pore spaces and fractures and includes aquifers. Groundwater is recharged through percolation of water on the ground's surface (e.g., precipitation and surface water bodies) and upward movement of water in lower aquifers through capillary movement. Groundwater is an essential resource that can be used for drinking, irrigation, and industrial processes, and can typically be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. Groundwater quality and quantity are regulated under several different programs. The federal underground injection control regulations, authorized under the *Safe Drinking Water Act*, require a permit for the discharge or disposal of

fluids into a well. The federal Sole Source Aquifer regulations, also authorized under the *Safe Drinking Water Act*, protect aquifers that are critical to water supply.

3.1.5.4 Stormwater

Stormwater (surface runoff generated from precipitation and snowmelt events) has the potential to introduce sediments and other pollutants into surface waters and is regulated under the CWA Section 402 National Pollutant Discharge Elimination System (NPDES) program. Stormwater management, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics. Prolonged increases in stormwater volume and velocity associated with development and increased impervious surfaces has potential to impact adjacent streams as a result of stream bank erosion and channel widening, or down cutting associated with the adjustment of the stream to the change in flow characteristics.

Stormwater management systems are typically designed to contain runoff on site during construction, and to maintain predevelopment stormwater flow characteristics following development through either the application of infiltration or retention practices. Section 438 of the *Energy Independence and Security Act* (42 U.S.C. § 17094) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 ft^2 must maintain or restore, to the maximum extent technicallyfeasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.

3.1.5.5 Wetlands

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, sediment detention, erosion protection, and wildlife habitat. Wetlands are protected as a subset of “Waters of the United States” under Section 404 of the CWA. The term “Waters of the United States” has a broad meaning under the CWA and in addition to navigable waters, incorporates deep-water aquatic habitats and wetlands. Section 404(b)(1) of the CWA directs the USEPA to develop guidelines for the placement of dredged or fill material (33 U.S.C. § 1341[b]). These USEPA guidelines are known as the “404(b)(1) Guidelines” and are located at 40 CFR Part 230. The stated purpose of the Guidelines is to “restore and maintain the chemical, physical, and biological integrity of waters of the U.S. through the control of discharges of dredged or fill material” 40 CFR § 230.1(a).

EO 11990, *Protection of Wetlands,* directs agencies to consider alternatives to avoid adverse effects and incompatible development in jurisdictional or non-jurisdictional wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to minimize impacts to the wetland.

3.1.5.6 Floodplains

Floodplains are areas of low-level ground along rivers, stream channels, or coastal waters that provide a broad area to inundate and temporarily store floodwaters. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. This functions to moderate flood peak flows, decrease erosion, maintain water quality, and provide flood storage, conveyance, and groundwater recharge. Floodplains are subject to periodic or infrequent inundation due to rain or snowmelt. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain.

The Federal Emergency Management Agency (FEMA) evaluates and maps flood potential, which defines the 100-year (regulatory) flood zone (i.e., floodplain). The 100-year floodplain is the geographic area that has a one-percent chance of inundation by a flood event in a given year. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, provides guidelines that agencies should carry out as part of their decision-making process on projects that have potential impacts to or within the floodplain. This EO requires that federal agencies avoid, to the extent possible, the long- and short-term, adverse impacts associated with the occupancy and modification of flood plains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative. EO 13690, *Establishing a Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, signed in January 2015, established a federal Flood Risk Management Standard and a process for further soliciting and considering

stakeholder input; however, this EO was revoked in 2017 by Section 6 of EO 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure*. EO 13807 did not revoke or otherwise alter EO 11988.

In order to determine the potential future exposure of each of the main Hawaiian islands to multiple coastal hazards as a result of possible future sea-level rise (SLR), the University of Hawaii Coastal Geology Group has created a model that maps the projected extent of chronic flooding associated with SLR. The worst-case scenario currently modeled includes an SLR of 3.2 feet.

3.1.6 Geological Resources

Geological resources consist of surface and subsurface materials and their properties. Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use. Topography is the change in elevation over the surface of a land area, and is influenced by factors including human activity, underlying geologic material, seismic activity, climatic conditions, and erosion. Because each of the Alternatives is located on an island, this section also describes geological resources related to the formation of the islands, such as volcanoes or similar tectonic influences.

Prime farmland is protected under the *Farmland Protection Policy Act* (FPPA) of 1981 and is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The intent of the FPPA is to minimize the extent that federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The implementing procedures of the FPPA and U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) require federal agencies to evaluate the direct and indirect effects of their activities on prime and unique farmland, and farmland of statewide and local importance, and to consider action alternatives that could avoid adverse effects.

3.1.7 Land Use

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions.

3.1.8 Socioeconomics

Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Socioeconomic data are typically presented at county, state, and U.S. levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends.

3.1.9 Environmental Justice and Protection of Children

Various EOs direct federal agencies to address disproportionate environmental and human health effects in minority and low-income communities and to identify and assess environmental health and safety risks to children.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and disproportionate impacts that could be imposed on them. This EO requires that federal agencies’ actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. EO 12898 was enacted to

ensure 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. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

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

For the purposes of this analysis, minority populations are defined as Alaska Natives and American Indians, Asians, Blacks or African-Americans, Native Hawaiians, and Pacific Islanders or persons of Hispanic origin (of any race); low-income populations include persons living below the poverty threshold as determined by the U.S. Census Bureau (USCB); and youth populations are children under the age of 18 years.

3.1.10 Cultural Resources

Cultural resources are nonrenewable resources that carry unique information about past societies and environments. They are tangible remains of past human activity. These remains may include buildings, structures, historic or precontact archaeological sites, rock art, earthworks, or landscapes. Cultural resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity, including latte sets, rock walls, Spanish-era structures);
- Architectural (i.e., buildings or other structures or groups of structures or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (TCPs) (resources of traditional, religious, or cultural significance to discreet communities).

Historic properties are cultural resources that are listed in or are eligible for listing in the NRHP. To be eligible for listing, a resource must meet one of the following four criteria and retain integrity:

- Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
- Associated with the lives of persons significant in our past (Criterion B);
- Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or
- Have yielded or be likely to yield information important in prehistory or history (Criterion D).

Properties that are less than 50 years old can be considered eligible for the NRHP under Criterion Consideration G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP criteria (Criteria A, B, C, or D). The term "historic property" refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources.

Federal laws protecting cultural resources include the *Archaeological and Historic Preservation Act of 1974* (16 U.S.C. § 469) as amended, the *American Indian Religious Freedom Act of 1978* (42 U.S.C. § 1996), the *Archaeological Resources Protection Act of 1979* (16 U.S.C. §§ 470aa–470mm), the *Native American Graves Protection and Repatriation Act of 1990* (25 U.S.C. § 3001, et seq.), and the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to making a decision or taking an action and integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the NHPA Section 106 consultation process, as set forth in 36 CFR Part 800. Section 106 also requires agencies to consult with federally recognized American Indian tribes with a vested interest in the undertaking.

Section 106 of the NHPA requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1[a]). For cultural resources analysis, the ROI is the Area of

Potential Effects (APE), defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist," (36 CFR § 800.16[d]) and thereby diminish their historic integrity.

3.1.11 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

The *Comprehensive Environmental Response, Compensation, and Liability Act*, as amended by the *Superfund Amendments and Reauthorization Act* and the *Toxic Substances Control Act* (TSCA), defines hazardous material as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration (OSHA) is responsible for enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of hazardous material in the workplace and ensures appropriate training in their handling.

The *Solid Waste Disposal Act* as amended by the *Resource Conservation and Recovery Act* (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. Hazardous waste is defined as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both hazardous materials and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

Air Force Policy Directive 32-70 establishes the policy that the USAF is committed to

- cleaning up environmental damage resulting from its past activities;
- meeting all environmental standards applicable to its present operations;
- planning its future activities to minimize environmental impacts;
- responsibly managing the irreplaceable natural and cultural resources it holds in public trust; and
- eliminating pollution from its activities wherever possible.

AFI 32-1067, *Water and Fuel Systems*, implements Policy Directive 32-70 and identifies compliance requirements for underground storage tanks, aboveground storage tanks, and associated piping that store petroleum products and hazardous substances. Evaluation of hazardous materials and hazardous wastes focuses on underground and aboveground storage tanks as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of hazardous materials and hazardous wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of hazardous materials or hazardous wastes, the extent of contamination varies based on type of soil, topography, weather conditions, and water resources.

AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities.

Through the Environmental Restoration Program initiated in 1980, a subcomponent of the Defense Environmental Restoration Program that became law under the *Superfund Amendments and Reauthorization Act*, each DoD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for affected sites follow the Hazardous and Solid Waste Amendment of 1984 under the RCRA Corrective Action Program. The Environmental Restoration Program provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Description of Environmental Restoration Program activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

Toxic substances might pose a risk to human health but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing material, lead-based paint (LBP), radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

3.1.11.1 Asbestos

AFI 32-1001, *Civil Engineer Operations*, provides the direction for asbestos management at USAF installations. This instruction incorporates by reference applicable requirements of 29 CFR § 1910.1025, 29 CFR § 1926.58, 40 CFR § 61.3.80, Section 112 of the CAA, and other applicable AFIs and DoD Directives. AFI 32-1052 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of asbestos in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. § 669 et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

3.1.11.2 Lead-Based Paint

Human exposure to lead has been determined a health risk by agencies such as OSHA and the USEPA. Sources of exposure to lead are dust, soils, and paint. In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the *Consumer Product Safety Act* (Public Law 101-608, as implemented by 16 CFR Part 1303), the Commission lowered the allowable lead level in paint to 0.06 percent (600 ppm). The Act also restricted the use of LBP in nonindustrial facilities. DoD implemented a ban of LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

3.1.11.3 Radon

The U.S. Surgeon General defines radon as an invisible, odorless, and tasteless gas, with no immediate health symptoms, that comes from the breakdown of naturally occurring uranium inside the earth (U.S. Surgeon General, 2005). Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. No federal or state standards are in place to regulate residential radon exposure at the present time, but guidelines were developed. Although 4.0 picocuries per liter (pCi/L) is considered an “action” limit, any reading over 2 pCi/L qualifies as a “consider action” limit. The USEPA and the U.S. Surgeon General have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low).

3.1.11.4 Polychlorinated Biphenyls

PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the U.S. until they were banned in 1979. The disposal of PCBs is regulated under the federal *Toxic Substances Control Act* (15 U.S.C. § 2601 et seq., as implemented by 40 CFR Part 761), which banned the manufacture and distribution of PCBs, with the exception of PCBs used in enclosed systems. Per USAF policy, all installations should have been PCB-free as of 21 December 1998. In accordance with 40 CFR Part 761 and USAF policy, PCB articles are categorized as follows:

- Less than 50 ppm—non-PCB (or PCB-free)
- 50 ppm to 499 ppm—PCB-contaminated
- 500 ppm and greater—PCB equipment

The *Toxic Substances Control Act* regulates and the USEPA enforces the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

3.1.12 Infrastructure, Transportation, and Utilities

Infrastructure consists of the systems and structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and

the degree to which an area is characterized as developed. The availability of infrastructure and its capacity to support more users, including residential and commercial expansion, are generally regarded as essential to the economic growth of an area.

The infrastructure components include utilities, solid waste management, sanitary and storm sewers, and transportation. Utilities include electrical, natural gas, liquid fuel, water supply, sanitary sewage/wastewater, and communications systems. Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs. Sanitary and storm sewers (also considered as utilities) includes those systems that collect, move, treat, and discharge liquid waste and stormwater. Transportation is defined as the system of roadways, highways, and transit services in the vicinity of the installation, which could be potentially affected by a proposed action.

3.2 EVALUATION CRITERIA

3.2.1 Noise

When evaluating noise effects, several aspects are examined, including: 1) the degree to which noise levels generated by training and operations, as well as construction, demolition, and renovation activities, would be higher than the ambient noise levels; 2) the degree to which there would be hearing loss and/or annoyance; and 3) the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source. An environmental analysis of noise includes the potential effects on the local population and estimates the extent and magnitude of the noise generated by the Proposed Action and Alternatives.

3.2.2 Safety

Impacts from a proposed action are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. For the purposes of this EA, an impact is considered significant if USAF OSHA criteria are exceeded or if established or proposed safety measures are not properly implemented, resulting in unacceptable safety risk to personnel.

3.2.3 Air Quality

General conformity under CAA §176(c) does not apply at any of the proposed locations. The USAF's Air Conformity Applicability Model was used to provide the quantitative analysis of emissions under the Proposed Action. The model provides estimated annual net increases in air emissions from proposed federal actions for each specific criteria and precursor pollutant as defined in the NAAQS. Assumptions of the model, methods, and detailed and summary results are provided in **Appendix B**. The Air Conformity Applicability Model was also used to provide emissions estimates for construction activities and increased personnel under the Proposed Action. As mentioned in Section 3.1.3.2, PMRF-Barking Sands, JBPHH, and Andersen AFB are not subject to general conformity requirements since the AQCRs in which they are located are designated unclassified/assumed to be in attainment status for all six criteria pollutants.

For this air quality analysis, the annual net increase in emissions for each project alternative was compared to the PSD permitting threshold of 250 tpy for criteria pollutants (except for lead, which is 25 tpy). The PSD permitting threshold was used as an indicator of the significance of potential impacts to air quality. If the increases in emissions from the Proposed Action are below the applicable PSD permitting thresholds for each criteria pollutant, it would indicate that the air quality impacts for each of the pollutants are not likely to be adverse.

Climate change presents a global problem caused by increasing concentrations of GHG emissions. While climate change results from the incremental addition of GHG emissions from millions of individual sources, the significance of an individual source alone is impossible to assess on a global scale beyond the overall need for global GHG emissions reductions to avoid catastrophic global outcomes. Therefore, the quantitative analysis of CO_2e emissions in this EA is to disclose the net increase of the action alternatives.

3.2.4 Biological Resources

The level of impact on biological resources is based on the following:

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological ramifications.

The impacts on biological resources are adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid "taking" federally threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS and NMFS that ends with USFWS and NMFS concurrence or a determination of the risk of jeopardy from a federal agency project.

3.2.5 Water Resources

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Impacts to water resources would occur if the Proposed Action:

- reduces water availability or supply to existing users;
- overdrafts groundwater basins;
- exceeds safe annual yield of water supply sources;
- affects water quality;
- affects coastal resources;
- endangers public health by creating or worsening health hazard conditions; or
- violates established laws or regulations adopted to protect sensitive water resources.

3.2.6 Geological Resources

Protection of geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of a proposed action and alternatives on geological resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

Geological resources impacts would result if:

- regional geology was affected;
- the potential for soil erosion or sedimentation was increased;
- soils affected were considered unsuitable for development; and
- soils classified as prime and unique farmland were affected.

3.2.7 Land Use

Potential impacts on land use are based on the level of land use sensitivity in areas potentially affected by a proposed action as well as compatibility of the action with existing conditions. In general, a land use impact would occur if it met one of the following criteria:

- inconsistent or noncompliant with existing land use plans or policies,
- precludes the viability of existing land use,
- precludes continued use or occupation of an area,
- incompatible with adjacent land use to the extent that public health or safety is threatened, or
- conflicts with planning criteria established to ensure the safety and protection of human life and property.

3.2.8 Socioeconomics

Consequences to socioeconomic resources were assessed in terms of the potential impacts on the local economy from implementation of the Proposed Action at the alternative locations. The level of impacts from expenditures associated with the alternatives was assessed in terms of direct impacts on the local economy and related impacts on other socioeconomic resources (e.g., housing, employment). The magnitude of potential impacts can vary greatly depending on the location of an action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area but might have significant impacts in a rural region. In addition, if potential socioeconomic changes from a proposed action

resulted in substantial shifts in population trends or in lower regional spending and earning patterns, they may be considered significant.

3.2.9 Environmental Justice and Protection of Children

Environmental justice analysis applies to potential disproportionate and adverse effects on minority, low-income, and youth populations. Environmental justice issues could occur if an adverse environmental or socioeconomic consequence to the human population fell disproportionately upon minority, low-income, or youth populations. In **Sections 3.3.9.2**, **3.4.9.2**, and **3.5.9.2**, ethnicity and poverty status of populations in the vicinity of each installation is compared to state/territory and national data to determine if these populations could be disproportionately affected by implementation of the Proposed Action at the alternative locations.

3.2.10 Cultural Resources

Adverse effects to cultural resources might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or selling, transferring, or leasing the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance. For the purposes of this EA, an effect is considered major if it alters the integrity of a NRHP-listed resource or potentially impacts TCPs.

3.2.11 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

Impacts on hazardous materials management would be considered significant if the federal action resulted in noncompliance with applicable federal and state regulations, or increased the amounts generated or procured beyond current installation waste management procedures and capacities. Impacts on the Environmental Restoration Program would occur if the federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment.

3.2.12 Infrastructure, Transportation, and Utilities

Impacts on infrastructure from a proposed action are evaluated for their potential to disrupt or improve existing levels of service in the ROI as well as generate additional requirements for energy or water consumption and impacts to resources such as sanitary sewer systems and solid waste management.

Significant transportation impacts would occur if a proposed action resulted in a substantial increase in traffic generation that would cause a decrease in the level of service, a substantial increase in the use of the connecting street systems or mass transit, or if on-site parking demand would not be met by projected supply. Significant impacts related to utilities/services would occur if a proposed action required more than the existing infrastructure could provide or required services in conflict with adopted plans and policies for the area.

3.3 ALTERNATIVE A–PACIFIC MISSILE RANGE FACILITY–BARKING SANDS (PREFERRED ALTERNATIVE FOR SPCS #4)

3.3.1 Noise

3.3.1.1 Existing Conditions

The ROI for noise under Alternative A is PMRF-Barking Sands. Primary sources of noise on PMRF-Barking Sands include airfield and range operations and missile, rocket, and drone launches. Airfield operations include take-offs and landings of high performance and cargo/passenger aircraft, as well as helicopter operations. Range operations include training and research and development activities support.

3.3.1.2 Environmental Consequences

Proposed Action. Implementation of Alternative A would include construction activities that would occur entirely on existing Installation property at PMRF-Barking Sands. No noise-sensitive receptors have been identified with 0.5-mile of the proposed site (USAF, 2020).

Noise associated with construction equipment is generally short term, intermittent, and highly localized. Additionally, adherence to standard Air Force Occupational Safety and Health regulations that require hearing protection along with other personal protective equipment and safety training would minimize the

risk of hearing loss to construction workers. Therefore, noise associated with the proposed construction, demolition, and renovation projects would not be anticipated to result in any significant direct or indirect impacts on noise-sensitive receptors. There would be no operational increases in noise resulting from implementation of Alternative A.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands would not be expected to have significant noise-related impacts because construction noise would be localized to the proposed SPCS site and would be short term.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. Noise in the area would not change from current conditions, and no significant impacts on noise-sensitive receptors would be anticipated.

3.3.2 Safety

3.3.2.1 Existing Conditions

The ROI for safety under Alternative A is PMRF-Barking Sands.

Ground safety encompasses several categories, including ground and industrial operations, operational activities, and motor vehicle use. Ground mishaps can occur from the use of equipment or materials and maintenance functions. Day-to-day operations and maintenance activities conducted by the 154th and 15th Wings are performed in accordance with applicable USAF safety regulations, published USAF Technical Orders, and standards prescribed by USAF Occupational Safety and Health requirements identified within AFI 91-202 and AFMAN 91-203.

All construction contractors at PMRF-Barking Sands must follow ground safety regulations and worker's compensation programs to avoid posing any risks to workers or personnel on or off Base. Construction contractors are responsible for reviewing potentially hazardous workplace operations, monitoring exposure to workplace chemicals (e.g., asbestos, lead, hazardous materials), physical hazards (e.g., noise propagation, slips, trips, falls), and biological agents (e.g., infectious waste, wildlife, poisonous plants). Construction contractors are required to recommend and evaluate controls (e.g., preventative, administrative, engineering) to ensure personnel are properly protected and to implement a medical surveillance program to perform occupational health physicals for those workers subject to any accidental chemical exposures.

The SPCS sites have designated ***electromagnetic radiation*** and ***radiofrequency (RF)*** energy safety zones around transmitter sites and tracking radars that may constitute a hazard to personnel, explosives, or fuels. Satellites operating at C-band and Ku-band frequencies would be placed at the proposed SPCS site. C-band communication occurs within a frequency range of 4 to 8 gigahertz, while Ku-band communication occurs at 12 to 18 gigahertz. Both C-band and Ku-band frequencies are categorized as RF energy, which is considered non-ionizing radiation. Ionization is a process by which electrons are stripped from atoms and molecules, which can lead to damage in biological tissue. Ionizing frequencies include x-rays and gamma rays (Federal Communications Commission, 2021).

While C-band and Ku-band frequencies are not associated with damage to biological tissue, ongoing exposure to non-ionizing radiation may lead to thermal effects, which occur when exposed to very high levels of RF energy and result in an increased body temperature and heating of biological tissue. The Federal Communications Commission notes that the eyes and testes are considered particularly susceptible to RF heating.

PMRF-Barking Sands has designated ***electromagnetic radiation*** and ***RF*** energy safety zones around transmitter sites and tracking radars that may constitute a hazard to personnel, explosives, or fuels. The Installation regularly conducts radiation hazard surveys prior to modifying existing units or installing new equipment and outfits all radar units with warning lights that indicate when the unit is on and when it is emitting electromagnetic radiation. The public is not exposed to any hazardous radiation from operations at PMRF-Barking Sands.

3.3.2.2 Environmental Consequences

Proposed Action – Ground Safety. Construction activities can potentially expose personnel to health and safety hazards from heavy equipment operation, hazardous materials and chemicals use, and working in confined, poorly ventilated, and noisy environments. Therefore, short-term, negligible to minor impacts on contractor health and safety would be anticipated to result from proposed construction and demolition

projects under Alternative A. To minimize health and safety risks, contractors would be required to use appropriate personal protective equipment and establish and maintain site-specific health and safety programs for their employee that follow all applicable OSHA regulations. Additionally, all construction contractors at PMRF-Barking Sands would be required to follow ground safety regulations and worker's compensation programs to avoid posing any risks to workers or personnel on or off Base.

Proposed Action – RF Energy. While the RF effects are uncommon and are known to occur only at very high levels of RF energy exposure, safety measures would be implemented to prevent excessive exposure to RF energy. The proposed SPCS facilities would include a barbed wire perimeter fence with a setback of 50 feet to prevent unprotected individuals from being exposed to RF radiation. The general public would not be exposed to unsafe levels of RF radiation, as the boundaries of the maximum permissible exposure levels would be contained by the Installation boundaries. The communications satellites and system associated with the Proposed Action would be constructed and operated in accordance with USAF safety guidance, including AFMAN 91-203 and AFI 91-401, *Directed Energy System Safety*.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would not be expected to have safety-related impacts.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. Safety on PMRF-Barking Sands would remain unchanged, and the implementation of the No Action Alternative would result in no significant impacts to safety.

3.3.3 Air Quality

3.3.3.1 Existing Conditions

The ROI for air quality under Alternative A is the SOH AQCR.

Regional Climate. PMRF-Barking Sands is located on the island of Kauaʻi, which has a semi-tropical, mild and consistent climate throughout the year. The average high and low temperatures in February are 79 and 63 degrees Fahrenheit, respectively, and on average 86 and 71 degrees Fahrenheit in August. Temperature patterns are generally more consistent across the island, while rainfall patterns vary based on the location within the island. PMRF-Barking Sands is located in the leeward, coastal area of the island, which is subject to the orographic effect. Average annual rainfall for Waimea on Kauaʻi (near PMRF-Barking Sands) is 21.76 inches per year and is highest from October to March during the wet season (US Climate Data, 2021).

Baseline Air Emissions. PMRF-Barking Sands is located in the County of Kauaʻi, which is part of the SOH AQCR. As previously described in **Section 3.1.3.2**, the DOH CAB has adopted standards for several air pollutants that are more stringent than the NAAQS. Additionally, DOH CAB has also established standards for hydrogen sulfide for which there are no NAAQS (Hawaii Administrative Rules [HAR] Title 11, Chapter 59). Currently, the entire SOH AQCR is designated as an unclassifiable/attainment area for all criteria pollutants (40 CFR § 81.312). Unclassifiable areas are those areas that have not had ambient air monitoring and are assumed to be in attainment with the NAAQS.

The main stationary sources of emissions at PMRF-Barking Sands include several diesel-fueled engine generators that are used during testing events and to provide power when electric demand is high. These generators are currently covered under the Noncovered Source Permits specific to Makaha and Kokee Nos. 0119-01N and 0120-01-N, and Noncovered Source Permits specific to PMRF-Barking Sands Nos. 0110-02-N and 0834-01-N issued by DOH CAB for stationary source emissions. Mobile source emissions are generated from aircraft operations and diesel- and gasoline-fueled vehicles and are thus exempted from permitting requirements. Annual emission inventory for stationary sources at PMRF-Barking Sands were not available and thus are not presented in this EA. Current levels of emissions from stationary sources at the facility do not exceed major-source permitting thresholds to trigger the requirement for a covered source permit.

Greenhouse Gases. The GHG reporting rule described in **Section 3.1.3.3** requires reporting of GHG data and other relevant information from larger GHG emission sources, fuel and industrial gas suppliers, and carbon dioxide injection sites in the U.S. According to Noncovered Source Permits No. 0110-02-N and 0834-01-N, GHG emissions from stationary sources at PMRF do not emit 25,000 metric tons or more; therefore, GHG reporting rule requirements are not applicable.

3.3.3.2 Environmental Consequences

Proposed Action. Implementation of Alternative A would be expected to have short-term and long-term, minor impacts on SOH AQCR air quality. Air quality impacts from construction would be short-term, local, direct and minor in nature, with emissions occurring only during construction. Emissions from the addition of personnel would be long-term, indirect, and minor. Assumptions of the model, methods, and detailed and summary results are provided in the Air Quality Model Report (**Appendix B**).

Table 3-3 presents total annual estimated air emissions for Alternative A compared to the PSD permitting threshold of 250 tpy for attainment area criteria pollutants. Estimated total annual emissions would not exceed the PSD permitting threshold for any criteria pollutant or precursor. Therefore, impacts from Alternative A on regional air quality in the SOH AQCR would be expected to be minor, and no adverse impacts would be expected to occur. Emissions for CO_2e do not have a regulatory threshold; however, estimated emissions for CO_2e are presented to demonstrate that CO_2e emissions would also be low when compared to GHG emissions of 25,000 metric tons or more associated with large GHG sources.

Table 3-3
Alternative A Estimated Emissions at PMRF-Barking Sands Compared to PSD Permitting Thresholds

Pollutant	Action Emissions (ton/year)		Insignificance Indicator	
	SPCS #4	SPCS #5	Indicator (ton/year)	Exceedance (Yes or No)
Volatile Organic Compounds	0.505	0.487	250	No
Nitrogen Oxides	1.586	1.571	250	No
Carbon Monoxide	4.344	4.134	250	No
Sulfur Oxides	0.006	0.006	250	No
PM_{10}	0.511	0.511	250	No
$PM_{2.5}$	0.057	0.057	250	No
Lead	0.000	0.000	25	No
Carbon Dioxide Equivalent	657.0	639.1	-	-

$PM_{2.5}$ = particulates equal to or less than 2.5 microns in diameter; PM_{10} = particulates equal to or less than 10 microns in diameter; PMRF = Pacific Missile Range Facility; PSD = Prevention of Significant Deterioration; SPCS = Space Control Squadron

The air pollutant emissions under Alternative A would be predominantly from construction of new facilities. Construction emissions are not restricted by the current noncovered source permit held by PMRF-Barking Sands. Criteria pollutants would result if new stationary sources (e.g., boilers, water heaters, emergency generators) for the proposed facilities are installed and operated. Prior to starting any construction for new fuel-burning equipment, noncovered source permit requirements contained in HAR § 11-60.1-61 should be examined to ensure that permitting requirements for non-major sources are not triggered and qualify for an exemption from the requirement to obtain a noncovered source permit. Emissions from new stationary emission sources must also be examined to ensure that the new fuel-burning emission sources do not trigger a full PSD review or covered source permit applicability based on their potential to emit regulated criteria pollutants or hazardous air pollutants. Generally, comfort heat natural gas-fired boilers, water heaters, and backup diesel generators for typical office buildings or administrative facilities are not likely to generate levels of pollutant emissions that would trigger the need to obtain air permits. However, emissions from several new sources, when taken together with existing emissions for the facility, may come close to or may even exceed covered source permitting thresholds.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would not be expected to have significant air quality impacts. Construction activities would be short term and localized in nature and their potential impacts on air quality would not last beyond the construction period.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur, and emissions would not change from current levels. As a result, no impacts would occur to regional air quality in SOH AQCR under the No Action Alternative.

3.3.4 Biological Resources

3.3.4.1 Existing Conditions

The ROI for biological resources under Alternative A includes the PMRF-Barking Sands Installation boundaries, including the land surrounding the facilities proposed for development.

Ecoregions are used to describe areas of similar type, quality, and quantity of environmental resources (USEPA, 2021a). Ecoregions are assigned hierarchical levels to delineate regions spatially based on different levels of planning and reporting needs. PMRF-Barking Sands is located entirely within the Oceana realm and the Hawaii Tropical Low Shrublands ecoregion that is found on all eight main islands (One Earth, 2021a; World Wildlife Fund [WWF], 2021a). This ecoregion, a mix of grassland and shrubland, receives a wide range of yearly precipitation (20 to 67 inches) and has been heavily degraded due to development and other human disturbances, invasive plants and animals, and fire (One Earth, 2021a; WWF, 2021a).

Vegetation. No natural vegetation is present on the proposed SPCS site at Alternative A. The majority of the site is paved, and existing vegetation is limited to landscaped grasses, trees, and shrubs and is highly disturbed by regular mowing and maintenance.

Wildlife. The only native terrestrial mammal located in and around PMRF-Barking Sands is the endangered, federally listed Hawaiian hoary bat (*Lasirus cinerus semotus*). Surveys indicate non-native bird species outnumber native species at PMRF-Barking Sands due to development and agriculture-altering natural habitat (CNRH, 2010). However, PMRF-Barking Sands does provide habitat for numerous listed birds (see below), as well as at least 14 migratory bird species, such as black-crowned night heron (*Nycticorax nycticorax*), and the seabird species wedge-tailed shearwater (*Puffinus pacificus*), which can be found nesting on the Installation for much of the year (CNRH, 2010).

Terrestrial reptiles documented on the site include the mourning gecko (*LepiDoDactylus lugubrus*), house gecko (*Hemidactylus frenatus*), and snake-eyed skink (*Cryptoblepharus poecilopleurus*) (Naval Facilities Engineering Systems Command Pacific [NAVFACPAC] 2006a). The only amphibian recorded on PMRF-Barking Sands is the marine toad or cane toad (*Rhinella marinus*), that was introduced intentionally for insect control (CNRH, 2010).

There are no ***federal or state-listed threatened or endangered plant species*** that occur naturally on PMRF-Barking Sands; however, critical habitat for lau‘ehu (*Panicum niihauense*) does occur within the Installation (CNRH, 2010). Located along the beach area near the Barking Sands Beach Cottages, approximately 300 meters from the proposed SPCS site, this area contains the primary constituent elements for the species to thrive, however, lau‘ehu has never been observed during surveys and there is no historical record of its occurrence (CNRH, 2010; NAVFACPAC, 2006b). Additionally, ‘ohai (*Sesbania tomentosa*) is found adjacent to PMRF-Barking Sands at Polihale State Park, which borders the northern property line of Barking Sands and is located approximately 6.5 km from the SPCS site (CNRH, 2010; PMRF, 2016).

Sixteen ***federal- or state-listed endangered and threatened fauna species*** that may occur on or adjacent to PMRF-Barking Sands (including marine areas) are outlined on **Table 3-4**.

Table 3-4
Endangered and Threatened Species at PMRF-Barking Sands and Vicinity

Scientific Name	Common Name	Federal Status	State Status
Wildlife			
Lasirus cinerus semotus	Hawaiian hoary bat	E	E
Megaptera novaengliae	Humpback whale	E	E
Monachus schauinslandi	Hawaiian monk seal	E	E
Anas wyvilliana	Hawaiian duck	E	E
Asio flammeus sandwichensis	Hawaiian short-eared owl	-	E
Fulica Americana alai	Hawaiian coot	E	E
Gallinula chloropus sandwichensis	Hawaiian common gallinule/moorhen	E	E
Himantopus mexicanus knudensi	Black-necked stilt	E	E
Nesochen sandvinvensis	Hawaiian goose	E	E
Phoebastria albatrus	Short-tailed albatross	E	E
Petrodroma phaeopygia sandwicense	Hawaiian dark-rumped petrel	E	E

Scientific Name	Common Name	Federal Status	State Status
Oceanodrama castro	Band-rumped storm-petrel	E	E
Puffinus auricularis newelli	Newell's shearwater	T	T
Chelonia mydas	Green sea turtle	T	T
Eretmochelys imbricata	Hawksbill sea turtle	E	E
Drosophila musaphilia	Hawaiian picture-wing fly	E	E
Drosophila sharpi	Hawaiian picture-wing fly	E	E
Vegetation			
Panicum niihauense	Lau-ehu	E	E
Sesbania tomentosa	Ohai	E	E

Source: CNRH, 2010; DLNR, 2021; PMRF, 2016
E = endangered, PMRF = Pacific Missile Range Facility; T = threatened

Of the five species of marine turtles, the green sea turtle and the hawksbill sea turtle are known to utilize beaches at PMRF-Barking Sands, while the other three species (loggerhead, leatherback, and olive Ridley) may travel through the water offshore but are not classified as residents of the area and are not included in this table (CNRH, 2010). Because the proposed SPCS site at PMRF-Barking Sands would be located inland and would not have direct contact with the ocean or its beaches, marine species are not discussed further in this section. Descriptions of terrestrial threatened and endangered fauna are included below.

The Kawai'ele Waterbird Sanctuary is located in close proximity to the proposed SPCS site and is separated from the site by the Kinikini Ditch. Threatened and endangered species of waterfowl are regularly spotted at the sanctuary, including the Hawaiian duck, Hawaiian goose, Hawaiian coot, black-necked stilt, Hawaiian short-eared owl, and other species.

1. *Hawaiian hoary bats* are a federal and state listed endangered species and Hawaii's only native terrestrial mammal (USFWS, 2021a). Wetlands are important foraging grounds for these mammals, making wetland habitat loss a large threat, with pesticides, predation, and roost disturbance listed as additional threats (USFWS, 2021a).

2. The *Hawaiian duck*, also called koloa-maoli, is an endemic federal and state listed endangered bird that is known to be found at the oxidation pond at PMRF-Barking Sands (CNRH, 2010). Young duck families have been spotted on the Installation, but nesting has not been confirmed. Threats include predation from invasive species, habitat loss and modification from invasive species, avian diseases, and hybridization with mallards (CNRH, 2010).

3. The *Hawaiian short-eared owl*, locally known as pueo, is an endemic state listed endangered species. Unlike most owls, pueo are active during the day and build nests on the ground (Hawaii Department of Land and Natural Resources [DLNR], 2021). Major threats include habitat loss and habitat degradation, predation by invasive mammals, and avian diseases (DLNR, 2021).

4. *Hawaiian coots*, also known as 'alae-ke'oke'o, are an endemic federally listed endangered species (CNRH, 2010). The species has been spotted in ditches of PMRF-Barking Sands and has been documented to nest on the Installation. The biggest threats include habitat loss, habitat modification from invasive plants, invasive predators, and avian disease (DLNR, 2005).

5. *Hawaiian common gallinule/moorhen*, also known as 'alae-'ula, are an endemic waterbird that is both federal and state listed as endangered. The families frequent the PMRF-Barking Sand ditches and likely nest on Base, but nesting has not been confirmed (CNRH, 2010). Their biggest threats are habitat loss, invasive predators, habitat modification from invasive plants, and avian diseases (CNRH, 2010).

6. Also known as the Hawaiian stilt or ae'o, the *black-necked stilt* is an endemic wading bird that is both federal and state listed as endangered and occupies ditches and sometimes the beach at PMRF-Barking Sands (CNRH, 2010). Major threats to the black-necked stilt are invasive predators and loss of wetland habitat (CNRH, 2010).

7. The *Hawaiian goose*, or nēnē, is a federal- and state-listed endangered species and is the only native resident goose in Hawaii. The Hawaiian goose can be found at PMRF-Barking Sands near the runway, as well as the beach cottages and the existing HIANG complex (proposed SPCS site location) and is known to nest on the proposed SPCS site (CNRH, 2010; U.S. Navy, 2020). Threats

to the Hawaiian goose include habitat loss and degradation, predation from invasive species, and more recently a variety of threats such as human disturbance, avian disease, and inbreeding depression (DLNR, 2021).

8. The *short-tailed albatross* is a federal and state listed endangered species that has only rarely been seen at PMRF-Barking Sands (CNRH, 2010). Mortalities from bycatch, marine pollution, plastic ingestion, and oil spills are the greatest threats facing this species (CNRH, 2010).
9. Also called the Hawaiian petrel, the *Hawaiian dark-rumped petrel* is an endemic species, listed as endangered both federally and within the state (CNRH, 2010). PMRF-Barking Sands provides a corridor for these birds as they travel between nesting and foraging sites (CNRH, 2010). Threats to this species include human hunting, invasive predators, and artificial lighting that causes disorientation and collisions (CNRH, 2010).
10. *Band-rumped storm-petrel,* known locally as ʻAkeʻake, is a federally listed endangered species known to nest in remote cliff locations on Kauaʻi and Lehua within Hawaii (USFWS, 2021f). Due to nesting in the high remote cliffs and near lava flows scientists have trouble documenting the species. Threats to this species include invasive predators like rats, cats, or mongooses, and habitat loss (America Bird Conservancy, 2021).
11. *Newell's shearwater*, also called aʻo, is both a federal- and state-listed threatened species, endemic to Hawaii. PMRF-Barking Sands provides a corridor for Newell's shearwater as they travel between nesting and foraging sites (CNRH, 2010). Threats to this species include invasive predators, habitat loss, disease, and notably artificial lighting that causes disorientation and collisions (CNRH, 2010).
12. *Hawaiian picture-wing flies* includes two different federal and state listed endangered species found only on the island of Kauaʻi and associated with their host plant, the native koa (CNRH, 2010). A major threat for these species includes loss of wetland habitat, and notably their host plant (CNRH, 2010). The USFWS has designated critical habitat for these flies in the vicinity of the Kōkeʻe Sites, and while there are no known populations found on PMRF-Barking Sands, the possibility remains that they could inhabit that area.

Non-native wildlife and vegetation that cause substantial damage and meet the criteria of ***invasive species*** may be found at PMRF-Barking Sands (see **Section 3.1.4.3** and **Table 3-5**). Of these 11 species, five animal species, dogs (*Canis lupus* familiaris), cats (*Felis catus*), pigs (*Sus scrofa*), species of rats (*Rattus*), and barn owls (*Tyto alba*), and two plant species, long-thorn kiawe (*Prosopis juliflora*) and buffel grass (*Cenchrus ciliaris*) have been documented in past surveys (CNRH, 2010; USFWS, 2014).

Table 3-5
Invasive Species at PMRF-Barking Sands and Vicinity

Scientific Name	Common Name
Wildlife	
Bubulcus ibis	Cattle egret
Canis lupus familiaris	Dog
Felis catus	Cat
Lithobates catesbeianus	American bullfrog
Rattus sp.	Rat species
Sus scrofa	Pig
Tyto alba	Barn owl
Vegetation	
Batis maritima	Pickleweed
Cenchrus ciliaris	Buffel grass
Eichhornia crassipes	Water hyacinth
Prosopis juliflora	Long-thorn kiawe
Rhizophora mangle	Mangrove

Source: CNRH, 2010; USFWS, 2014
PMRF = Pacific Missile Range Facility

3.3.4.2 Environmental Consequences

Proposed Action – Vegetation. The proposed SPCS site is completely paved and developed, with the exception of maintained landscaped areas. No significant impacts to natural vegetation would be anticipated to occur under Alternative A.

Proposed Action – Wildlife. The proposed SPCS site is completely paved and developed, with the exception of maintained landscaped areas, and does not provide suitable habitat for wildlife. Wildlife, and especially avian species, utilizing the surrounding undeveloped areas for foraging and breeding would normally be sensitive to increased noise impacts from military aircraft. Although there is variability in responses across species, many birds and wildlife have the ability to habituate to noise and movement from military aircraft (Grubb et al., 2013), and military aircraft operations have been ongoing at PMRF-Barking Sands for decades. As such, the noise and movement temporarily caused by the less noisy construction and renovation activities would have negligible short-term impacts on wildlife.

Proposed Action – Threatened and Endangered Species. As noted above, 16 federal or state-listed threatened or endangered species are known to occur on or adjacent to PMRF-Barking Sands. Federally designated critical habitat for the lau'ehu is present on the Installation, but the plant has not been observed, although no formal surveys have been conducted in support of the Proposed Action. Suitable habitat for special status species is not located on the proposed SPCS site.

Birds and wildlife, including threatened and endangered species, can become accustomed to noise and movement from military aircraft. It is anticipated that noise and movement from construction and renovation activities would have short-term, insignificant impacts to threatened and endangered species.

The nēnē (Hawaiian Goose) is commonly observed in the vicinity of the Kinikini Ditch and the proposed SPCS site. The first documented nest on PMRF-Barking Sands was Fall 2010 at the HIANG complex. Nēnē are most likely to be observed at the HIANG complex during the nesting season (September to April). The *PMRF-Barking Sands Nene Management Plan* provides management measures that help prevent impacts to the nēnē without causing undue harm to mission objectives. Under the Proposed Action, a vegetation management plan would be drafted to prevent vegetation growth within the proposed SPCS site. Specifically, vegetation located along the northeastern side of the site would be mowed at regular intervals to prevent it from being attractive to nēnē for nesting. The terms of the 2014 BO require coordination with USFWS prior to implementation of any actions affecting a nēnē nest and designates a maximum amount of nests that may be removed in a given year; however, nest removal would only be authorized under bird-airstrike hazard or mission impacts and would not include the HIANG property at the proposed SPCS site. Therefore, no nēnē nests would be removed under the Proposed Action. Any activities that could impact the nēnē would be conducted in accordance with the terms of the BO and USFWS consultation (**Appendix A**). Environmental commitments associated with protected species are outlined in **Section 2.6.2**. Mitigation measures to ensure that these environmental commitments are met are outlined in **Section 2.7**. Accordingly, implementation of Alternative A would not be likely to adversely affect the nēnē. The Hawaiian hoary bat is present in the vicinity and may fly through the proposed SPCS site at PMRF-Barking Sands. The hoary bat can be harmed by flying into barbed wire. Under Alternative A, 1,920 feet of barbed wire would be installed. Using the formula established to estimate take of bat species by barbed wire (0.3636/mile x 0.013 x 30 years), less than one bat would be taken over the life of the project. Additionally, the proposed SPCS site has only one tree that would be removed, and it is unlikely to host the hoary bat. Out of an abundance of caution, the tree would not be removed during the pupping season (1 June–15 September). Therefore, Alternative A would not be likely to adversely affect the Hawaiian hoary bat.

In order to prevent harm to the nocturnal fledglings of Newell's shearwater, Hawaiian petrel, and the band-rumped storm-petrel, lighting design plans would be required to meet the terms of the 2014 BO and consultation with USFWS (**Appendix A**), including focusing outside lighting downward and utilizing the required colored bulbs as set forth in the BOs for all outside structures, towers, and electrical distribution lines. Construction slated for the nocturnal seabird fledgling period (mid-September through mid-December) would occur only during daylight hours. Lighting at the proposed SPCS facility would be used at night only if required for Force Protection or safety, and all newly installed fixtures would be full cutoff, with bulbs shielded above and around all sides. Environmental commitments associated with protected species are outlined in **Section 2.6.2**. Mitigation measures to ensure that these environmental commitments are met are outlined in **Section 2.7**. Accordingly, Alternative A would not be likely to adversely affect, the Newell's shearwater, Hawaiian petrel, and the band-rumped storm-petrel.

Hawaiian waterbirds occupy the Kawai‘ele Waterbird Sanctuary, which is adjacent to the PMRF-Barking Sands parcel. Standing water on the SPCS site could temporarily attract Hawaiian waterbirds. Environmental commitments associated with protecting the Hawaiian waterbirds, including limiting standing water at the SPCS site, are outlined in **Section 2.6.2**. Mitigation measures to ensure that these environmental commitments are met are outlined in **Section 2.7**. Accordingly, implementation of Alternative A would not be likely to adversely affect Hawaiian waterbirds.

It is anticipated that Alternative A is not likely to adversely affect other special status species not already mentioned above, as ground disturbance related to Alternative A would occur in an area that is already paved and developed. Construction and renovation activities would be conducted in accordance with the stipulations of the 2014 BO, dated 9 September 2014, that concluded formal consultation for Hawaiian black-necked stilt, Hawaiian moorhen, Hawaiian coot, Hawaiian duck, Hawaiian goose, Hawaiian hoary bat, Hawaiian petrel, Newell’s shearwater, and candidate band-rumped storm petrel.

Consultation with USFWS is complete; documentation is included in **Appendix A**. The NGB has issued a determination of *Not Likely to Adversely Affect* for impacts to protected species under Alternative A. USFWS concurred with the determination of *Not Likely to Adversely Affect* for impacts to protected species in a letter dated 16 December 2021. In a letter dated 19 February 2021 sent in response to a scoping letter from NGB dated 29 January 2021, the NMFS stated that no consultation is required if it is determined that the Proposed Action would not affect any ESA-listed species under its jurisdiction. NGB has determined that there would be no effects to ESA-listed species under the Proposed Action.

Proposed Action – Invasive Species. None of Alternative A’s construction or renovation activities would have the potential to directly impact invasive species. These activities would use BMPs from the *PMRF-Barking Sands Integrated Pest Management Plan* (PMRF-Barking Sands, 2020c). In order to limit the potential for introduction of invasive species, equipment and off-site vehicles would be cleaned prior to use on-site. Fill dirt, straw, and any plantings would also be checked for evidence of invasive non-native plants.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would result in negligible impacts to vegetation and wildlife, as construction activities would occur in previously disturbed areas with minimal natural resources present. When added to past, present, and foreseeable future actions, the Proposed Action would have minimal noise disturbance to wildlife. Adverse effects to the nēnē could occur if the terms of the BO are not adhered to and steps are not taken to conserve suitable habitat for the nēnē in areas that would not interfere with the mission.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. Biological resources on PMRF-Barking Sands would remain unchanged, and the implementation of the No Action Alternative would result in no significant impacts to biological resources.

3.3.5 Water Resources

3.3.5.1 Existing Conditions

The ROI for water resources under Alternative A is the Mana Plain and the coastal zone, which includes PMRF-Barking Sands.

No natural ***surface water*** resources, such as lakes, streams, or natural ponds, are present on PMRF-Barking Sands, the Mana Plain, or the proposed PMRF SPCS site, as the high permeability of the underlying soils inhibit the establishment of natural surface water features (PMRF, 2016).

The Mana Plain, which bounds the western flank of the island of Kaua‘i and includes the land on which PMRF-Barking Sands is located, was originally a wetland but is now artificially drained through pumping by Agribusiness Development Corporation to allow for agriculture and prevent flooding. Surface water on the Mana Plain is restricted to a system of drainage ditches that discharge the pumped water from agricultural lands and stormwater runoff to the sea (U.S. Navy, 2009). Surface water within PMRF-Barking Sands is largely restricted to two of these drainage ditches, the Kinikini Ditch and the Nohili Ditch, which transect the Barking Sands installation (NAVFAC, 2010). The Kinikini ditch is the closest drainage ditch to the proposed PMRF-Barking Sands SPCS site and is located approximately 90 feet to the northeast and separated from the site by dense vegetation (**Figure 3-1**).

The entire SOH, excluding lands solely under federal jurisdiction, is classified as a ***coastal zone*** under the Zone Management Program (OP-CZM). The SOH OP-CZM has developed Hawaii’s federally approved

Figure 3-1 Water Resources–PMRF-Barking Sands

CZMA, and Hawaii's Coastal Management Program is overseen by the SOH Office of Planning, Coastal *Hawaii Ocean Resources Management Plan* (SOH, 2020b). The SOH DOH Clean Water Branch co-administers components of the Management Plan with the OP-CZM and develops water quality standards and identifies impaired water bodies that are not attaining water quality standards.

Water quality in the coastal zone along the PMRF shoreline currently meets all applicable water quality standards, with the exception of ammonium at two locations where drainage ditches on the Mana Plain discharge to the sea (SOH, 2020a). DOH CAB direction under Section 303(d) of the CWA is to improve or maintain water quality conditions, and a Total Maximum Daily Load water quality improvement plan to attain water quality standards for ammonia will be developed in the future (SOH, 2020a). The Agribusiness Development Corporation monitors drainage ditch outfall locations under NPDES permit No. HI0021940 issued by the SOH Clean Water Branch; however, the permit was not renewed in 2015, and is currently in process for renewal (Personal communication with M. Kanashiro, March 12, 2021).

While surrounded by seawater, Kaua'i is underlain by large quantities of fresh ***groundwater*** due to abundant rainfall, and the permeable soils and rocks that allow rainfall to easily infiltrate and accumulate below the ground surface (NAVFAC, 2010). These geologic conditions allow water to move through the subsurface; however, low-permeable geologic features that are present on the island impound the water in thick groundwater reservoirs (NAVFAC, 2010). The four primary aquifer types on Kaua'i are: flank volcanic basal aquifers; dike-impounded high-level aquifers (near the ground surface); perched high-level aquifers; and sedimentary basal aquifers (NAVFAC, 2010).

PMRF-Barking Sands is located in the Kekaha Aquifer System of the Waimea Aquifer Sector and overlies two aquifers: a sedimentary aquifer; and a dike-impounded aquifer (NAVFAC, 2010). The sedimentary aquifer is basal, unconfined, and has potential ecological use. It is considered irreplaceable and ecologically important with moderate salinity and has a high vulnerability to contamination. The dike-impounded aquifer is basal, confined, and mildly saline. It has potential use for drinking water and is considered irreplaceable with a low vulnerability to contamination (NAVFAC, 2010). Groundwater in the region increases in salinity closer to the coast and is generally considered to be potable at the Base of the Mana cliffs (U.S. Navy, 2017). The nearest fresh groundwater source to PMRF-Barking Sands is the Napali formation along the Base of the Mana cliffs, located more than 5 miles from PMRF-Barking Sands.

Stormwater runoff on PMRF-Barking Sands is restricted to a network of drainage ditches on the Mana Plain that drain pumped water from agricultural fields located east of the installation. These drainage ditches discharge to the sea, and their outfalls are authorized and monitored under a NPDES permit held by Agribusiness Development Corporation that is currently in process for renewal. As described above, PMRF-Barking Sands does not operate under a separate NPDES permit.

No jurisdictional ***wetlands*** are located on PMRF-Barking Sands; however, one man-made oxidation pond (located approximately 0.70 mile southwest of the proposed PMRF-Barking Sands SPCS site) and drainage ditches on the Installation support protected bird species (NAVFAC, 2010). The closest wetland areas to the proposed SPCS site are located adjacent to Highway 50, approximately 400 feet north from the proposed SPCS site, and separated from the site by the Kinikini ditch. These wetland areas are associated with the Kawai'ele Waterbird Sanctuary and are classified by the National Wetland Inventory (NWI) as approximately 31 acres of freshwater ponds interspersed with approximately three acres of forested/shrub wetland (USFWS NWI, 2021).

Floodplains. FEMA Flood Insurance Rate Maps (FIRM) indicate the majority of PMRF-Barking Sands is located in Zone AE (is within the 100-year floodplain with a 1-percent chance of inundation by a flood event in any given year, and a 26-percent chance of flooding over a 30-year period) (FEMA, 2021), and the Hawaii Emergency Management Agency indicates all of the Installation is in a Tsunami Evacuation Zone (Hawaii Emergency Management Agency, 2021). According to FIRM Panel 1500020120F, the proposed PMRF-Barking Sands SPCS site is located within Zone D, indicating possible but undetermined flood hazards (FEMA, 2021); the proposed SPCS site is not located within a 100-year floodplain. The southwest boundary of the site is located approximately 300 feet from the sea and abuts Zone VE (coastal areas within the 100-year flood zone that have an additional hazard associated with storm waves) (FEMA, 2021).

The primary flood hazard at PMRF-Barking Sands is from overflow of the drainage ditches that drain the Mana Plain during periods of high rainfall; the Mana Plain is drained through pumping to prevent flooding in addition to allowing agriculture. The proposed SPCS site, while located within the coastal zone, is not located within the 3.2-foot SLR exposure area (**Figure 3-2**) (SOH, 2021).

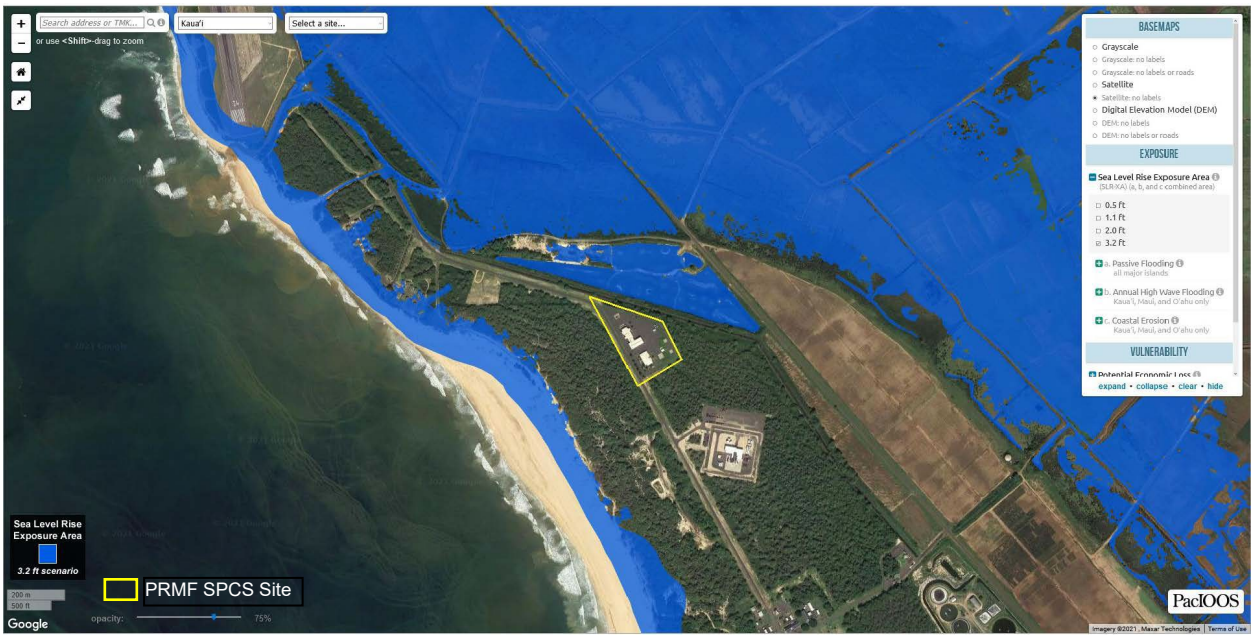

Figure 3-2 Sea-Level Rise Exposure Area–PMRF-Barking Sands

3.3.5.2 Environmental Consequences

Proposed Action. Ground disturbance from building and equipment pad construction under Alternative A would include activities such as vegetation clearing, grading, excavating, and recontouring of soils, which present the risk of potential impacts to water resources. Low Impact Development construction projects could be implemented in order to minimize impacts associated with implementation of Alternative A.

Proposed Action – Surface Water. As described above**,** no natural surface water resources are present on PMRF-Barking Sands, the Mana Plain, or the proposed PMRF SPCS site. Surface water on the Mana Plain is restricted to a system of drainage ditches that discharge pumped water from agricultural lands and stormwater runoff to the sea, the closest of which is the Kinikini ditch, located approximately 90 feet from the proposed SPCS site, and separated from the site by dense vegetation.

As described in **Section 3.3.6.2**, the risk of potential soil erosion and sedimentation from construction would be minimized through the implementation of appropriate erosion and sediment control BMPs identified and implemented as part of a required NPDES Construction Stormwater General Permit SWPPP Erosion and Sediment Control Plan (ESP), which would prevent sediment, debris, and other pollutants from entering the Installation's stormwater drainage ditches and consequently discharging to the sea.

Therefore, no significant direct or indirect impacts to surface water quality would be anticipated to result from implementation of Alternative A.

Proposed Action – Coastal Zones. As described above, all of the islands of Hawaii, excluding lands solely under federal jurisdiction, are classified as a coastal zone under the CZMA. Federal consistency requires that federal actions, within and outside the coastal zone, which have reasonably foreseeable effects on any coastal use (land or water), or natural resource of the coastal zone be consistent to the maximum extent practicable with the enforceable policies of the Hawaii Coastal Management Program presented in the OMRP (SOH, 2020b). The Hawaii Office of Planning noted that implementation of the Proposed Action at PMRF-Barking Sands may be subject to a CZMA review via letter dated 8 March 2021 and requested that the EA evaluate the vulnerability of the site to SLR, include the SLR map, and address stormwater concerns for nearshore marine resources.

Activities associated with implementation of Alternative A have the potential for short- and long-term impacts to soil and water resources in the coastal zone; however, these impacts would be minimized by complying with the NPDES Construction General Permit and Base-wide Storm Water Management Plan

(SWMP), as described in the respective sections of this EA. Therefore, no significant direct or indirect impacts to the coastal zone are anticipated to result with the implementation of Alternative A.

Pursuant to Section 307 of the CZMA, the OP-CZM may conduct a federal consistency review of the Proposed Action to ensure consistency with the CZMA. If an activity is determined to directly affect the coastal zone, NGB would submit a consistency determination prior to approving the activity, as required under 15 CFR § 930.34(a)(1). The SOH would then have 45 days to agree or disagree with the determination. Construction occurring under Alternative A would be limited to an 883 ft^2 addition to an existing building and would not impact the coastal zone. Therefore, USAF would not submit a consistency determination for the Proposed Action.

The proposed SPCS site, while located within the coastal zone, is not located within the 3.2-foot SLR exposure area (SOH, 2021), and therefore would not be vulnerable to potential flooding from predicted increases in sea levels rising resulting from climate change.

Proposed Action – Groundwater. As described above, PMRF-Barking Sands overlies two brackish aquifers. Potential inputs of pollutants to these aquifers under Alternative A could occur if chemicals or petroleum products are spilled from equipment due to malfunction or refueling errors; however, appropriate spill containment and control BMPs included in the NPDES Construction Stormwater General permit SWPPP would be adhered to and would be implemented in construction vehicle refueling areas to prevent pollutants from entering the soil and the underlying aquifers. Should an accidental spill of petroleum from vehicles or machinery occur outside of protected refueling areas, it would likely be a few gallons or less in volume, and soil would be removed and properly disposed of in adherence to the Installation's Hazardous Waste Management Plan (PMRF-Barking Sands, 2018a).

Proposed Action – Stormwater. As described above, stormwater runoff on the Installation is restricted to a system of drainage ditches that discharge to the sea. Also described, the risk of potential soil erosion and sedimentation from proposed construction would be minimized through the implementation of appropriate erosion and sediment control BMPs identified and implemented as part of a required NPDES Construction Stormwater General Permit SWPPP ESP, which would prevent sediment, debris, and other pollutants from entering the Installation's stormwater drainage. Therefore, no significant direct or indirect impacts to stormwater quality would be anticipated to result from implementation of Alternative A.

The proposed PMRF-Barking Sands SPCS site is developed and paved with asphalt, and implementation of Alternative A would not result in an increase in impervious surface area. Therefore, no significant direct or indirect impacts to stormwater quantity would be anticipated to result from increased impervious area associated with implementation of Alternative A.

Proposed Action – Wetlands. A letter received from USEPA Region 9 dated 8 March 2021 noted that the Proposed Action should avoid the discharge of dredging material into adjacent wetlands. As described above, no jurisdictional wetlands are located on the proposed SPCS site, and the closest wetland area is located approximately 400 feet north from the proposed site and separated from the site by the Kinikini ditch. No construction activities would occur within this wetland area, no dredge or fill material would be placed into this wetland area, and adherence to the NPDES Construction Stormwater General Permit SWPPP ESP would prevent the migration sediment into this wetland area. Therefore, construction activities associated with Alternative A would not impact wetlands, and implementation of the Proposed Action at this site would comply with EO 11990.

Proposed Action – Floodplains. Extreme weather events due to climate change for the state of Hawaii include increases in both heavy rainstorms and hurricane frequency and severity, leading to more flooding events (USEPA, 2016a). As described above, the proposed SPCS site is located in Zone D (area of undetermined, but possible, flood hazards) and is not located within a 100-year floodplain; therefore, proposed activities under Alternative A would not impact floodplains and the implementation of the Proposed Action at this site would comply with EO 11988. A letter from SOH DLNR dated 8 March 2021 requested that the Proposed Action, if implemented at PMRF-Barking Sands, follow flood hazard zone requirements.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, is not expected to adversely impact water resources. Construction activities would only occur in previously disturbed areas lacking surface water resources, and BMPs to control erosion and sedimentation would be implemented. Therefore, the Proposed SPCS site is not expected to have increased vulnerability to potential flooding from predicted climate change-driven extreme weather events.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. Water resources would not change from current condition, and no impacts to water resources would be anticipated.

3.3.6 Geological Resources

3.3.6.1 Existing Conditions

The ROI for geological resources under Alternative A is the proposed SPCS site at PMRF-Barking Sands.

Regional Geology. Kauaʻi, a volcanic island that is part of the Main Hawaiian Islands, was formed when a massive shield volcano was built up from the sea floor by many thousands of thin flows of basaltic lava (MacDonald et al., 1960). The general area where PMRF-Barking Sands is located is part of the Mana Plain, a wedge of terrestrial and marine sediments overlying volcanic basement rocks that consist of the Napali Formation of the Waimea volcanic series (PMRF, 2016).

Topography. The island of Kauaʻi is a deeply eroded volcanic shield with a maximum elevation of 5,243 fee (NAVFAC, 2010). The Mana Plain, on which PMRF-Barking Sands is located, is a low-lying coastal terrace on the western flank of the island with gentle westerly slopes near the volcanic upland, and relatively flat sandy land at the coastal margin. Low beach barrier dunes, mildly undulating sands, and the more prominent Nohili Dunes located at the northern boundary of PMRF-Barking Sands provide some local elevation (U.S. Navy, 2009); however, topography within the proposed PMRF-Barking Sands SPCS site is flat.

Soils. The proposed PMRF-Barking Sands SPCS site is developed and has been paved over with asphalt. Soil underlying the proposed site is mapped entirely as Jaucas loamy fine sand with zero to eight percent slopes (**Figure 3-3**). Jaucas loamy fine sand is a very deep soil profile (in some cases more than 5 feet deep), that is excessively drained with very rapid permeability (NRCS, 2021a).

The soil underlying the proposed PMRF SPCS site and adjacent lands is not identified as ***prime farmland*** and is not in agricultural use (NRCS, 2021b).

3.3.6.2 Environmental Consequences

Proposed Action. Ground surface disturbance from activities proposed under Alternative A would not alter geologic structures or features because underlying bedrock geology at PMRF-Barking Sands and the proposed SPCS site would not be disturbed. The proposed SPCS site is developed and has been paved over with asphalt, and the underlying soil, as described above, is in some cases more than 5 feet deep before bedrock is encountered. Therefore, no direct or indirect impacts to local or regional geology would occur.

Activities associated with Alternative A would occur entirely on the proposed SPCS site, which is completely paved and has been previously developed. Ground surface disturbance from construction activities under Alternative A presents the risk of potential short- and long-term increased soil erosion and sedimentation; however, this risk would be low given the flat topography of the proposed site, excessively drained soils with very rapid permeability, and the implementation of appropriate erosion and sediment control BMPs. BMPs would be identified and implemented as part of a SWPPP ESP that would be developed and adhered to in compliance with a required NPDES Construction Stormwater General Permit. Construction activities associated with Alternative A would not result in any significant direct or indirect impacts to soil resources.

There is no prime farmland on the proposed SPCS site; therefore, no impacts to prime farmland would occur under Alternative A.

The Proposed Action, in addition to the past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would have negligible effects on geological resources during or after construction and renovation activities, which would occur in previously disturbed areas. BMPs and compliance with permits would minimize the effect on soils.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. Soils would not change from current condition, and no impacts to soils would be anticipated.

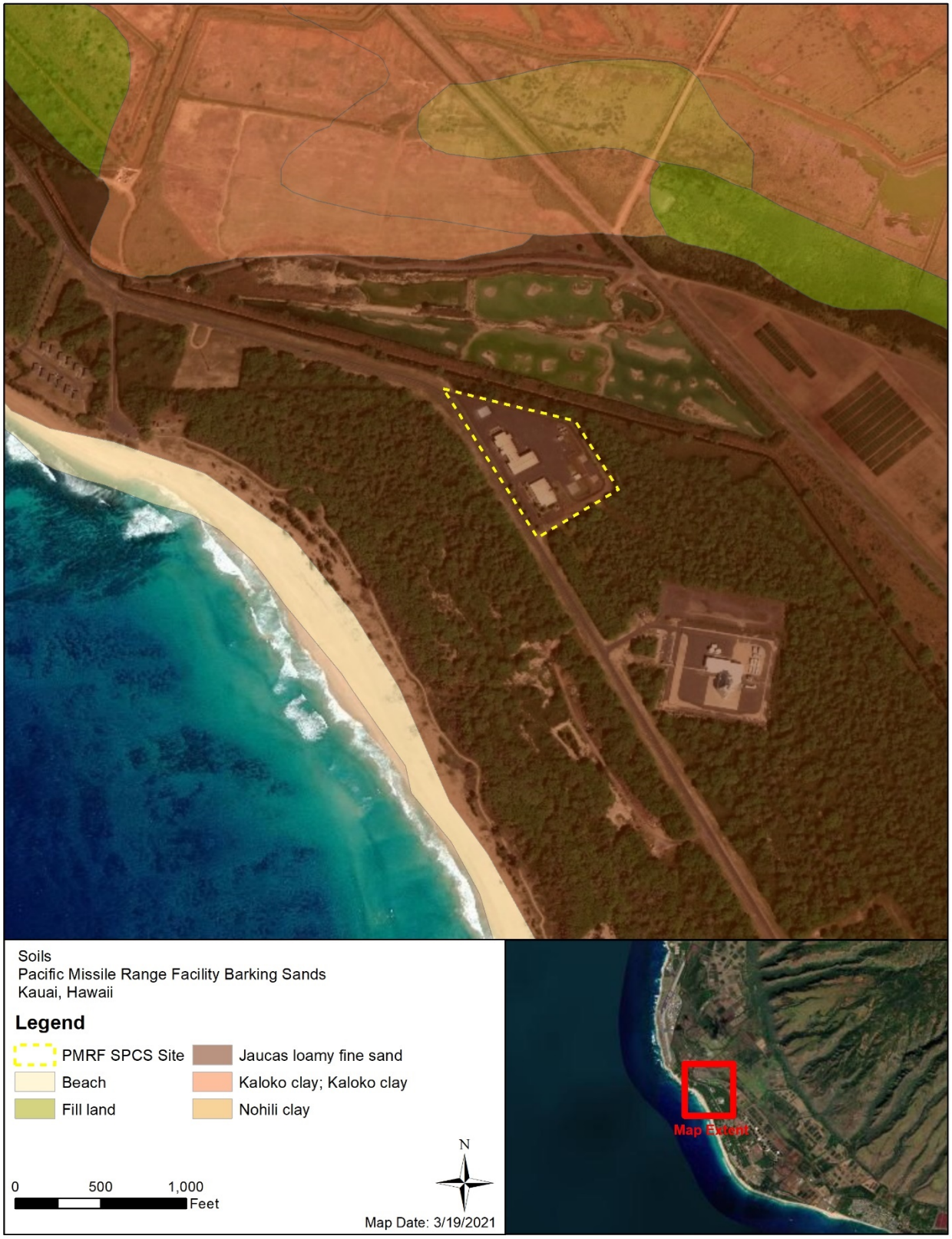

Figure 3-3 Site Soils–PMRF-Barking Sands

3.3.7 Land Use

3.3.7.1 Existing Conditions

The ROI for land use under Alternative A is PMRF-Barking Sands. PMRF-Barking Sands is located on the west coast of Kauaʻi, Hawaii, and covers approximately 2,335 acres. The Installation is currently divided into eight land use categories: airfield operation, Base administration, community support, housing, industrial, open space, range operations, and supply (PMRF-Barking Sands, 2016). The majority of current land use is open space and range operations. Land use for the proposed PMRF-Barking Sands SPCS site is industrial, and it is currently developed with communications structures consisting of two buildings and storage facilities. Land use surrounding the site is open space, and the Kawaiʻele Waterbird Sanctuary managed by SOH DLNR is located approximately 400 feet directly north of the site.

3.3.7.2 Environmental Consequences

Proposed Action. Land use on PMRF-Barking Sands would not be negatively impacted with the implementation of Alternative A. Construction activities associated with this alternative would occur entirely within the existing boundaries of PMRF-Barking Sands in areas of existing land use that include land currently developed and classified as industrial. Land use surrounding the proposed SPCS site is open space, and the Kawaiʻele Waterbird Sanctuary is located approximately 400 feet directly north of the site; however, no permanent changes to the noise environment would occur with the implementation of Alternative A, and noise impacts would be temporary during the construction period. Therefore, there would be no changes to existing land use or land use compatibility with the implementation of Alternative A.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would not be expected to have significant land use impacts, as the overall land use as a military installation would remain unchanged.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. Land use would not change from current conditions, and no impacts to land use would be anticipated.

3.3.8 Socioeconomics

3.3.8.1 Existing Conditions

The ROI for socioeconomics under Alternative A includes PMRF-Barking Sands and the surrounding environs.

Population. The proposed SPCS site is located in Census Tract 409, which encompasses the entirety of PMRF-Barking Sands. Population in this census tract has increased by approximately 12.3 percent between 2010 and 2019, which a current population of 5,424 people. Kauaʻi County has also experienced a relatively high growth rate since 2010 (**Table 3-6**), experiencing growth rates that substantially exceed the population growth rates for the state and the nation. Kauaʻi County, which is home to approximately 5 percent of the population of the SOH, grew approximately 9.5 percent from 2010 to 2019, compared to about 3.8 percent for Hawaii and about 6.3 percent for the U.S. In 2019 (the most recently published population data), Kauaʻi County had a population of approximately 72,293 people (USCB, 2020a).

Table 3-6
Population in the PMRF-Barking Sands Region of Influence as Compared to Hawaii and the United States (2010–2019)

Geographic Area	2010	2019	Growth Rate 2010–2019 (Percent)
CT 409	4,757	5,424	12.3
Kauaʻi County	65,460	72,293	9.5
Hawaii	1,363,621	1,415,872	3.8
United States	308,745,538	328,239,523	6.3

Source: USCB, 2020a
CT = census tract; PMRF = Pacific Missile Range Facility

A total of 86 active duty and reserve military full time service members are stationed at PMRF-Barking Sands on Kauaʻi, in addition to approximately 1,400 retired, reserve, and guard DoD service members who live within 20 miles of the Installation (PMRF-Barking Sands, 2016). A total of 212 people, including active-duty military and their dependents, live on Base at PMRF-Barking Sands (PMRF-Barking Sands, 2016).

Employment. Kauaʻi County's 2019 annual average labor force was approximately 36,536 total people, and the average unemployment rate was 2.7 percent (978 unemployed). The Kauaʻi County unemployment rate was slightly higher than the average unemployment rate for Hawaii (2.5 percent) and was below the 3.5 percent national average unemployment rate (U.S. Bureau of Labor Statistics, 2018, 2019a).

U.S. Bureau of Economic Analysis data and information on the region's largest employers show that employment in the area is dominated by the Accommodation and Food Services Sector, reflecting the importance of the tourism industry in Kauaʻi. The Government and Government Enterprises sector is the second largest industry in Kauaʻi County. The largest employer in Kauaʻi County is Grand Hyatt-Kauaʻi Resort & Spa. Ilima Terrace, Business Center at Grand Hyatt, and Marriott-Kauaʻi Resort are the next three largest employers in terms of size (SOH, 2019a).

Housing. USCB estimates show that housing vacancy rates in Kauaʻi County for both homeowner and rental housing in 2019 were below the state averages, while homeowner vacancy rates were below the national average and the rental vacancy rate was slightly above the national average (**Table 3-7**). There are approximately 8,679 vacant units in Kauaʻi County. The percentage of homes that are owner-occupied for Kauaʻi County (67.4) is above both the U.S. average of 64.1 percent and the Hawaii average of 60.2 percent. Compared to the national median home value of $240,500, homes in Kauaʻi County have a median value of $622,300, while homes in Hawaii have a median value of $669,200. Kauaʻi County has a higher rate of rental vacancies than the national average (USCB, 2020a).

PMRF-Barking Sands housing for accompanied personnel includes a total of 54 units, while unaccompanied housing consists of 18 units. Occupancy rates on the Installation usually are in the range of 90 percent and a waitlist has not historically been required (Personal communication with Jeffrey Shaw, 2021). The basic allowance for housing for the area starts at $1,872 for an E1 without dependents and increases to a maximum of $3,456 per month for an O7 with dependents (Defense Travel Management Office, 2021). The average monthly rent for a two-bedroom apartment in Kauaʻi County is $2,090 (U.S. Department of Housing and Urban Development, 2021).

Table 3-7
Housing in Kauaʻi County

Attribute	Kauaʻi County	Hawaii	United States
Total Units	31,577	550,328	139,686,209
Owner-occupied	67.4%	60.2%	64.1%
Renter-occupied	32.6%	39.8%	35.9%
Vacant Units	8,679	85,029	16,883,357
Homeowner Vacancy Rate[a]	0.9%	1.4%	1.5%
Rental Vacancy Rate[b]	6.4%	8.8%	6.0%
Median Value[c]	$622,300	$669,200	$240,500

Source: USCB, 2020a
Notes:
a. Homeowner vacancy rate is the proportion of the homeowner inventory that is vacant "for sale."
b. Rental vacancy rate is the proportion of the rental inventory that is vacant "for rent."
c. Median value of owner-occupied units.

Schools. PMRF-Barking Sands is located within the Hawaii Public Schools Kauaʻi District. The Kauaʻi District encompasses nine elementary schools, three middle schools, and three high schools (SOH Department of Education [DOE], 2021). The District is comprised of one Complex Area, which includes the Kauaʻi Complex, Kapaa Complex, and Waimea Complex; PMRF-Barking Sands falls under the Waimea Complex. PMRF-Barking Sands is served by three main schools, including Kekaha Elementary School, Waimea Canyon Middle School, and Waimea High School. There is one institution of higher learning on Kauaʻi, Kauaʻi Community College, which is located in Lihue.

3.3.8.2 Environmental Consequences

Proposed Action. Socioeconomic impacts resulting from Alternative A were evaluated using SPCS #4 personnel requirements for ANG space operators and operations support personnel for an offensive

mission, as the 88 to 115 new personnel required are higher than the 62 to 105 personnel associated with the SPCS #5 and thus provide a more conservative estimate for impacts. The proposed SPCS unit would consist of approximately one-third full-time personnel and two-thirds drill-status guardsmen. Therefore, assuming a conservative maximum of 115 personnel, an estimated 38 full-time personnel would staff the unit, while the remaining 77 personnel would be made up of drill-status guardsmen currently living on Kaua'i and O'ahu. It is anticipated that the majority of the full-time personnel would be local Kaua'i residents, as four of the last five full-time hires over the last 20 years have lived on Kaua'i (Personal communication, Lt Col Chad Briggs, 2021). The requirements for an estimated additional 38 military, contract, and civilian personnel and their families under the Proposed Action in the Kaua'i County region would have no readily discernable impact on the region's population, particularly as it is anticipated that the majority of hires would be current residents of Kaua'i.

If all 38 full-time personnel and their families requested to live on PMRF-Barking Sands on Base housing, there would not be sufficient space to house personnel; however, based on historical trends, it is anticipated that only 8 of the 38 would be hired from off-island and would require housing. It is anticipated that 93 percent of personnel that would arrive at PMRF-Barking Sands would be accompanied, and of these, at least half of the personnel would request to live on Base due to the high cost of living in the area (Personal communication, Lt Col Chad Briggs, 2021). If more personnel than anticipated requests on-Base housing, there would be inadequate housing available to support the beddown of an SPCS squadron, meaning some personnel may be placed on a waitlist for housing or may be required to find housing off Base.

Based on the basic allowance for housing, it is anticipated that personnel moving to the area in support of the SPCS beddown would have sufficient funds for rental housing if an insufficient supply of housing on Base necessitated finding off Base housing. Impacts to the local economy and Installation personnel could occur if additional housing is constructed in order to support personnel associated with the SPCS beddown; however, no housing construction is planned at this time. If a higher than anticipated number of full-time personnel are hired from outside of Kaua'i and move to the local area and requiring housing, it is possible that the cumulative effect of basic housing allowance used to rent or purchase properties could cause housing prices in the area to rise, potentially impacting the local community. However, based on historical trends and current estimates, effects to the local community would not be anticipated.

Under Alternative A, construction of a new building and equipment pad, as well as the resurfacing of the parking lot would result in a temporary increase of 20 to 50 construction personnel, which would have no impact on the socioeconomic condition on the region. The 115 additional military, contract, and civilian personnel would represent an increase of more than 135 percent of the total persons permanently assigned to and working at PMRF-Barking Sands, where currently 86 personnel are employed. Adequate housing and educational resources are available in the ROI to accommodate the small increase in personnel; therefore, no impacts on employment, housing, or educational resources would occur under implementation of Alternative A.

In scoping comments dated 2 March 2021, USEPA Region 9 requested clarification on the need for additional infrastructure and housing to support the relocation of additional troops under the Proposed Action at PMRF-Barking Sands. The Proposed Action, in addition to past, present, and reasonably foreseeable future actions, would substantially increase the population on PMRF-Barking Sands and would increase the demand for housing on and off Base. Depending on the demand for housing on Base, PMRF-Barking Sands could decide to construct new housing in support of additional personnel. However, no projects are currently planned to increase housing on Base. Construction and demolition projects would result in a beneficial impact, as local sales and payroll taxes would increase.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. No expenditures would occur locally or regionally to support the action alternatives. There would be no change to socioeconomic conditions under the No Action Alternative.

3.3.9 Environmental Justice and Protection of Children

3.3.9.1 Existing Conditions

In 2019, the SOH and Kaua'i County had a much higher percentage of minorities in the population compared to the U.S., with nearly 76 percent and 69 percent of the population, respectively (USCB, 2020a). Compared to the U.S., Kaua'i County and Hawaii have a much higher percentage of the population that is considered Native Hawaiian or Pacific Islander (25.1 percent, 26.8 percent, and 0.4 percent, respectively).

Over the same period, Kaua'i County had the same rate of poverty as the SOH and a lower rate of poverty than the U.S. (**Table 3-8**); the percentage of the population below poverty in Kaua'i County and the SOH is 9.3 percent, while the percent below poverty in the U.S. is 12.3 percent. The percentage of children in Kaua'i County was slightly lower than the U.S. and slightly higher than Hawaii, but similar to the percentage of children in both places as a whole (**Table 3-8**) (USCB, 2020b).

Table 3-8
Total Population and Populations of Concern in Kaua'i County

Geographic Area	Total Population	Percent Minority	Percent Hispanic or Latino[a]	Percent		
Kaua'i County	72,293	68.8	11.4	26.8	9.3	21.7
State of Hawaii	1,415,872	75.9	10.7	25.1	9.3	21.2
United States	328,239,523	28.0	18.4	0.4	12.3	22.2

Source: USCB, 2020b Table DP05
Note:
a. Hispanic and Latino denote a place of origin and percent youth are all persons under the age of 18.

3.3.9.2 Environmental Consequences

Proposed Action. Environmental justice impacts resulting from Alternative A were evaluated using SPCS #4 personnel requirements for ANG space operators and operations support personnel for an offensive mission, as the 88 to 115 new personnel required are higher than the 62 to 105 personnel associated with the SPCS #5 and thus provide a more conservative estimate for impacts. Under Alternative A, the increase in the number of personnel at PMRF-Barking Sands would not result in a disproportionate impact on minorities, low-income, and youth populations because vacancy rates in Kaua'i County are sufficient to support housing additional personnel off Base.

The impact assessment for each of the resource topics considered in the preceding sections identified only negligible-to-low impacts on the physical, natural, and human environment (see **Table 2-2**). Implementation of Alternative A would not result in the disproportionally high and adverse impacts on minority, low-income, or youth populations.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would not be expected to have a disproportionate impact on minority and low-income populations or children.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. No expenditures would occur locally or regionally to support the action alternative. There would be no change to minority, low-income, or youth populations under the No Action Alternative.

3.3.10 Cultural Resources

3.3.10.1 Existing Conditions

The APE for cultural resources under Alternative A is a 0.25-mile radius around the proposed SPCS site at PMRF-Barking Sands.

Archaeological, Traditional Cultural, and Architectural Properties. Eight prior studies have been conducted within a 0.25-mile radius around the proposed SPCS project site on PMRF–Barking Sands (ASM Affiliates, 2021).

One cultural resource (SIHP 50-30-05-2011) dating from the Historic Period has been recorded within a 0.25-mile radius around the proposed SPCS site (**Table 3-9**). This site is the surface ruins of a possible World War II-era or post-World War II-era training structure (Feature A) and a recent trash deposit (Feature B). This resource was determined not eligible for listing in the NRHP.

Table 3-9
Cultural Resources Recorded within a 0.25-mile Radius around the PMRF-Barking Sands Proposed SPCS Site

SIHP #	Date Recorded	Resource Name	NRHP Status
50-30-05-2011	1997	Complex of two Historic Period features; a wooden structure (Feature A) and a trash deposit (Feature B)	Not Eligible

Source: ASM Affiliates, 2021
PMRF = Pacific Missile Range Facility; SPCS = Space Control Squadron

In general, the project site is highly disturbed and intact archaeological deposits are not expected to be found at this location (HIANG, 2014).

TCPs may include traditionally used plants and animals, trails, and certain geographic areas. No TCPs, sacred areas, or traditional-use areas have been identified on or in the vicinity of the proposed SPCS site. PMRF-Barking Sands continues to consult and communicate with NHOs regarding potentially sensitive cultural resources and TCPs.

Tribal Lands. PMRF-Barking Sands participates in ongoing consultation and communications with NHOs.

3.3.10.2 Environmental Consequences

Proposed Action – Archaeological Resources and Traditional Cultural Properties. Alternative A includes construction activities that would require ground disturbance at the Proposed SPCS site. An addition would be added to the existing building, potentially requiring ground disturbance for construction of the foundation. A 2015 report documenting archaeological surveys and testing in the vicinity of the proposed SPCS site recommended that archaeological monitoring be conducted and guided by an Archaeological Monitoring Plan if ground-disturbing activities are to occur in areas not subjected to subsurface testing (Clark et al., 2015). Archaeological resources on PMRF-Barking Sands outside of the proposed SPCS site have been identified as eligible for the NRHP. The proposed SPCS site has been completely surveyed for archaeological resources and is located in a developed area that is considered to have low probability of archaeological discoveries. PMRF-Barking Sands has known TCPs outside of the proposed SPCS site and there are no federally recognized tribes located in Hawaii as listed on the National Conference of State Legislatures website (NCSL, 2021). In the event that archaeological resources are discovered during implementation of Alternative A, Standard Operating Procedures for the inadvertent discovery of archaeological or human remains, as detailed in the ICRMP, would be followed (HIANG, 2014).

Proposed Action – Architectural Properties. There are no recorded architectural resources that are eligible for the NRHP within a 0.25-mile radius around the proposed SPCS site. Therefore, no effects to historic properties would occur. Implementation of Alternative A would result in impacts to several existing buildings, none of which are eligible for inclusion in the NRHP.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would not result in impacts to cultural resources, archaeological resources, historic resources, or TCPs. NGB mailed a scoping letter containing maps of the Alternative locations and information about the project to the HI SHPO on 29 January 2021 requesting assistance in defining the APE. An acknowledgement letter was received from the SHPO via email on 12 February 2021. A consultation package was sent to HI SHPO on 5 August 2021. The HI SHPO responded with a letter of no concurrence on 7 September 2021. The NGB, working with Navy personnel at PMRF-Barking Sands, has reached a determination of *No Historic Properties Affected* for the Proposed Action under Alternative A. Additionally, the Proposed Action falls under a Regional PA signed by the Commander, Navy Region Hawaii; the Advisory Council on Historic Preservation; and the HI SHPO. The PA states that if Navy personnel determine that an undertaking does not have the potential to cause effects on listed, contributing, or eligible properties, no further review under the PA and the NHPA is required. As terms in the PA supersede standard consultation procedures outlined in Section 106 of the NHPA and implementing regulations (36 CFR Part 800), no further consultation with the HI SHPO is required.

Letters were also mailed to NHO organizations (see **Appendix A**) requesting assistance in identifying areas of concern, which could include potential effects to physical, ecological, social, cultural, and archaeological resources of particular concern to NHOs. No areas of concern were identified by the NHOs as a result of these letters. The NHOs contacted during the scoping period will also receive the Draft EA and Draft Finding of No Significant Impact for comment during the public comment period.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. There would be no impact to cultural resources under the No Action Alternative.

3.3.11 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

3.3.11.1 Existing Conditions

The ROI for this resource under Alternative A is the proposed SPCS site at PMRF-Barking Sands and vicinity.

Under federal law, state regulations can be more stringent than federal policies. SOH DOH received primacy of its hazardous waste program from the USEPA in 2001; therefore, the regulations governing hazardous waste in Hawaii are contained in the HAR Title 11. The majority of HAR regulating hazardous waste mirrors USEPA regulations; HAR § 11-260 to 272 control the identification, treatment, storage, transportation, handling, labeling and disposal of hazardous waste. HAR § 11-273 regulates the management of universal waste and HAR § 11-279 regulates used oil storage, transportation, and disposal (NAVFAC Hawaii, 2014).

PMRF-Barking Sands is classified as a large-quantity hazardous waste generator as defined by the USEPA, generating more than 2,200 pounds of nonacute hazardous waste per month. PMRF-Barking Sands operates numerous initial accumulation points (IAPs), where up to 55 gallons of "total regulated hazardous wastes" or up to 1 quart (2.2 pounds) of "acutely hazardous wastes" are accumulated. IAP managers are responsible for properly segregating, storing, characterizing, labeling, marking, packaging, and transferring all hazardous wastes for disposal from the IAP to an established 90-day storage area according to federal, state, local, and U.S. Navy regulations. The Hazardous Waste Program Manager is responsible for characterizing and profiling each waste stream. PMRF-Barking Sands also operates two 90-day accumulation sites, where hazardous waste accumulates before transfer to the Defense Logistics Agency Disposition Services for transportation off Installation for ultimate disposal (PMRF-Barking Sands, 2018b). Wastes generated on Base are managed under regulations set forth in the PMRF-Barking Sands RCRA Part B permit. PMRF-Barking Sands also holds a RCRA permit for handling the disposal and treatment of waste munitions.

Installation Restoration Program Sites. The Secretary of Defense established the Environmental Restoration Program in 1980 to investigate and remediate hazardous waste sites at DoD facilities. The USAF subsequently established its Installation Restoration Program (IRP) to locate and investigate hazardous waste sites on its installations, termed IRP sites. Fully restored and remediated IRP sites present few constraints to future on Base development; however, the implementation of land use controls may be required. Land use controls are physical, legal, or administrative mechanisms that restrict or limit access to contaminated property to promote beneficial land uses and protect human health and the environment. There are three IRP sites located within approximately 1 mile of the proposed SPCS site (**Table 3-10** and **Figure 3-4**).

Table 3-10
Installation Restoration Program Sites near the PMRF-Barking Sands Proposed SPCS Site

Site Name	Status
Landfill #1	Recommended for No Further Action
Fire Fighting Training Pit #1	Field Sampling Required
Area SW of Runway 34, Site 6	Field Sampling Required

PMRF = Pacific Missile Range Facility; SPCS = Space Control Squadron

Each of the IRP sites listed in **Table 3-10** above is located approximately 1 mile northwest of the proposed SPCS site at the southern end of Runway 34. Cleanup at Landfill #1 has been completed and a recommendation for No Further Action has been submitted to USEPA; concurrence status is currently pending (Personal communication with Jan Kotoshirodo, 2020). Field sampling is planned for Fire Fighting Training Pit #1, which is known to be a possible historical per- and polyfluoroalkyl substances release site. Field sampling is planned for late 2021. Investigation is also planned for the Area Southwest of Runway 34. Limited information regarding this site is available, but a petroleum substance and buried debris were found adjacent to the runway, requiring investigation. Field sampling for this site is planned for late 2021.

Asbestos is a mineral fiber that was historically added to products to strengthen them and provide heat insulation and fire resistance. Many building products contained asbestos prior to the 1970s. Naval Facilities

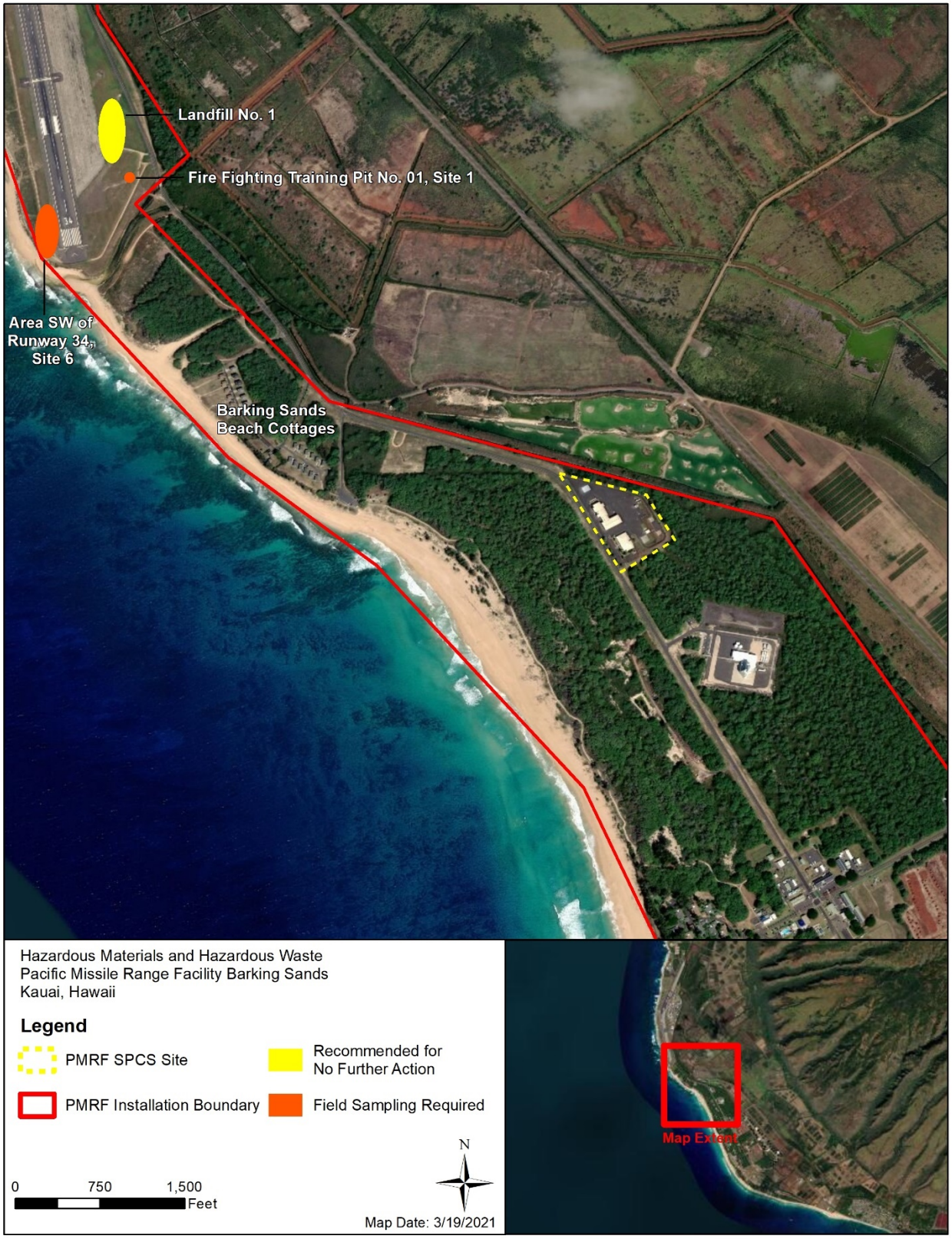

Figure 3-4 Hazardous Materials and Hazardous Waste–PMRF-Barking Sands

Engineering Systems Command (NAVFAC) developed the *Asbestos Program Management Plan* for PMRF-Barking Sands, which includes program administration, organizational roles and responsibilities, standard work practices, and documentation (NAVFAC Hawaii, 2017). All the facilities at the proposed SPCS site were constructed in 1995, after the use of asbestos in construction materials was discontinued. There are no facilities containing asbestos on the proposed SPCS site.

LBP also is considered a hazardous material. Although these paints are no longer used at the Base, some buildings on PMRF-Barking Sands were constructed prior to 1978 and may contain LBP. LBP removal and disposal at the Base is conducted in accordance with federal, state, and local regulations, and all paint waste generated from paint removal operations at the Base is containerized, sampled, and analyzed to determine if the waste meets the definition of hazardous waste. All buildings on the proposed SPCS were constructed after 1978 and are presumed not to contain LBP.

Radon. The USEPA radon zone for Hawaii is Zone 3 (Low Potential, predicted indoor average level less than 2 pCi/L). The Hawaii Noise Radiation and Indoor Air Quality Branch (USEPA, 2020c) indicates that radon levels in Honolulu County vary from under 2.0 pCi/L (92 percent of reported results in Zone 3), to 8 percent of results between 2.0 and 3.9 pCi/L (Zone 2). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods.

PCBs. All known PCB transformers were removed from PMRF-Barking Sands in 1990. None of the buildings on the proposed SPCS site contain any PCB equipment or PCB-contaminated equipment.

3.3.11.2 Environmental Consequences

Proposed Action – Hazardous Materials and Wastes. The use of certain hazardous materials would be required during proposed construction activities associated with Alternative A; hazardous materials that could be used include paints, welding gases, solvents, preservatives, sealants, and pesticides. Additionally, hydraulic fluids and petroleum products, such as diesel and gasoline, would be used in construction vehicles. Construction contractors would be responsible for monitoring exposure to hazardous materials. Adherence to the PMRF-Barking Sands *Hazardous Waste Management Plan* would minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal hazardous materials regulations (NAVFAC Hawaii, 2014). Therefore, short-term, negligible to minor impacts would be anticipated to result from the use of hazardous materials and petroleum products during the proposed construction activity.

Proposed Action – IRP Sites. Implementation of Alternative A would not impact any existing IRP sites. The three closest IRP sites are located approximately 1 mile of the proposed SPCS site.

Proposed Action – Asbestos. No impacts to asbestos would occur as a result of implementation of Alternative A, as the buildings currently located on the proposed SPCS site were constructed after the use of asbestos in construction materials was discontinued. Therefore, disturbance of asbestos at PRMF-Barking Sands would not occur.

Proposed Action – LBP. No impacts to LBP would be anticipated to occur as a result of implementation of Alternative A, as the buildings currently located on the proposed SPCS site were constructed after the use of LBP was discontinued. Therefore, disturbance of LBP at PRMF-Barking Sands would not occur.

Proposed Action – Radon. The USEPA radon zone for PMRF-Barking Sands is Zone 3 (predicted indoor average level greater than 2 pCi/L). The USEPA does not recommend corrective action for levels of radon below 4 pCi/L. There would be no impact related to radon due to implementation of Alternative A.

Proposed Action – PCBs. No impacts to PCBs would be anticipated from implementation of Alternative A. All known PCB transformers were removed from PMRF-Barking Sands in 1990. None of the buildings on the proposed SPCS site contain any PCB equipment or PCB-contaminated equipment.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would result in negligible impacts related to hazardous materials and wastes.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. No change to the management of hazardous materials, contaminated sites, or toxic substances would occur.

3.3.12 Infrastructure, Transportation, and Utilities

3.3.12.1 Existing Conditions

The ROI for this resource under Alternative A is PMRF-Barking Sands.

Solid Waste. PMRF disposes of solid waste in the Kekaha landfill. The PMRF operations and maintenance contractor collects this refuse and delivers it to the County-operated sanitary landfill at Kekaha, which is the only landfill on Kaua'i.

Sanitary Sewer. The PMRF-Barking Sands wastewater treatment plant is privately owned by NAVFAC and treats the wastewater generated within the region. PMRF-Barking Sands contains two wastewater treatment facilities. The facility in the south end of the region treats approximately 10,000 gallons per day. The treatment process consists mainly of a primary settler, an anaerobic treatment lagoon, and a secondary infiltration pond. The north end facility is located near the Base's north entrance and treats approximately 7,500 gallons per day (County of Kaua'i, 2015).

Transportation. Imiloa Road is a two-lane roadway that provides direct access to PMRF-Barking Sands from State Highway 50 (Kaumuali'i Highway). It intersects Kaumuali'i Highway, which is a primary circulation route connecting PMRF-Barking Sands with Kekaha and Lihue. Kaumuali'i Highway, in the vicinity of Imiloa Road, is a two-lane road.

Kaumuali'i Highway, north of Imiloa Road and between Tarter Drive and Kia Road, has a capacity of 24,800 vehicles and averages 1,100 cars daily. The level of service in 2020 for Kaumuali'i Highway near the Base was determined to be "A" (County of Kaua'i, 2020). The "A" level of service traffic is considered the best quality of traffic with good flow and speeds at the posted speed limit.

Utilities. The PMRF-Barking Sands water system (Public Water System No. 430) is owned by NAVFAC Hawaii and is operated and maintained by Manu Kai, LLC (PMRF, 2020). The average daily flow for the PMRF-Barking Sands water system is approximately 0.42 million gallons per day and there are 185 service connections within the system. The PMRF-Barking Sands water system obtains water from two sources: a well source and a connection to the Kaua'i Department of Water's Kekaha system (County of Kaua'i, 2015). The PMRF-Barking Sands water system facilities, all of which are located within the boundaries of the Installation, include two mechanical control buildings, four storage tanks, and two pneumatic pressure tanks. The drinking water system provides water for domestic, irrigation, and fire protection purposes.

Electricity at PMRF-Barking Sands is provided by Kaua'i Island Utility Cooperative (KIUC) power. In December 2017, NAVFAC and KIUC signed an agreement to incorporate distributed energy resources on PMRF-Barking Sands grounds. Located on 140 acres of land leased from the U.S. Navy, the AES PMRF-Barking Sands solar-plus-storage project is a 14 megawatts solar installation, coupled with a 70 megawatt hour, 5-hour duration storage system (Silvia, 2020).

Project Infrastructure. The SPCS structure at PMRF-Barking Sands would comply with all state and local building codes. These include State Building Code Council's Hawaii State Building Code, *Appendix W – Hawaii wind design provisions for new construction* (SBCC, 2021). This building code also includes design requirements for tsunami loads as well as both short and long seismic events.

3.3.12.2 Environmental Consequences

Proposed Action – Solid Waste. Short-term, minor impacts on solid waste management would occur during construction. No long-term impacts on solid waste management would be anticipated to occur because construction and operation of the proposed SPCS facility would not appreciably increase the amount of solid waste generated on the Installation from everyday functions.

Proposed Action – Sanitary Sewer. Short-term, negligible, adverse impacts on the sanitary sewer and wastewater treatment system would occur during construction when existing lines are connected or capped as appropriate. Long-term, negligible, adverse impacts would occur because the operation of the new buildings would increase the demand on the sanitary sewer and wastewater treatment system. Changes in demands would be minimal, and the sanitary sewer and wastewater treatment system has the capacity required to meet new demands.

Proposed Action – Transportation. PMRF-Barking Sands roadways would experience temporary impacts on transportation and circulation from construction-related traffic (i.e., heavy construction equipment and construction worker vehicles) during construction proposed under Alternative A.

Construction vehicle entry through PMRF-Barking Sands' primary entrance may result in minor delays during the peak hours of 7:00 a.m. and 4:00 pm; however, the overall impact on traffic at PMRF-Barking Sands would be temporary and minor. Construction equipment and vehicle staging would occur on previously developed or disturbed areas; therefore, impacts to parking in the vicinity of the proposed construction would be temporary and minor.

Up to 115 personnel would be added to the PMRF-Barking Sands workforce under Alternative A. There would be a slight increase of traffic as a result of the additional personnel. However, no adverse impacts to roads or intersections would occur at PMRF-Barking Sands.

Proposed Action – Utilities. Climate change may lead to decreased overall precipitation in Hawaii, which could impact availability of drinking water (USEPA, 2016a). Short-term, negligible, adverse impacts on the potable water supply system would occur during construction when existing lines are connected and capped as appropriate. Long-term, negligible, adverse impacts would occur because the operation of the new building would increase the demand on the potable water supply system. Changes in demand would be minimal, and the potable water supply system has the capacity required to meet new demands.

Construction and operation of the proposed SPCS facility would cause a slight increase in electricity demand; however, energy efficient construction to decrease energy consumption consistent with EO 13693, *Planning for Federal Sustainability in the Next Decade* would be implemented. Therefore, net changes in long-term demand are anticipated to be minimal, and the electrical system has the capacity required to meet new demands.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off PMRF-Barking Sands, would result in negligible impacts related to utilities and infrastructure. Therefore, the proposed SPCS site would not be expected to contribute to overall decrease in drinking water availability that could result from climate change-driven droughts.

Proposed Action – Project Infrastructure. Extreme weather events due to climate change for the state of Hawaii include increases in hurricane frequency and severity, leading to more wind events (USEPA, 2016a). The SPCS structure at PMRF-Barking Sands would comply with seismic, tsunami, and wind design codes. Therefore, the site would not be expected to have increased vulnerability to wind, tsunami, or seismic events.

Under the ***No Action Alternative***, no activities associated with Alternative A would occur. No changes to infrastructure, transportation, or utilities would occur.

3.4 ALTERNATIVE B–JOINT BASE PEARL HARBOR-HICKAM

3.4.1 Noise

3.4.1.1 Existing Conditions

The ROI for noise under Alternative B is JBPHH. The primary sources of noise on JBPHH is airfield operations. In addition to aviation noise, some additional noise results from the day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operations of the airfield. These noise sources include the operations of ground-support equipment, and other transportation noise from vehicular traffic.

3.4.1.2 Environmental Consequences

Proposed Action. Implementation of Alternative B would include construction activities that would occur entirely on existing Installation property. No noise sensitive receptors have been identified with 0.5-mile of the proposed site (USAF, 2020). Model results indicate that existing dBAs range from 65 to 85 across JBPHH, and do not exceed 75 dBA in the vicinities of the proposed SPCS site (USAF, 2020). Environmental consequences under Alternative B at JBPHH are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.1.2**).

Noise associated with construction equipment is generally short term, intermittent, and highly localized. Additionally, adherence to standard Air Force Occupational Safety and Health regulations that require hearing protection along with other personal protective equipment and safety training would minimize the risk of hearing loss to construction workers. Therefore, noise associated with the proposed construction, demolition, and renovation projects would not be anticipated to result in any significant direct or indirect

impacts on noise-sensitive receptors. There would be no operational increases in noise resulting from implementation of Alternative B.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH would not be expected to have significant noise-related impacts because construction noise would be localized to the proposed SPCS site and would be short term.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. Noise in the area would not change from current conditions, and no significant impacts on noise-sensitive receptors would be anticipated.

3.4.2 Safety

3.4.2.1 Existing Conditions

The ROI for safety under Alternative B is JBPHH. Existing conditions for ***ground safety*** and ***RF energy safety*** under Alternative B at JBPHH are the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.2.1**).

3.4.2.2 Environmental Consequences

Proposed Action. Environmental consequences for ground safety and RF energy safety under Alternative B at JBPHH are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.2.2**). A scoping letter dated 29 January 2021 was sent to the Federal Aviation Administration (FAA) providing the opportunity to specify any concerns related to the proposed project. The FAA responded by email on 17 February 2021, noting that the proximity of the proposed SPCS site to the Daniel K. Inouye International Airport required that NGB fill out FAA Form 7460-1 in order to allow the FAA to analyze the potential effects of the proposed construction and operation of the SPCS on navigable airspace. The FAA provided a Determination of No Hazard to Air Navigation by mail on 14 May 2021.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, would not be expected to have significant safety-related impacts.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. Safety on JBPHH would remain unchanged, and the implementation of the No Action Alternative would result in no significant impacts to safety.

3.4.3 Air Quality

3.4.3.1 Existing Conditions

The ROI for air quality under Alternative B is the SOH AQCR.

Regional Climate. JBPHH is located on the island of O‘ahu, Hawaii, which experiences a climate that has little seasonal variation and minimal seasonal temperature ranges. The island experiences an average high and low January temperature of 80 degrees and 65 degrees Fahrenheit, and an average high and low of 88 degrees and 74 degrees in July. Temperatures outside of these ranges are extremely rare. JBPHH experiences an average annual rainfall of 22 inches, with the majority of precipitation occurring during the winter months.

Baseline Air Emissions. JBPHH is located in Honolulu County, which is part of the SOH AQCR. See **Section 3.1.3.2** for information on the DOH CAB standards. JBPHH currently operates under multiple Covered Source Permit issued by DOH CAB for stationary source emissions from U.S. Navy and USAF operations. These stationary sources include boilers, combustion turbines, diesel engine generators, and ship building/ship repair operations. Annual emission inventory reports for stationary sources at JBPHH were not available and are not presented in this EA. Current levels of emissions from stationary sources at the facility exceed permitting thresholds to trigger requirements for covered source permits.

Greenhouse Gases. The GHG reporting rule described in **Section 3.1.3.3** requires reporting of GHG data and other relevant information from larger GHG emission sources, fuel and industrial gas suppliers, and carbon dioxide injection sites in the U.S. As required under the Covered Source Permits Nos. 0105e-01-C, 0105a-01-C, and 0209-01-C, GHG emissions from stationary sources at JBPHH do not emit 25,000 metric tons or more; therefore, GHG reporting rule requirements are not applicable.

3.4.3.2 Environmental Consequences

Proposed Action. Environmental consequences under Alternative B at JBPHH are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.3.2**).

Table 3-11 presents total annual estimated air emissions for Alternative B compared to the PSD permitting threshold of 250 tpy for attainment area criteria pollutants. Estimated total annual emissions would not exceed the PSD permitting threshold for any criteria pollutant or precursor. Therefore, impacts from Alternative B on regional air quality in the SOH AQCR would be expected to be minor, and no impacts would be expected to occur. Emissions for CO_{2e} do not have a regulatory threshold; however, estimated emissions for CO_{2e} are presented to demonstrate that CO_{2e} emissions would also be low when compared to GHG emissions of 25,000 metric tons or more associated with large GHG sources.

Table 3-11
Alternative B Estimated Emissions at JBPHH Compared to PSD Permitting Threshold Thresholds

Pollutant	Action Emissions (ton/year)		Insignificance Indicator	
	SPCS #4	SPCS #5	Indicator (ton/year)	Exceedance (Yes or No)
Volatile Organic Compounds	0.532	0.514	250	No
Nitrogen Oxides	1.16	1.146	250	No
Carbon Monoxide	3.712	3.502	250	No
Sulfur Oxides	0.005	0.004	250	No
PM_{10}	0.814	0.813	250	No
$PM_{2.5}$	0.042	0.042	250	No
Lead	0	0	25	No
Carbon Dioxide Equivalent	516.1	498.2	-	-

$PM_{2.5}$ = particulates equal to or less than 2.5 microns in diameter; PM_{10} = particulates equal to or less than 10 microns in diameter; PMRF = Pacific Missile Range Facility; SPCS = Space Control Squadron

The air pollutant emissions under Alternative B would be predominantly from construction of new facilities. Construction emissions are not restricted by the current covered source permit held by JBPHH. Criteria pollutants would result if new stationary sources (e.g., boilers, water heaters, emergency generators) for the proposed new facilities are installed and operated. Prior to starting any construction for a new fuel-burning equipment, permit requirements contained in HAR § 11-60.1-82 should be examined to determine if new equipment planned for installation are insignificant, thus not requiring a permit. Additionally, for proposed new stationary emission sources, an application of modification to the existing covered source permit may be necessary, especially if sources are determined to be significant based on their size or emission levels. For larger, more polluting new stationary emission sources, permitting rules must be examined to ensure that the new fuel-burning emission sources do not trigger a PSD review based on their potential to emit regulated criteria pollutants or hazardous air pollutants. Generally, natural gas comfort heat boilers, water heaters, and backup diesel generators for typical office buildings or administrative facilities are not likely to generate pollutant emission quantities that would trigger the requirement for permits.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, would result in less than significant impacts on air quality. Construction activities would be short term and localized, and their potential impacts on air quality would not last beyond the construction period.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur, and emissions would not change from current levels. As a result, no impacts would occur to regional air quality in SOH AQCR under the No Action Alternative.

3.4.4 Biological Resources

3.4.4.1 Existing Conditions

The ROI for biological resources under Alternative B includes JBPHH, including the land surrounding the facilities proposed for development (see **Figure 1-2**).

Ecoregions are used to describe areas of similar type, quality, and quantity of environmental resources (USEPA, 2021a). Ecoregions are assigned hierarchical levels to delineate regions spatially based on different levels of planning and reporting needs. JBPHH is located entirely within the Oceana realm and the

different levels of planning and reporting needs. JBPHH is located entirely within the Oceana realm and the Hawaii Tropical Low Shrublands ecoregion that is found on all eight main islands (One Earth, 2021a; WWF, 2021a). This ecoregion, a mix of grassland and shrubland, receives a wide range of yearly precipitation (20 to 67 inches) and has been heavily degraded due to development and other human disturbances, invasive plants and animals, and fire (One Earth, 2021a; WWF, 2021a).

Vegetation at the proposed SPCS site on JBPHH consists of mowed grasses and a small stand of trees.

Wildlife. The only native terrestrial mammal located in and around JBPHH is the endangered, federal listed Hawaiian hoary bat (*Lasirus cinerus semotus*). However, a major concern is the presence of feral cats (*Felis catus*) that prey on native species (JBPHH, 2011). Damage-causing non-native species are described in **Section 3.4.4.1.1.5**. A variety of marine mammals are located in the waters of Pearl Harbor and further offshore. Notably, federal listed, endangered Hawaiian monk seals (*Monachus schauinslandi*) can be found spending time hauled out on the shores around the harbor (JBPHH, 2011).

Much of the habitat around JBPHH consists of dense mangrove forests and rocky shoreline, making it unsuitable for waterbirds or shorebirds, although several species, such as the curlew sandpiper (*Calidris ferruginea*) and the Pacific golden plover (*Pluvialis fulva*), can be found on shorelines (JBPHH, 2011). Forty-nine species of migratory birds have been observed at the Pearl Harbor Naval Complex, including a variety of common gulls, such as the California gull (*Larus californicus*), the ring-billed gull (*Larus delawarensis*), ducks and wigeons, including mallards (*Anas platyrhynchos*) and the American wigeon (*Anas americana*), and the indigenous black-crowned night heron (*Nycticorax nycticorax*) (JBPHH, 2011). Two notable raptors are in the area: the peregrine falcon (*Falco* peregrinus) and osprey (*Pandion* haliaetus).

Due to the lack of natural habitat on JBPHH, there have been no focused surveys on terrestrial amphibians and reptiles, with Navy surveys instead focused on inland forested areas where these species are more likely to be found (JBPHH, 2011). However, threatened green sea turtles inhabit the waters in and around Pearl Harbor and are known to nest on the sandy beaches in the area.

Similarly, few surveys have been done to investigate for sensitive insect species; however, the indigenous *Pantala flavescens* were found in a stream on navy property (NAVFACPAC, 2007). In 2013 the coconut rhinoceros beetle (*Asiatic rhinoceros beetle*) was detected on JBPHH and efforts are ongoing to control this invasive species that causes damage to coconut plants (CNRH, 2021).

There are no federal or state-listed plant species that occur naturally in the Pearl Harbor Naval Complex (JBPHH, 2011).

Ten ***federal or state-listed endangered and threatened fauna*** species have been previously observed on JBPHH (including marine areas). Of these species, the Hawaiian hoary bat, Hawaiian coot, common moorhen, Hawaiian short-eared owl, and Hawaiian duck have the potential to occur on the proposed SPCS site (JBPHH, 2009a) and are described in further detail below. These species have not been observed on the proposed SPCS site; however, no formal surveys of the proposed SPCS site have been conducted in support of the Proposed Action. Species that do not have the potential to occur on the proposed SPCS site are not described in further detail.

1. *Hawaiian hoary bats* are a federal- and state-listed endangered species and Hawaii's only native terrestrial mammal (USFWS, 2021a).
2. *Hawaiian coots* are an endemic federal- and state-listed endangered species found in fresh and brackish water along shorelines, in estuaries, and in freshwater habitats of Pearl Harbor (NAVFACPAC, 2006d).
3. *Hawaiian common gallinule/moorhen*, are an endemic waterbird that is both federal- and state-listed as endangered and found along the shoreline, estuaries, and freshwater habitats in and around Pearl Harbor (JBPHH, 2011).
4. The *Hawaiian short-eared owl*, locally known as pueo, is an endemic state listed endangered species. Unlike most owls, pueo are active during the day and build nests on the ground (DLNR, 2021). Major threats include habitat loss and habitat degradation, predation by invasive mammals, and avian diseases (DLNR, 2021).
5. The *Hawaiian duck*, also called koloa-maoli, is an endemic federal- and state-listed endangered bird, found along the shoreline, in estuaries, and in freshwater habitats in and around Pearl Harbor (JBPHH,

2011). Their habit of ground nesting makes individuals, chicks, and eggs vulnerable to mongoose, pig, dog, and bullfrog predation. Besides predation threats from invasive species, threats include habitat loss and modification from invasive species, avian diseases, and hybridization with mallards (JBPHH, 2011).

See **Section 3.3.4.1** and **Table 3-4** for further descriptions of these species.

At JBPHH, there are eight non-native wildlife and vegetation species found on the Installation that cause substantial damage and meet the criteria of ***invasive species*** (see **Section 3.1.4.3** and **Table 3-12**). The Navy currently has control programs in place for each of these species (JBPHH, 2011).

Table 3-12
Invasive Species at JBPHH and Vicinity

Scientific Name	Common Name
Wildlife	
Anas platyrhynchos	Mallard
Anas platyrhynchos/Anas wyvilliana	Mallard/Hawaiian duck hybrid
Asiatic rhinoceros beetle	Coconut rhinoceros beetle
Felis catus	Cat
Vegetation	
Batis maritima	Pickleweed
Gracilaria salicornia	Gorilla seaweed
Prosopis pallida	Kiawe
Rhizophora mangle	Mangrove

Source: JBPHH, 2011; CNRH, 2021
JBPHH = Joint Base Pearl Harbor-Hickam

3.4.4.2 Environmental Consequences

Proposed Action – Vegetation. No significant impacts to vegetation would be anticipated to occur under the implementation of Alternative B, as Hickam AFB has been entirely disturbed and no natural vegetation remains.

Proposed Action – Wildlife. The proposed SPCS site is located in a developed area and does not provide suitable habitat for wildlife. Wildlife, and especially avian species, utilizing the surrounding undeveloped areas for foraging and breeding would normally be sensitive to increased noise impacts from military aircraft. Environmental consequences for wildlife under Alternative B at JBPHH are the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.4.2**).

Proposed Action – Threatened and Endangered Species. As noted in **Section 3.4.4.1**, nine federal or state-listed threatened or endangered species are known to occur on JBPHH. Suitable habitat for special status species is not located on the proposed SPCS site. Of these species, the Hawaiian hoary bat, Hawaiian coot, common moorhen, Hawaiian short-eared owl, and Hawaiian duck have the potential to occur on the proposed SPCS site (JBPHH, 2009a). However, these species have not been observed on the proposed SPCS site, although the Hawaiian hoary bat may fly through the parcel.

The hoary bat can be harmed by flying into barbed wire. Because Alternative B is not a preferred alternative for either mission, no formal design is available for the proposed facilities. However, it is anticipated that the fence with barbed wire would be similar to that proposed at PMRF-Barking Sands (refer to **Section 3.3.4.2**). In the event that trees would be removed under Alternative B, trees would not be removed during the Hawaiian hoary bat pupping season (1 June to 15 September). Therefore, it is anticipated that implementation of Alternative B is not likely to adversely affect the Hawaiian hoary bat.

Because the presence of these species has not been confirmed, the proposed SPCS site contains no suitable habitat, and no tree removal would occur, it is anticipated that implementation of Alternative B is not likely to adversely affect special status species. The NGB issued a determination of *Not Likely to Adversely Affect* for impacts to protected species under Alternative B. Consultation with USFWS is complete following receipt of concurrence with NGB's determination of *Not Likely to Adversely Affect* for impacts to protected species on 16 December 2021; documentation is included in **Appendix A**.

Birds and wildlife, including threatened and endangered species, can become accustomed to noise. It is anticipated that construction and renovation noise on the proposed SPCS site would result in short-term, insignificant impacts to threatened and endangered species.

Proposed Action – Invasive Species. None of the construction activities associated with Alternative B would have the potential to directly impact invasive species. Construction activities under Alternative B would be implemented using BMPs in accordance with the JBPHH *Integrated Pest Management Plan* (NAVFAC, 2013). In order to limit the potential for introduction of invasive species, equipment and off-site vehicles would be required to be cleaned prior to use on-site. Fill dirt, straw, and any plantings would also be checked for evidence of invasive non-native plants.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, would result in negligible impacts to biological resources. Construction activities would occur in previously disturbed areas with minimal natural resources present. When added to past, present, and foreseeable future actions, the Proposed Action would result in minimal noise disturbance to wildlife. These actions would not be expected to result in any adverse effects on threatened and endangered species. As such, no significant effects on biological resources would be expected.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. Biological resources on JBPHH would remain unchanged, and the implementation of the No Action Alternative would result in no significant impacts to biological resources.

3.4.5 Water Resources

3.4.5.1 Existing Conditions

The ROI for water resources under Alternative B is JBPHH.

No natural ***surface water*** resources, such as lakes, streams, or natural ponds, are present on JBPHH or the proposed JBPHH SPCS site; however, several man-made drainage ditches and canals convey groundwater seepage and stormwater runoff to Mamala Bay. The closest of these canals to the proposed JBPHH SPCS site is Kumumauʻu Canal, located adjacent to the western boundary of the proposed site, which is connected to numerous drainage swales, underground storm drains, and two major segments of the industrial stormwater sewer (**Figure 3-5**). Kumumauʻu Canal discharges to Mamala Bay approximately 400 feet downstream from the southwest corner of the site boundary. The JBPHH SPCS site, while having a predominantly flat topography, straddles the divide of two watersheds, causing surface runoff from the western portion of the site to flow west towards the Kumumauʻu Canal, and from the eastern portion of the site, to flow east towards the Manuwai Canal.

Under the CZMA, the entire SOH, excluding lands solely under federal jurisdiction, is classified as a ***coastal zone***; the SOH OP-CZM oversees Hawaii's Coastal Management Program (see **Section 3.3.5.1**). SLR is predicted at a 3.2-ft scenario, as shown in (**Figure 3-6**).

Three primary aquifers comprise the Oʻahu groundwater flow system: the deeper Basal aquifer and the more surficial aquifers consisting of the Schofield high level water body, and the dike-impounded water body. In addition, ***groundwater*** occurs locally within perched aquifers above the Basal aquifer. These aquifers are recharged from both upgradient areas near the mountain crests and from vertical infiltration at the Schofield Plateau ground surface (U.S. Army, 2016).

The southern Oʻahu groundwater area has been subdivided into six subordinate groundwater sectors, of which two underlie JBPHH: Pearl Harbor and Honolulu. Both aquifer sectors have upper and lower aquifers, and the upper aquifer of both sectors is an unconfined, basal sedimentary aquifer that has low to moderate salinity, and high vulnerability to contamination (JBPHH, 2012). The lower aquifer of both sectors is a basal, confined, flank aquifer with fresh to low salinity, and low to moderate vulnerability to contamination due to the impermeability of the overlying caprock (JBPHH, 2012). The groundwater supply under JBPHH is generally unusable because of its brackish nature, and there are no drinking water wells located on JBPHH (JBPHH, 2012).

As with surface water flow within the proposed JBPHH SPCS site described above, groundwater underlying the western portion of the site flows also west toward the Kumumauʻu Canal, and groundwater underlying the eastern portion of the site flows east towards Manuwai Canal due to the site straddling two watersheds.

Stormwater runoff at JBPHH is collected through a network of underground drainage pipes that discharge to either to Mamala Bay or the Kumumauʻu Canal, which discharges into Mamala Bay (JBPHH, 2009b, 2018). JBPHH is covered under individual NPDES Small Municipal Separate Storm Sewer System Permit No. HIS000257 issued by the SOH Clean Water Branch, which authorizes the discharge of stormwater runoff for all storm drains entering Mamala Bay. Under the Municipal Separate Storm Sewer System permit,

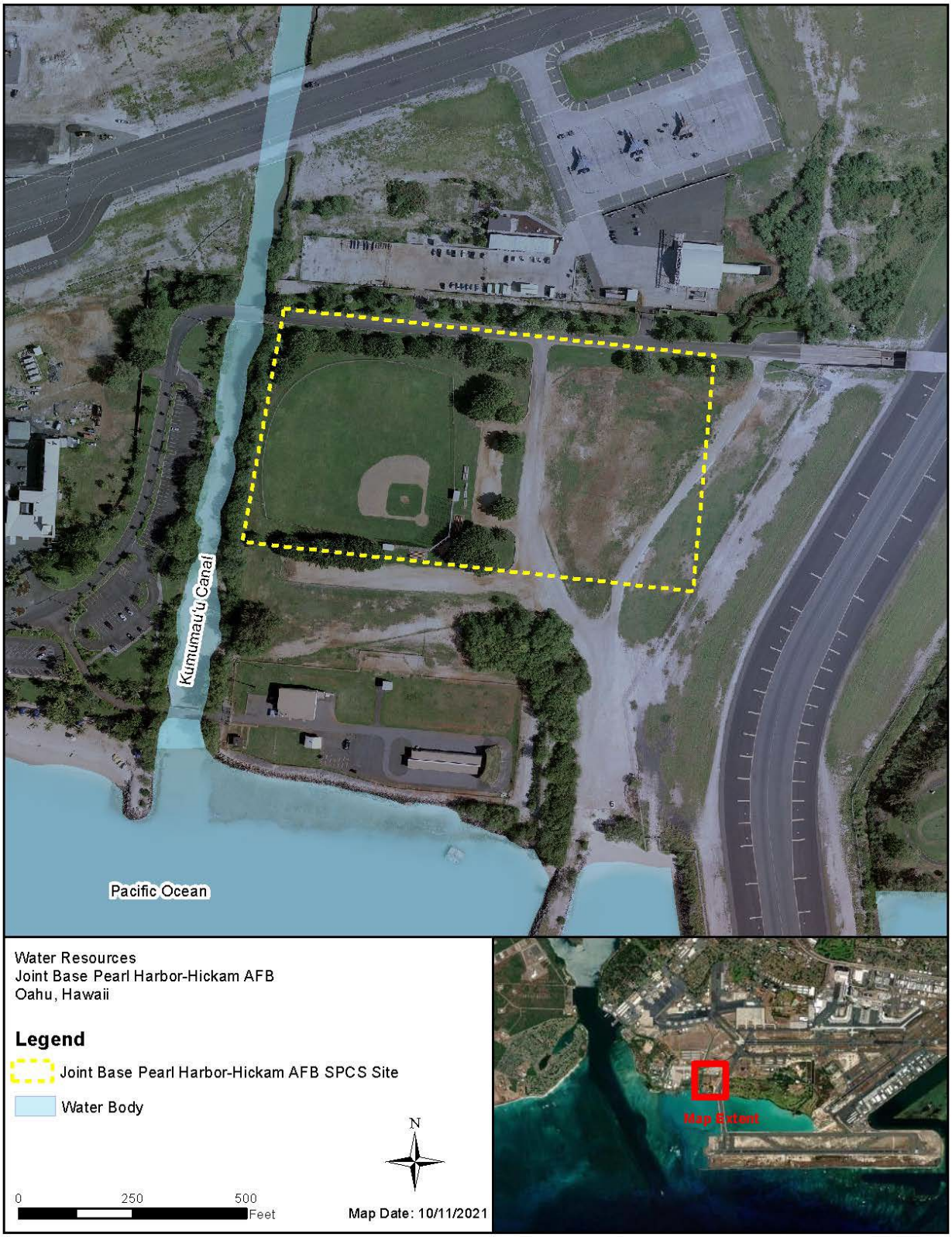

Figure 3-5 Water Resource – JBPHH

Figure 3-6 Sea-Level Rise Expansion Area-JBPHH

JBPHH is required to maintain and implement a Base-wide SWMP, which protects the quality of water resources using a multi-faceted approach that includes, but is not limited to, a Construction Site Runoff Control Program, Erosion Control BMPs Program Plan, Spill Prevention and Response Plan, and a Toxic or Hazardous Materials/Waste Disposal (Navy Region Hawaii, 2016).

Small ***wetland*** areas are located along the banks of the Kumumau'u Canal, which borders the proposed JBPHH SPCS site property to the west, and the USFWS NWI classifies the Kumumau'u Canal as a riverine wetland (USFWS NWI, 2021). The NWI wetland boundary for the Kumumau'u Canal does not extend into the proposed site, and no wetlands are present on the site.

Floodplains. FEMA FIRM indicate JBPHH is located within two flood zones: Zone D (areas of undetermined, but possible, flood hazards); and Zone AE (within the 100-year floodplain with a one percent chance of inundation by a flood event in any given year, and a 26 percent chance of flooding over a 30-year period) (FEMA, 2021). According to FIRM Panel 15003C0333G, the proposed JBPHH SPCS site is located within Zone D, and surrounded by Zone AE (FEMA, 2020). The southwest corner of the site is located approximately 400 feet from Mamala Bay and abuts Zone VE (coastal areas within the 100-year flood zone that have an additional hazard associated with storm waves) (FEMA, 2020).

3.4.5.2 Environmental Consequences

Proposed Action – Surface Water. As described above, no natural surface water resources, such as lakes, streams, or natural ponds, are present on JBPHH or the proposed JBPHH SPCS site; however, several man-made drainage ditches and canals convey groundwater seepage and stormwater runoff to Mamala Bay, the closest of which is Kumumau'u Canal, which is located adjacent to the western boundary of the proposed SPCS site and discharges to Mamala Bay approximately 400 feet downstream from the southwest corner of the site boundary.

As described in **Section 3.4.6.2**, the risk of potential soil erosion and sedimentation from proposed construction would be minimized through the implementation of appropriate erosion and sediment control BMPs identified and implemented as part of a required NPDES Construction General Permit SWPPP ESP, which would prevent sediment, debris, and other pollutants from entering the Installation's stormwater drainage ditches and canals and consequently discharging into Mamala Bay. Additionally, the Base-wide SWMP Construction Site Runoff Control Program, Erosion Control BMPs Program Plan, Spill Prevention and Response Plan, and Toxic or Hazardous Materials/Waste Disposal policies and procedures would be adhered to, which serve to protect the quality of all water resources, including surface water in the drainage ditches and canals that discharge to Mamala Bay. Therefore, no significant direct or indirect impacts to surface water quality would be anticipated to result from implementation of Alternative B.

Proposed Action – Coastal Zone. Environmental consequences for coastal zones under Alternative B at JBPHH are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.5.2**). Therefore, no significant direct or indirect impacts to the coastal zone are anticipated under Alternative B.

The Hawaii Office of Planning noted via letter dated 8 March 2021 that implementation of the Proposed Action at JBPHH may be subject to a CZMA review and requested that the EA evaluate the vulnerability of the site to SLR, include the SLR map, and address stormwater concerns for nearshore marine resources. Construction occurring under Alternative B would not impact the coastal zone. Therefore, USAF would not submit a consistency determination for the Proposed Action.

The proposed SPCS site, while located within the coastal zone, is not located within the 3.2-foot SLR exposure area (SOH, 2021) and, therefore, would not be vulnerable to potential flooding from predicted increases in sea levels rising from climate change.

Proposed Action – Groundwater. As described above, JBPHH overlies two aquifers: Pearl Harbor and Honolulu. Environmental consequences for groundwater under Alternative B are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.5.2**). Should an accidental spill of petroleum from vehicles or machinery occur outside of protected refueling areas, it would likely be a few gallons or less in volume, and soil would be removed and properly disposed of in adherence to the SWMP Spill Prevention and Response Plan and Toxic or Hazardous Materials/Waste Disposal policies and procedures.

Proposed Action – Stormwater. As described above, several man-made drainage ditches and canals convey groundwater seepage and stormwater runoff to Mamala Bay. The risk of potential soil erosion and sedimentation from proposed construction would be minimized through the implementation of appropriate erosion and sediment control BMPs identified and implemented as part of a required NPDES Construction General Permit SWPPP ESP, which would prevent sediment, debris, and other pollutants from entering the Installation's stormwater drainage ditches and canals. Additionally, the Base-wide SWMP Construction Site Runoff Control Program, Erosion Control BMPs Program Plan, Spill Prevention and Response Plan, and Toxic or Hazardous Materials/Waste Disposal policies and procedures, which serve to protect the quality of all water resources, including stormwater discharged to the drainage ditches and canals, would be adhered to. Therefore, no significant direct or indirect impacts anticipated to stormwater quality would be anticipated to result from implementation of Alternative B.

Impervious area would increase by approximately two acres from building, parking lot, and equipment pad construction associated with Alternative B. This increase would correspondingly reduce infiltration, potentially resulting in short- and long-term increases in stormwater runoff on the proposed SPCS site; however, an infiltration basin or other appropriate and approved Low Impact Development solution for the site would be constructed to comply with UFC 3-210-10 and Section 438 of the *Energy Independence and Security Act*. Therefore, no significant direct or indirect impacts to stormwater quantity would be anticipated to result from increased impervious area associated with implementation of Alternative B.

Proposed Action – Wetlands. A letter received from USEPA Region 9 dated 8 March 2021 noted that the Proposed Action should avoid the discharge of dredging material into adjacent wetlands and the Kumumau'u Canal. Small wetland areas located along the banks of the Kumumau'u Canal, which borders the proposed SPCS site property, do not extend into the proposed SPCS site, and would not be affected by the Proposed Action. No construction activities would occur within these wetland areas, no dredge or fill material would be placed into these wetland areas, and adherence to the SWMP Construction Site Runoff Control Program and Erosion Control BMPs Program Plan would prevent the migration sediment into these wetland areas. Therefore, construction activities under Alternative B would not impact wetlands, and implementation of the Proposed Action at this site would comply with EO 11990.

Proposed Action – Floodplains. Extreme weather events due to climate change for the state of Hawaii include increases in both heavy rainstorms and hurricane frequency and severity, leading to more flooding events (USEPA, 2016a). As described above, the proposed SPCS site is located in Zone D (area of undetermined, but possible, flood hazards); therefore, proposed activities under Alternative B would not be anticipated to impact floodplains and the implementation of the Proposed Action at this site would comply with EO 11988. A letter from SOH DLNR dated 8 March 2021 requested that the Proposed Action, if implemented at JBPHH, follow flood hazard zone requirements.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, is not expected to impact water resources. Construction activities would only occur in previously disturbed areas lacking surface water resources, and BMPs to control erosion and sedimentation would be implemented. Therefore, the site is not expected to have increased vulnerability to potential flooding from predicted climate change-driven extreme weather events.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. Water resources would not change from current condition, and no impacts to water resources would be anticipated.

3.4.6 Geological Resources

3.4.6.1 Existing Conditions

The ROI for geological resources under Alternative B is the proposed SPCS site at JBPHH.

Regional Geology. O‘ahu, a volcanic island that is part of the Main Hawaiian Islands, was formed by the eroded remnants of two large shield volcanoes. Weathering and erosion have modified these volcanos, leaving the Ko‘olau Range along the eastern coastline of O‘ahu, the Wai‘anae Range in the western parts of the island, and the Schofield Plateau that divides them. A flat coastal plain underlain by sedimentary deposits surrounds much of the island and varies in width from a narrow marine terrace to a broad plain several miles wide. Where it is extensive, as in southern O‘ahu, its surface is composed mainly of emerged Pleistocene coral reefs and associated sediments. The Ewa Plain and Honolulu Plain, on which JBPHH is located, are two southern coastal plains that lie atop a broad coral reef platform underlain by volcanics (U.S. Geological Survey, 1996).

The ***topography*** of O‘ahu is influenced by two, nearly parallel, northwest to southeast trending mountain ranges: the Ko‘olau and Wai‘anae ranges. Elevations on the island range from sea level on the coastal plains to 4,025 feet above mean sea level in the Wai‘anae Range. The Ewa Plain and Honolulu Plain on which JBPHH is located is the largest flat land area on the island, with elevations that range from 0 to 20 feet above mean sea level. JBPHH is located approximately 400 feet from the shoreline at 3 feet mean sea level, and the Installation’s topography, including the proposed JBPHH SPCS site, is flat with no slope.

Soil underlying the proposed JBPHH SPCS site is mapped entirely as fill land, mixed (**Figure 3-7**), which consists of materials delivered from a variety of sources and is commonly used for urban development purposes (e.g., buildings, housing, and industrial facilities). The fill land soil profile within the proposed site is zero to 6 inches of gravelly sandy loam, 6 to 60 inches of fine sandy loam, and 60 to 70 inches of bedrock, and is typically well drained with low runoff potential (NRCS, 2021a).

The soil underlying the proposed JBPHH SPCS site and adjacent lands is not identified as ***prime farmland*** and is not in agricultural use (NRCS, 2021b).

3.4.6.2 Environmental Consequences

Proposed Action. Environmental consequences for geologic resources under Alternative B at JBPHH are expected to be the same as those under Alternative A at PRMF-Barking Sands (see **Section 3.3.6.2**).

The Proposed Action, in addition to the past, present, and reasonably foreseeable future actions on and off JBPHH, would have negligible effects to geological resources during construction activities, which would occur in previously disturbed areas. BMPs and compliance with permits would minimize the effect on soils.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. Soils would not change from current condition, and no impacts to soils would be anticipated.

3.4.7 Land Use

JBPHH is located on the south coast of O‘ahu, Hawaii, and covers approximately 27,694 acres. The 154th Wing, located within JBPHH, is currently divided into 13 land use categories: administrative, aircraft operations and maintenance, aircraft clearance areas, airfield pavement areas, community commercial, community service, housing accompanied, housing unaccompanied, industrial, medical/dental, open space/buffer zone, outdoor recreation, and open water (JBPHH, 2018).

The western portion of the proposed JBPHH SPCS site is currently designated for recreational use as Hickam Softball Field (**Figure 3-8**), and the eastern portion of the site is vacant and does not contain any structures. The vacant property is currently being used for temporary storage of excess vehicles owned by the U.S. Navy and as a construction staging area. Land use in the vicinity of the site is categorized as aircraft operations and maintenance, and industrial, and the site is bounded by a small arms/pyrotechnics ordnance operations area to the south. The Kumumau‘u Canal, a former IRP site that has since been closed and requires No Further Action, is adjacent to the western boundary, and Mamala Bay Drive forms its northern boundary.

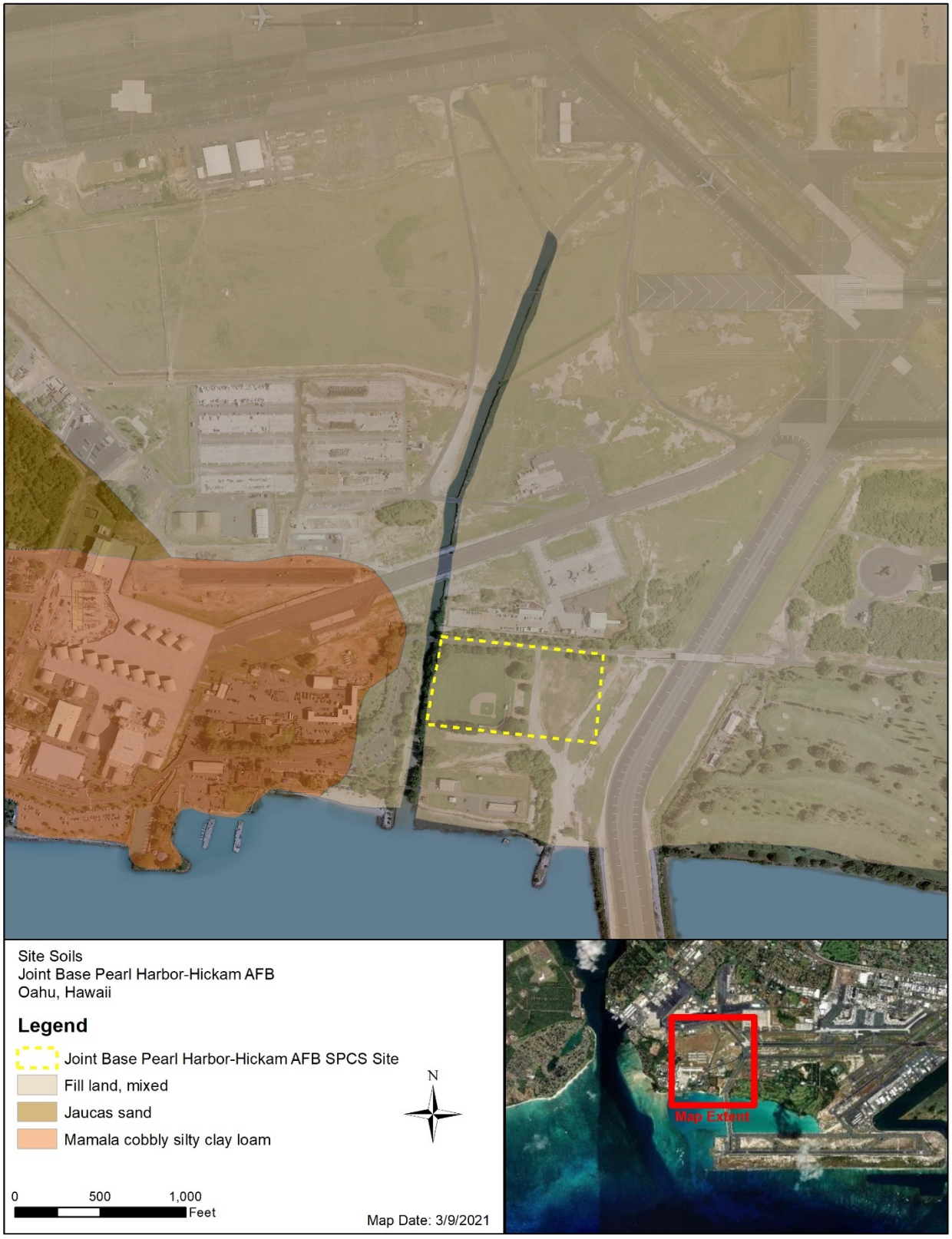

Figure 3-7 Site Soils–JBPHH

Figure 3-8 Land Use–JBPHH

3.4.7.1 Environmental Consequences

Proposed Action. Environmental consequences for land use under Alternative B at JBPHH are expected to be the same as those under Alternative A at PRMF-Barking Sands (see **Section 3.3.7.1**).

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, would not be expected to have significant land use impacts, as the overall land use as a military installation would remain unchanged.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. Land use would not change from current conditions, and no impacts to land use would be anticipated.

3.4.8 Socioeconomics

3.4.8.1 Existing Conditions

The ROI for socioeconomics under Alternative B includes JBPHH and the surrounding environs.

Population. The proposed SPCS site is located in Census Tract 9819, Block Group 1, which encompasses most of the Hickam property; this block group was previously designated as Census Tract 73.03, Block Group 1 for the 2010 Census. Population in this block group has increased by nearly 27 percent between 2010 and 2019, which a current population of 433 people. Honolulu County has experienced a relatively low growth rate since 2010 (**Table 3-13**), experiencing growth rates that substantially below the population growth rates for the state and the nation. Honolulu County, which is home to approximately 69 percent of the population of the SOH, grew approximately 2 percent from 2010 to 2019, compared to about 3.8 percent for Hawaii and about 6.3 percent for the U.S. In 2019 (the most recently published population data), Honolulu County had a population of approximately 974,563 people (USCB, 2020b).

Table 3-13
Population in the JBPHH Region of Influence as Compared to Hawaii and the United States (2010–2019)

Geographic Area	2010	2019	Growth Rate 2010–2019 (Percent)
CT 9819, BG 1 (formerly CT 73.03, BG 1)	341	433	26.9
Honolulu County	955,775	974,563	2.0
Hawaii	1,363,621	1,415,872	3.8
United States	308,745,538	328,239,523	6.3

Source: USCB, 2020b
BG = block group; CT = census tract; JBPHH = Joint Base Pearl Harbor-Hickam

A total of 35,651 active duty and reserve military full time service members are stationed at the 12 JBPHH annex locations on O‘ahu, in addition to 16,303 civilian DoD employees and 859 contractors. A total of 4,683 people, including active-duty military and their dependents, live on Base at JBPHH (Personal communication with Cheyne Taum, 2021).

Employment. Honolulu County’s 2019 average labor force was approximately 659,310 people, and the average unemployment rate was 2.6 percent (16,468 unemployed). The Honolulu County unemployment rate was slightly higher than the average unemployment rate for Hawaii (2.5 percent) and was well below the 3.5 percent national average unemployment rate (U.S. Bureau of Labor Statistics, 2018, 2019a).

U.S. Bureau of Economic Analysis data and information on the region’s largest employers show that employment in the area is dominated by the Government and Government Enterprises sectors, which reflects the importance of the military and government agencies in Honolulu County. The second largest industry in Honolulu County in terms of largest employers is the Accommodation and Food Services sector, which reflects the importance of the tourism industry. The Government and Government Enterprises sector accounts for 22.8 percent of employment in Honolulu County, while the Accommodation and Food Services sector accounts for 11 percent of employment in the county.

The largest employer in Honolulu County is Altres Industrial, a staffing company that employs staff for hire on temporary contracts. The Kapiolani Medical Center, Queen’s Medical Center, and Hawaii Health Systems Corporation are the next three largest employers in terms of size (SOH, 2019b).

Housing. USCB estimates show that housing vacancy rates in Honolulu County for both homeowner and rental housing in 2019 were below the national and state averages (**Table 3-14**). There are approximately 38,263 vacant units in Honolulu County. The percentage of homes that are owner-occupied for Honolulu County (57.4), and Hawaii (60.2) is well below the U.S. average of 64.1 percent, which may be associated with the high median value of housing in Honolulu County and Hawaii. Compared to the national median home value of $240,500, homes in Honolulu County have a median value of $739,700, while homes in Hawaii have a median value of $669,200. Rental vacancy rates in Honolulu County are lower than rental vacancy rates in Hawaii and the U.S. (USCB, 2020a).

Table 3-14
Housing in Honolulu County

Attribute	Honolulu County	Hawaii	United States
Total Units	354,719	550,328	139,686,209
Owner-occupied	57.4%	60.2%	64.1%
Renter-occupied	42.6%	39.8%	35.9%
Vacant Units	38,263	85,029	16,883,357
Homeowner Vacancy Rate[a]	1.2%	1.4%	1.5%
Rental Vacancy Rate[b]	4.9%	8.8%	6.0%
Median Value[c]	$739,700	$669,200	$240,500

Source: USCB, 2020a
Notes:
a. Homeowner vacancy rate is the proportion of the homeowner inventory that is vacant “for sale.”
b. Rental vacancy rate is the proportion of the rental inventory that is vacant “for rent.”
c. Median value of owner-occupied units.

The basic allowance for housing for the area starts at $2,118 for an E1 without dependents and increases to a maximum of $4,032 per month for an O7 with dependents (Defense Travel Management Office, 2021). The average monthly rent for a two-bedroom apartment in urban Honolulu is $2,285 (U.S. Department of Housing and Urban Development, 2021),

Schools. JBPHH is located within the Hawaii Public Schools Central O‘ahu District. The Central O‘ahu District encompasses 29 elementary schools, 6 middle schools, 1 middle and high school, and 5 high schools (SOH DOE, 2021). The District is comprised of two Complex Areas, including the Aiea-Moanalua-Radford Complex Area and the Leilehua-Mililani-Waialua Complex Area; JBPHH falls under the Aiea-Moanalua-Radford Complex Area. JBPHH is served by five main schools; three elementary schools, including Mokulele Elementary, Hickam Elementary, and Nimitz Elementary are located on the Installation. Aliamanu Middle School and Radford High School are located off Base. Most children living on Base at JBPHH attend public schools in the Radford Complex, while children living off Base attend the schools in their assigned Complex Area unless they apply and are accepted into a different area. One private school, Kamaaiana Kids, is located off Base. Institutions of higher education in the region include the Navy College Office Hawaii, which offers college course on the Pearl Harbor side of JBPHH, University of Hawaii at Manoa, University of Oklahoma Pacific-Hickam AFB, University of Maryland Global Campus-Hickam AFB, and other higher education institutions in the Honolulu area.

3.4.8.2 Environmental Consequences

Proposed Action. Socioeconomic impacts resulting from Alternative B were evaluated using SPCS #4 personnel requirements for ANG space operators and operations support personnel for an offensive mission, as the 88 to 115 new personnel required are higher than the 62 to 105 personnel associated with the SPCS #5 and thus provide a more conservative estimate for impacts. The requirements for an estimated additional 115 military, contract, and civilian personnel and their families under the Proposed Action in the Honolulu County region would have no readily discernable impact on the region’s population. Assuming all personnel relocated with family members to Honolulu County, this would be a negligible increase in the County’s population of over 974,000 people. If all 115 personnel and their families requested to live on JBPHH in Base housing, the number of people housed on Base would increase by approximately 2.5 percent. It is anticipated that personnel moving to the area in support of the SPCS beddown would have sufficient funds for rental housing should they desire to live off Base. Therefore, no significant impacts to the local or regional population would be anticipated under implementation of Alternative B.

Under Alternative B, construction of a new building, equipment pad, and parking lot would result in a temporary increase of 20 to 50 construction personnel, which would have no impact on the socioeconomic condition on the region. The 115 additional military, contract, and civilian personnel would represent a small increase in the total persons permanently assigned to and working at JBPHH, where currently over 35,000 military and civilian personnel are employed. Adequate housing and educational resources are available in the ROI to accommodate the small increase in personnel; therefore, no impacts on employment, housing, or educational resources would occur under implementation of Alternative B.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, would not be expected to have impacts to the region's population, employment, housing, or educational opportunities. Construction and demolition projects would result in a beneficial impact, as local sales and payroll taxes would increase.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. No expenditures would occur locally or regionally to support the action alternative. There would be no change to socioeconomic conditions under the No Action Alternative.

3.4.9 Environmental Justice and Protection of Children

3.4.9.1 Existing Conditions

In 2019, the SOH and Honolulu County had a much higher percentage of minorities in the population compared to the U.S., with nearly 76 percent and 80 percent of the population, respectively (USCB, 2020a). Compared to the U.S., the SOH and Honolulu County, have a much higher percentage of the population that is considered Native Hawaiian or Pacific Islander (25.1 percent, 23.1 percent, and 0.4 percent, respectively).

Over the same period, Honolulu County had a lower rate of poverty than the SOH and the U.S. (**Table 3-15**); the percentage of the population below poverty in Honolulu County is 8.1 percent, while the percent below poverty in Hawaii and the U.S. is 9.3 percent and 12.3 percent, respectively. The percentage of children in Honolulu County was slightly lower, but similar to the percentage of children in the SOH and the U.S. as a whole (**Table 3-15**) (USCB, 2020b).

Table 3-15
Total Population and Populations of Concern in Honolulu County

Geographic Area	Total Population	Percent Minority	Percent Hispanic or Latino[a]	Percent Native Hawaiian or Pacific Islander	Percent Below Poverty	Percent Youth[a]
Honolulu County	974,563	79.9	10.0	23.1	8.1	21.0
State of Hawaii	1,415,872	75.9	10.7	25.1	9.3	21.2
United States	328,239,523	28.0	18.4	0.4	12.3	22.2

Source: USCB, 2020b Table DP05
Note:
a. Hispanic and Latino denote a place of origin and percent youth are all persons under the age of 18.

3.4.9.2 Environmental Consequences

Proposed Action. Environmental consequences for environment justice and protection of children under Alternative B at JBPHH are expected to be the same as those under Alternative A at PRMF-Barking Sands (see **Section 3.3.9.2**). In an email dated 2 February 2021, the O'ahu Council of Hawaii Civic Clubs requested that the EA address any potential impacts to affected communities.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, would not be expected to have a disproportionate impact on minority and low-income populations or children.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. No expenditures would occur locally or regionally to support the action alternatives. There would be no change to minority, low-income, or youth populations under the No Action Alternative.

3.4.10 Cultural Resources

3.4.10.1 Existing Conditions

The APE for cultural resources under Alternative B is a 0.25-mile radius around the proposed SPCS site.

Archaeological, Traditional Cultural, and Architectural Properties.

Four cultural resources are located within a 0.25-mile radius around the proposed SPCS site (**Table 3-16** and **Figure 3-9**), all of which are historic buildings. Building 3440H (Battery Selfridge; Site 50-80-13-01600) is listed in the NRHP, having been nominated in 1977 as part of the "Artillery District of Honolulu" Multiple Property Submission along with Batteries Randolph of Fort DeRussy and Batteries Jackson, Hawkins, Hawkins Annex, and Hasbrouck of Fort Kamehameha. Buildings 3505H, 3510H, and 3520H are Cold War-era buildings that are considered eligible for inclusion in the NRHP.

Table 3-16
Cultural Resources Recorded within a 0.25-mile Radius around the JBPHH Proposed SPCS Site

SIHP #	Building #	Date Recorded	Resource Name	NRHP Status
50-80-13-01600	3440H	1977	Battery Selfridge	Listed
-	3505H	2008	Gate/Sentry House	Eligible
-	3510H	2008	Ordinance Operations Building	Eligible
-	3520H	2008	Small Arms/Pyrotechnics Magazine	Eligible

Source: JBPHH Cultural Resource Manager
JBPHH = Joint Base Pearl Harbor-Hickam; SPCS = Space Control Squadron

No archaeological sites have been identified within a 0.25-mile radius around the proposed SPCS site.

No TCPs, sacred areas, or traditional-use areas have been identified on or in the vicinity of the proposed SPCS site. JBPHH continues to consult and communicate with NHOs regarding potentially sensitive cultural resources and TCPs.

Tribal Lands. There are no federally recognized tribes located in Hawaii as listed in NCSL (2021). However, JBPHH participates in ongoing consultation and communications with NHOs.

3.4.10.2 Environmental Consequences

Proposed Action – Archaeological Resources and Traditional Cultural Properties. Alternative B includes construction activities that would require ground disturbance at the proposed SPCS site.

No archaeological resources within a 0.25-mile radius around the proposed SPCS site have been determined eligible for inclusion in the NRHP. The proposed SPCS site was constructed in an area that was built up through bringing in sediment from other locations to elevate the land above sea level. Because this area was previously inundated and then built up through fill material, no intact archaeological resources would be present.

In the event that archaeological resources are discovered during implementation of Alternative B, Standard Operating Procedures for the inadvertent discovery of archaeological or human remains, as detailed in the ICRMP, would be followed (Hickam AFB, 2008).

Proposed Action – Architectural Properties. Four architectural resources were recorded within a 0.25-mile radius around the proposed SPCS site. Three buildings, #3505H (Gate/Sentry House), #3510H (Ordinance Operations Building), and 3520H (Small Arms/Pyrotechnics Magazine), all recorded in 2008, have been determined eligible for the NRHP. One building, #3440H (Battery Selfridge), recorded in 1977, is listed on the NRHP. These buildings fall within the 0.25-mile buffer for indirect effects but outside the direct APE. Therefore, no direct impacts to architectural properties would be anticipated. The construction of the SPCS facility would not disturb the historical setting for any of the four NRHP-listed or eligible architectural properties; therefore, no indirect effects to architectural properties would be anticipated.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, would not result in incremental impacts to cultural resources, archaeological resources, historic resources, or TCPs. The NGB, working with Navy personnel at JBPHH, has reached a determination of *No*

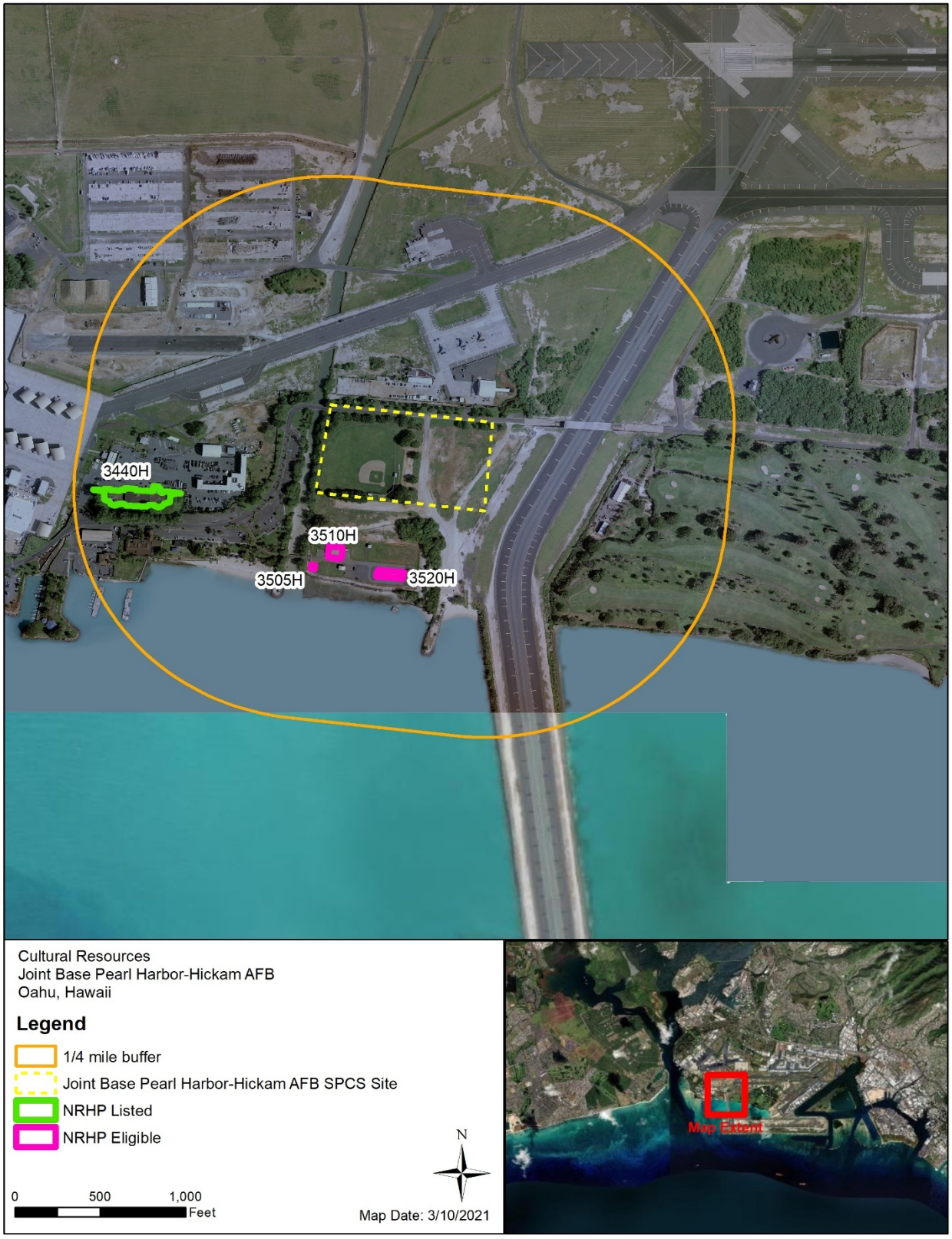

Figure 3-9 Cultural Resources–JBPHH

Historic Properties Affected for the Proposed Action under Alternative B. Details regarding the status of consultation with the HI SHPO are provided in **Section 3.3.9.2**. Similar consultation with HI SHPO and NHOs occurred for the Proposed Action at JBPHH as for PMRF-Barking Sands (see **Section 3.3.9**).

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. There would be no impacts to cultural resources under the No Action Alternative.

3.4.11 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

3.4.11.1 Existing Conditions

The ROI for this resource under Alternative B is the proposed SPCS site at JBPHH and vicinity.

Under federal law, state regulations can be more stringent than federal policies. The SOH DOH received primacy of its hazardous waste program from the USEPA in 2001; therefore, the regulations governing hazardous waste in Hawaii are contained in the HAR Title 11. The majority of HAR regulating hazardous waste mirrors USEPA regulations; HAR § 11-260 to 272 control the identification, treatment, storage, transportation, handling, labeling and disposal of hazardous waste. HAR § 11-273 regulates the management of universal waste and HAR § 11-279 regulates used oil storage, transportation, and disposal (NAVFAC Hawaii, 2014).

JBPHH is classified as a large-quantity hazardous waste generator as defined by the USEPA, generating more than 2,200 pounds of nonacute hazardous waste per month. JBPHH operates numerous IAPs, where up to 55 gallons of "total regulated hazardous wastes" or up to 1 quart (2.2 pounds) of "acutely hazardous wastes" are accumulated. IAP managers are responsible for properly segregating, storing, characterizing, labeling, marking, packaging, and transferring all hazardous wastes for disposal from the IAP to an established 90-day storage area according to federal, state, local, and U.S. Navy regulations. The Hazardous Waste Program Manager is responsible for characterizing and profiling each waste stream. JBPHH also operates several 90-day accumulation sites, where hazardous waste accumulates before transportation off Installation for ultimate disposal (NAVFAC Hawaii, 2014). Wastes generated on Base are managed under regulations set forth in the JBPHH RCRA Part B permit. JBPHH also holds a RCRA permit for handling the disposal and treatment of waste munitions.

The Navy Region Hawaii owns a permitted treatment, storage, and disposal facility, referred to as the Conforming Storage Facility, at Building No. 1526 under the USEPA ID No. HI 117 002 4334. The Conforming Storage Facility is utilized as a central facility for the receipt and temporary storage of hazardous waste prior to transfer to a USEPA-approved disposal facility on the continental U.S. Under the same USEPA ID No., the Region owns the Industrial Waste Treatment Facility at Building 1424 in JBPHH.

IRP Sites. There are nine IRP sites located in the vicinity of the proposed SPCS site under Alternative B (**Table 3-17**). See **Sections 3.1.11** and **3.3.11.1** for more information about IRP sites.

Site H0026 (formerly SD003)-Kumumauʻu Canal is directly adjacent to the proposed SPCS site and borders the property on the western side. Site H0031 (ST038)-Fort Kamehameha/HIANG underground storage tanks, Site H0044 (DA103)-Basewide PCBs, and Site H0045 (SD019)-Sanitary Sewer System are located in the adjacent parcel to the south of the proposed SPCS site. The remaining sites are located within 1 mile of the proposed SPCS site. All of the IRP sites located in the vicinity are closed and No Further Action is recommended.

Table 3-17
Installation Restoration Program Sites in the Vicinity of the JBPHH Proposed SPCS Site

New Site ID	Old Site ID	Site Name	Status
H0023	ST020	Explosive Ordnance USTs	NFA
H0026	SD003	Kumumauʻu Canal	NFA
H0031	ST038	Fort Kamehameha/HIANG USTs	NFA
H0001	MY111	HIANG Motor Pool	NFA
H0102	DB186	Construction Debris Mound	NFA
H0106	SS181	Hush House Rel Area	NFA
H0105	RW185	Washrack AGE Facility	NFA
H0044	DA103	Basewide PCBs	NFA
H0045	SD019	Sanitary Sewer System	NFA

AGE = aerospace ground equipment; JBPHH = Joint Base Pearl Harbor-Hickam; NFA = No Further Action; UST= underground storage tank; PCB = polychlorinated biphenyl; SPCS = Space Control Squadron

Asbestos. NAVFAC developed the *Asbestos Program Management Plan* for JBPHH, which includes program administration, organizational roles and responsibilities, standard work practices, and documentation (NAVFAC Hawaii, 2017).

LBP. Although these paints are no longer used at the Base, some buildings on JBPHH were constructed prior to 1978 and may contain LBP. LBP removal and disposal at the Base is conducted in accordance with federal, state, and local regulations, and all paint waste generated from paint removal operations at the Base is containerized, sampled, and analyzed to determine if the waste meets the definition of hazardous waste.

No permanent structures are located on the proposed SPCS site.

Radon is an odorless, colorless, radioactive gas that develops from the natural breakdown of uranium in soil and rock. Radon can migrate through permeable rocks and soils and seep into buildings or structures, thereby posing an atmospheric human health risk. The national standard of concern for indoor radon is 4 pCi/L in the air (NRC, 1999). USEPA and the U.S. Surgeon General have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low). The USEPA radon zone for Hawaii is Zone 3 (Low Potential, predicted indoor average level less than 2 pCi/L. The Hawaii Noise Radiation and Indoor Air Quality Branch (USEPA, 2019) indicates that radon levels in Honolulu County vary from under 2.0 pCi/L (92 percent of reported results in Zone 3), to 8 percent of results between 2.0 and 3.9 pCi/L (Zone 2). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods.

3.4.11.2 Environmental Consequences

Proposed Action – Hazardous Materials and Wastes. Environmental consequences for hazardous materials and wastes under Alternative B at JBPHH are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.11.2**). Adherence to the JBPHH *Hazardous Waste Management Plan* would minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal hazardous materials regulations (NAVFAC Hawaii, 2014). Therefore, short-term, negligible to minor impacts would be anticipated to result from the use of hazardous materials and petroleum products during the proposed construction activity.

Proposed Action – IRP Sites. The proposed SPCS site is not located within any existing IRP sites (see **Section 3.4.11.1**). Therefore, no impacts on IRP would be anticipated in response to proposed construction associated with Alternative B.

Proposed Action – Asbestos and LBP. No permanent structures exist on the proposed SPCS site and no demolition or renovation activities would be associated with Alternative B. Therefore, disturbance of asbestos and LBP at JBPHH would not occur.

Proposed Action – Radon. The USEPA radon zone for JBPHH is Zone 3 (predicted indoor average level greater than 2 pCi/L). The USEPA does not recommend corrective action for levels of radon below four pCi/L. There would be no impact related to radon due to implementation of Alternative B.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, is not anticipated to result in significant impacts to hazardous materials and wastes.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. No change to the management of hazardous materials, contaminated sites, or toxic substances would occur.

3.4.12 Infrastructure, Transportation, and Utilities

3.4.12.1 Existing Conditions

The ROI for this resource under Alternative B is JBPHH.

Solid Waste. JBPHH disposes of solid waste in the PVT landfill with the exception of asbestos-containing material, which is disposed of at the Waimanalo Gulch Sanitary Landfill. The JBPHH operations and maintenance contractor collects this refuse and delivers it to the landfill. JBPHH operates a Recycling Center at the Base to reduce solid waste disposal at regional landfills.

Sanitary Sewer. NAVFAC Hawaii owns and operates the wastewater treatment plant for JBPHH. The facility accepts both domestic (household) and industrial wastewater. It provides advanced secondary

treatment through the use of clarifiers, an activated sludge process, and effluent filtration for approximately 6.5 million gallons of wastewater per day. The facility's current capacity is 49,000 cubic meters, or 13 million gallons, per day (NAVFAC, 2020).

Transportation. There are eight points of access to JBPHH. The Main Nimitz Gate, along with O'Malley, Makalapa, Borchers, Ford Island, Porter and Kuntz Gates are all open 24 hours. The Halawa Gate is open from 5:00 am to 4:00 pm during weekdays for inbound commercial trucks only. The proposed SPCS site would likely be accessed by using the Kuntz or O-Malley gates. Intersections at JBPHH were determined to have a level of service ranging from A through D for peak hours in November 2019 (U.S. Navy, 2020).

Utilities. NAVFAC Hawaii owns and operates the water system servicing JBPHH. The drinking water system provides water for domestic, irrigation and fire protection purposes. Potable water for JBPHH comes from three ground water sources: Waiawa, Halawa, and Red Hill (JBPHH, 2019).

The Hawaiian Electric Company provides electricity to JBPHH, which provides land for several solar power facilities, including the West Loch Solar Project.

Project Infrastructure. The SPCS structure at JBPHH would comply with all state and local building codes. These include State Building Code Council's Hawaii State Building Code, *Appendix W – Hawaii wind design provisions for new construction* (SBCC, 2021) This building code also includes design requirements for tsunami loads as well as both short and long seismic events.

3.4.12.2 Environmental Consequences

Proposed Action. Environmental consequences for infrastructure, transportation, and utilities under Alternative B for JBPHH are expected to be the same as those under Alternative A for PMRF-Barking Sands (see **Section 3.3.12.2**).

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off JBPHH, is not expected to result in negligible impacts related to utilities and infrastructure.

Under the ***No Action Alternative***, no activities associated with Alternative B would occur. No changes to infrastructure, transportation, or utilities would occur.

3.5 ALTERNATIVE C–ANDERSEN AIR FORCE BASE (PREFERRED ALTERNATIVE FOR SPCS #5)

3.5.1 Noise

3.5.1.1 Existing Conditions

The ROI for noise under Alternative C is Andersen AFB. The primary sources of noise at Andersen AFB is airfield operations. In addition to aviation noise, some additional noise results from the day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operations of the airfield. These noise sources include the operations of ground-support equipment, and other transportation noise from vehicular traffic.

Typical ambient sound levels on the Base have been modeled previously as part of the *Air Installations Compatible Use Zones Study for Andersen Air Force Base, Guam* (USAF, 2013). Modeling results for this assessment indicate existing dBA range from 65 to 85 dBA across Andersen AFB, and do not exceed 75 dBA in the vicinity of the proposed SPCS site (USAF, 2013). In the vicinity of Andersen AFB, noise contours extend off Base to the south and west, and there are populated areas currently within the noise contours up to 70 dBA (USAF, 2013).

3.5.1.2 Environmental Consequences

Proposed Action. Implementation of Alternative C at Andersen AFB would include construction activities that would occur entirely on existing Installation property at Andersen AFB. No noise sensitive receptors have been identified with 0.5-mile of the proposed SPCS site (USAF, 2013). Model results indicate that existing dBAs range from 65 to 85 across Andersen AFB and do not exceed 75 dBA in the vicinity of the proposed SPCS site (USAF, 2013). Environmental consequences under Alternative C at Andersen AFB are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.1.2**).

Noise associated with construction equipment is generally short term, intermittent, and highly localized. Additionally, adherence to standard Air Force Occupational Safety and Health regulations that require hearing protection along with other personal protective equipment and safety training would minimize the

risk of hearing loss to construction workers. Therefore, noise associated with the proposed construction, demolition, and renovation projects would not be anticipated to result in any significant direct or indirect impacts on noise-sensitive receptors. There would be no operational increases in noise resulting from implementation of Alternative C.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Andersen AFB would not be expected to have significant noise-related impacts because construction noise would be localized to the proposed SPCS site and would be short term.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. Noise in the area would not change from current conditions, and no significant impacts on noise-sensitive receptors would be anticipated.

3.5.2 Safety

3.5.2.1 Existing Conditions

The ROI for direct and indirect effects on safety for Alternative C is Andersen AFB. The various components of the existing condition for Safety are discussed below.

Existing conditions for ***ground safety*** under Alternative C at Andersen AFB are the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.2.1**).

The existing conditions for ***RF energy and radiation safety*** at Andersen AFB include location of the THAAD system on the Installation at Northwest Field. THAAD is a transportable system that is designed to intercept ballistic missiles in their final phase of flight through the use of X-band radar. Due to the potential for biological tissue damage resulting from x-ray exposure, THAAD equipment is surrounded by setback fencing that prevents unauthorized personnel and the public exposure to radiation.

Three zones were established based on crash patterns: the Clear Zone, Accident Potential Zone (APZ) I, and APZ II. The Clear Zone starts at the end of the runway and extends outward 3,000 feet. It has the highest accident potential of the three zones. APZ I extends an additional 5,000 feet from the Clear Zone. It includes an area of reduced accident potential. APZ II extends from APZ I an additional 7,000 feet in an area of further reduced accident potential. APZs were developed as part of the 2013 AICUZ for Andersen AFB. Clear Zones are required for all fixed-wing active runways and extend from both ends of runway 06L/24R and 06R/24L (USAF, 2013). APZs I and II extend from the Clear Zone along straight-in approach departure corridors. These zones overlap at Andersen AFB as a result of the two parallel runways.

The proposed SPCS site is located outside of the Clear Zone, APZ I, and APZ II zones and is not located within a Surface Danger Zone.

3.5.2.2 Environmental Consequences

Proposed Action. Environmental consequences for ground safety and RF energy safety under Alternative C at Andersen AFB are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.2.2**). RF energy generated by communications equipment associated with the Proposed Action would not occur at unsafe levels outside of the footprint of the proposed SPCS site.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off the Andersen AFB, would not be expected to have significant safety-related impacts.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. Safety on Andersen AFB would remain unchanged, and the implementation of the No Action Alternative would result in no significant impacts to safety.

3.5.3 Air Quality

The ROI for air quality under Alternative C is Guam AQCR 246.

3.5.3.1 Existing Conditions

Regional Climate. Andersen AFB is located in a low-latitudes zone that experiences a maritime tropical climate that is consistent throughout the year. The island experiences a mean average temperature of 83 degrees Fahrenheit with monthly average temperatures varying by approximately 1.4 degrees Fahrenheit (Andersen AFB, 2020a). The island of Guam experiences two distinct seasons each year, the wet and dry seasons. The wet season occurs from June through November, and approximately 73 percent of the annual

precipitation falls during this time. The dry season lasts from December through May. The average annual rainfall on Guam is 93 inches, but rainfall varies significantly from year to year (Andersen AFB, 2020a).

Baseline Air Emissions. With the exception of the areas within a 3.5-mile radius around the Piti and Tanguisson Power Plants, which are in nonattainment of the NAAQs for sulfur dioxide, Guam AQCR 246 is designated by USEPA as attainment/unclassifiable for all criteria pollutants. Andersen AFB is located outside of the nonattainment areas (USEPA, 2021b).

Andersen AFB currently operates under Title V Permit No. FO-001R1, which has been issued by Guam EPA for stationary source emissions that include internal and external combustion engines, landfill emissions, field operations, fuel storage and transfers, and an asphalt batch plant. Annual Emission Inventory reports for stationary sources at Andersen AFB are not presented in this EA. Current levels of emissions from stationary sources at the facility exceed major-source permitting thresholds to trigger the requirement for a Title V permit.

Greenhouse Gases. The GHG reporting rule described in **Section 3.1.3.3** requires reporting of GHG data and other relevant information from larger GHG emission sources, fuel and industrial gas suppliers, and carbon dioxide injection sites in the U.S. In accordance with Title V Permit No. FO-001R1, stationary sources at Andersen AFB do not emit 25,000 metric tons or more of GHG emissions; therefore, GHG reporting rule requirements are not applicable.

3.5.3.2 Environmental Consequences

Proposed Action. Environmental consequences under Alternative C at Andersen AFB are expected to be the same as those under Alternative A at PMRF-Barking Sands (see **Section 3.3.3.2**).

Table 3-18 presents total annual estimated air emissions for Alternative C compared to the PSD permitting thresholds for attainment area criteria pollutants. Estimated total annual emissions are negligible when compared to the PSD permitting threshold for any criteria pollutant or precursor. Therefore, impacts from Alternative C on regional air quality in Guam AQCR 246 would be expected to be minor, and no significant impacts would be expected to occur. Emissions for CO_2e do not have a regulatory threshold; however, estimated emissions for CO_{2e} are presented to demonstrate that CO_{2e} emissions would also be low when compared to GHG emissions of 25,000 metric tons or more associated with large GHG sources.

Table 3-18
Alternative C Emissions at Andersen AFB Compared to PSD Permitting Thresholds

Pollutant	Action Emissions (ton/year)		Insignificance Indicator	
	SPCS #4	SPCS #5	Indicator (ton/year)	Exceedance (Yes or No)
Volatile Organic Compounds	0.677	0.647	250	No
Nitrogen Oxides	1.238	1.214	250	No
Carbon Monoxide	7.077	6.601	250	No
Sulfur Oxides	0.008	0.008	250	No
PM_{10}	0.824	0.823	250	No
$PM_{2.5}$	0.045	0.044	250	No
Lead	0	0	25	No
Carbon Dioxide Equivalent	565.4	542.5	-	-

AFB = Air Force Base; $PM_{2.5}$ = particulates equal to or less than 2.5 microns in diameter; PM_{10} = particulates equal to or less than 10 microns in diameter; PSD = Prevention of Significant Deterioration; SPCS = Space Control Squadron

The air pollutant emissions from Alternative C of the Proposed Action would be predominantly from construction of new facilities. Construction emissions are not restricted by the current Title V Permit held by Andersen AFB. Criteria pollutants would result if new stationary sources (e.g., boilers, water heaters, emergency generators) for the proposed new facilities are installed and operated. Prior to starting any construction for a new fuel-burning equipment, permit requirements should be examined to determine if new equipment planned for installation are insignificant, thus not requiring a permit. Additionally, for proposed new stationary emission sources, an application of modification to the existing Title V Permit may be necessary, especially if sources are determined to be significant based on their size or emission levels. For larger, more polluting new stationary emission sources, permitting rules must be examined to ensure that the new fuel-burning emission sources do not trigger a PSD review based on their potential to emit regulated criteria pollutants or hazardous air pollutants. Generally, natural gas comfort heat boilers, water

heaters, and backup diesel generators for typical office buildings or administrative facilities are not likely to generate pollutant emission quantities that would trigger the requirement for permits.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Andersen AFB, would result in a less than significant impacts on air quality. Construction activities would be short term and localized in nature and their potential impacts on air quality would not last beyond the construction period.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur, and emissions would not change from current baseline levels. As a result, no impacts would occur to regional air quality in Guam AQCR 246 under the No Action Alternative.

3.5.4 Biological Resources

3.5.4.1 Existing Conditions

The ROI for biological resources under Alternative C includes the Andersen AFB Main Base boundaries.

Ecoregions are used to describe areas of similar type, quality, and quantity of environmental resources (USEPA, 2021a). Ecoregions are assigned hierarchical levels to delineate regions spatially based on different levels of planning and reporting needs. Andersen AFB is located entirely within the Oceana realm and the Marianas Tropical Dry Forests ecoregion (One Earth, 2021b; WWF, 2021b). In this ecoregion, the seasonal variation in precipitation (heavy rains followed by long dry seasons) is strongly influenced by the position of the Inter-tropical Convergence Zone and the subtropical high-pressure zones and has a substantial impact on the local biota (Andersen AFB, 2019; WWF, 2021b).

Vegetation. About 48 percent of Guam is covered in forest, including parts of Andersen AFB. Vegetation on Andersen AFB is most commonly associated with native limestone forests, specifically limestone coastal scrub characterized by vegetative communities consisting of dominant trees such as fagot (*Ochrosia oppositifolia*), nunu (*Ficus prolixa*), Ahgao (*Premna serratifolia)*, *Pandanus* spp., *Guamia mariannae,* pago (*Taliparitі tilaceum*)*,* beach cherry (*Eugenia reinwardtiana*), gulos (*Cynometra ramiflora*), mapunyao, macaranga (*Macaranga thompsonii*), seeded breadfruit (*Artocarpus mariannensis*), joga (*Elaeocarpus joga*), and Faniok (*Merrilliodendron megacarpum*). *Ochrosia mariannensis* may also be present on Andersen AFB in edge habitats (Andersen AFB, 2019). Also found on Andersen AFB are coconut groves, which are large, forested areas comprised almost exclusively of coconut palm with minimal understory of herbs and ferns (Andersen AFB, 2019).

No sensitive habitat is located within the proposed SPCS site; the site consists of frequently mowed grasses and a few trees. The cantonment area on Andersen AFB, in which the proposed SPCS site is located, has been cleared of natural vegetation and is considered developed. The closest areas identified as sensitive habitat include the Pati Point Marine Preserve Area and Guam Micronesian Kingfisher Survival and Recovery Habitat, which are located approximately 0.5 mile from the proposed SCPS site (Andersen AFB, 2019).

Wildlife. The only remaining mammal native to Guam is the Mariana fruit bat (*Pteropus mariannus mariannus*) (Andersen AFB, 2019). A total of 10 non-native mammal species have been introduced and established on Guam. More information about non-native mammals on Guam can be found in the Andersen AFB Integrated Natural Resources Management Plan (INRMP).

There are approximately 105 migratory or wintering non-breeding bird species on Guam and 7 breeding resident bird species (Andersen AFB, 2019). The seven breeding resident species include yellow bittern (*Ixobrychus sinensis*), Pacific reef heron (*Egretta sacra*), Mariana common moorhen (*Gallinula chloropus guami*), brown noddy (*Anous stolidus*), white tern (*Gygis alba*), Mariana swiftlet (*Aerodramus bartschi*), and Micronesian starling (*Aplonis opaca*). More information about migratory or wintering non-breeding bird species on Guam can be found in the Andersen AFB INRMP.

There is no scientific consensus on exactly which reptile and amphibian species are definitely native to Guam; however, six reptile species are generally considered native [mutilating gecko (*Gehyra mutilata*), Pacific blue-tailed skink (*Emoia caeruleocauda*), tide-pool skink (*Emoia astrocostata*), moth skink (*Lipinia noctua*), Pacific slender-toed gecko (*Nactus pelagicus*), and mourning gecko (*LepiDoDactylus lugubris*)] (Andersen AFB, 2019). More information about non-native reptiles on Guam can be found in the Andersen AFB INRMP.

There are no confirmed native amphibian species to Guam, but it is generally concluded that there are 11 non-native amphibian species: marine toad (*Rhinella marina*), greenhouse frog (*Eleutherodactylus planirostris*), eastern dwarf tree frog (*Litoria fallax*), Guenther's Amoy frog (*Sylvirana guentheri*), Pacific chorus frog (*Pseudacris regilla*), slender-digit chorus frog (*Kaloula picta*), white-lipped tree frog (*Polypedates leucomystax*), crab-eating frog (*Fejervarya cancrivora*), marbled pygmy frog (*Microhyla pulchra*), grass frog (*Fejervarya limnocharis*), and Hong Kong whipping frog (*Polypedates megacephalus*) (Andersen AFB, 2019).

Guam houses dozens of native invertebrate species, including the Mariana eight-spot butterfly (*Hypolimnas octocula marianesis*) and a variety of freshwater snails, as well as several non-native invertebrates, including the coconut rhinoceros beetle (*Oryctes rhinoceros*), Asian cycad scale (*Aulacaspis yasumatsui*), cycad blue butterfly (*Chilades pandava*); two species of scarab beetle (*Protaetia orientalis* and *P. pryeri)*, which damage native vegetation; and, the little fire ant (*Wasmannia auropunctata*), greater banded hornet (*Vespa tropica*), and New Guinea flatworm (*Platydemus manokwari*), which impact native wildlife species (Andersen AFB, 2019).

Fourteen federal- or Guam-listed ***endangered and threatened flora species*** previously observed on Andersen AFB (including marine areas) (**Table 3-19**). The cantonment area on Andersen AFB, in which the proposed SPCS site is located, has been cleared of natural vegetation and is considered developed, with the closest areas identified as sensitive habitat occurring approximately 0.5 mile of the proposed SPCS site (Andersen AFB, 2019).

Of these species, only the Micronesian starling (*Aplonis opaca*) has the potential to occur on the proposed SPCS site. This species has not been observed there, although no formal surveys have been conducted in support of the Proposed Action. Endemic to the Mariana Islands, the Micronesian starling is federal and Guam ESA-listed as endangered due to a number of factors including human disturbance, habitat alteration, disease, and predation by invasive brown treesnakes (USFWS, 1991). With only three known locations on Guam, they prefer to nest and roost in colonies in caves (Andersen AFB, 2019).

There are many non-native wildlife and vegetation species on Guam that cause substantial damage that meet the criteria of ***invasive species*** (see **Section 3.1.4.3** and **Table 3-20**).

Table 3-19
Endangered and Threatened Species at Andersen AFB and Vicinity

Scientific Name	Common Name	Federal Status	Guam Status
Wildlife			
Pteropus mariannus	Mariana fruit bat	T	E
Gallinula chloropus guami	Mariana common moorhen	E	E
Aplonis opaca	Micronesian starling	-	E
Eretmochelys imbricata	Hawksbill turtle	E	E
Chelonia mydas	Green sea turtle	E	E
Emoia atrocostata	Tide-pool skink	-	E
Emoia cyanura	Azure-tailed skink	-	E
Emoia slevini	Slevin's skink	E	E
Lipinia noctua	Moth skink	-	E
Nactus pelagicus	Pacific slender-toed gecko	-	E
Perochirus ateles	Micronesian gecko	-	E
Partula gibba	Humped tree snail	E	E
Partula radiolata	Guam tree snail	E	E
Hypolimnas octocula marianesis	Mariana eight-spot butterfly	E	-

Source: USFWS IPaC, 2021
E = endangered, T = threatened

Table 3-20
Invasive Species of Guam

Scientific Name	Common Name
Wildlife	
Aulacaspis yasumatsui	Asian cycad scale
Boiga irregularis	Brown treesnake
Canis lupus familiaris	Dog
Felis catus	Cat

Scientific Name	Common Name
Eleutherodactylus planirostris	Greenhouse frog
Hemidactylus frenatus	House gecko
Mus musculus	House mouse
Oryctes rhinoceros	Coconut rhinoceros beetle
Platydemus manokwari	New Guinea flatworm
Rattus exulans	Pacific rat
Rattus norvegicus	Norway rat
Rattus rattus	Black rat
Rhinella marina	Marine toad
Suncus murinus	Asian house shrew
Sus scrofa	Pig
Trachemys scripta elegans	Red-eared slider
Wasmannia auropunctata	Little fire ant
Vegetation	
Annona reticulata	Custard apple
Antigonon leptopus	Chain-of-love plant
Bambusa vulgris	Burr marigold
Cenchrus echinatus	Burr grass
Cestrum diurnum	Chinese inkberry
Chromolaena odorata	Siam weed
Coccinia grandis	Ivy gourd
Leucaena leucocephala	Tangan-tangan
Megathyrsus maximus	Guinea grass
Mikania micrantha	Bitter vine
Mimosa diplotricha	Giant sensitive plant
Pennisetum polystachion)	Mission grass
Pimenta racemosa	Bay rum
Spathodea campanulata	African tulip tree
Sphagneticola trilobata	Creeping oxeye
Stachytarpeta indica	Indian snakeweed
Tabebuia pallida	Cuban pink trumpet tree
Tetrastigma pubinerve	Chestnut vine-
Triphasia trifolia	Limeberry-
Vitex agnus-castus	Vitex tree

Source: Andersen AFB, 2019; ISSG, 2021

3.5.4.2 Environmental Consequences

Proposed Action – Vegetation. The cantonment area on Andersen AFB, in which the proposed SPCS site is located, has been cleared of natural vegetation and is considered developed. No significant impacts to vegetation would be anticipated to occur under the implementation of Alternative C, as no natural vegetation remains in the vicinity of or on the proposed SPCS site.

Proposed Action – Wildlife. The proposed SPCS site is located in a developed area and does not provide suitable habitat for wildlife. Wildlife, and especially avian species, utilizing the surrounding undeveloped areas for foraging and breeding would normally be sensitive to increased noise impacts from military aircraft. Although there is variability in responses across species, many birds and wildlife have the ability to habituate to noise and movement from military aircraft (Grubb et al., 2013), and military aircraft operations have been ongoing at Andersen AFB for decades. As such, the noise and movement temporarily caused by construction and renovation activities would have negligible short-term impacts on wildlife.

Proposed Action – Threatened and Endangered Species. As noted above, 14 federal or Guam-listed threatened or endangered species are known to occur on Andersen AFB; however, suitable habitat for special status species is not found on the proposed SPCS site. Of these species, only the Micronesian starling and the Mariana fruit bat have the potential to occur on the proposed SPCS site while flying through the location; however, these species have not been identified on the property, although no formal surveys have been conducted in support of the Proposed Action. NGB has determined that implementation of Alternative C is not likely to adversely affect the Mariana fruit bat because the proposed facilities would not require barbed wire fencing and no tree removal is anticipated. The presence of this species has not been confirmed and the proposed SPCS site contains no suitable habitat. NGB issued a determination of *Not*

Likely To Adversely Affect for impacts to the Micronesian starling and Mariana fruit bat under Alternative C on 19 November 2021. Consultation with USFWS is complete following receipt of concurrence with NGB's determination of *Not Likely to Adversely Affect* for impacts to the Micronesian starling and Mariana fruit bat on 16 December 2021; documentation is included in **Appendix A**.

Proposed Action – Invasive Species. None of the construction activities associated with Alternative C would have the potential to directly impact invasive species. Construction activities under Alternative C would be implemented using BMPs in accordance with the Andersen AFB *Pest Management Plan* (Andersen AFB, 2018a). In order to limit the potential for introduction of invasive species, equipment and off-site vehicles would be required to be cleaned prior to use on-site. Fill dirt, straw, and any plantings would also be checked for evidence of invasive non-native plants.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Andersen AFB, would result in negligible impacts to biological resources. Construction activities would occur in previously disturbed areas with minimal natural resources present. When added to past, present, and foreseeable future actions, the Proposed Action would result in minimal noise disturbance to wildlife. These actions would not be expected to result in any adverse effects on threatened and endangered species. As such, no significant effects on biological resources would be expected.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. Biological resources on Andersen AFB would remain unchanged, and the implementation of the No Action Alternative would result in no significant impacts to biological resources.

3.5.5 Water Resources

3.5.5.1 Existing Conditions

The ROI for water resources under Alternative C is the Andersen AFB Main Base.

No natural ***surface water*** resources such as lakes or streams are present on Andersen AFB or the proposed Andersen SPCS site due to the highly permeable limestone karst that underlies the area, as described in **Section 3.5.6.1.1** (Andersen AFB, 2019). Temporary ponding may occur during periods of prolonged heavy rains and typhoon events, but the rainfall typically percolates rapidly into limestone cavities.

The entire island of Guam, excluding lands solely under federal jurisdiction, is classified as a ***coastal zone*** under the CZMA, and Guam's Coastal Management Program is overseen by the Guam Bureau of Statistics and Plans (GBSP). GBSP has developed Guam's federally approved coastal zone management plan: *Guidebook to Development Requirements on Guam* (GBSP, 2020), which describes the laws, regulations, permits, and established guidelines for development projects on Guam.

Andersen AFB and the proposed Andersen SPCS site are located above the recharge area of the Northern Guam Lens Aquifer (NGLA), a designated a sole source aquifer under the *Safe Drinking Water Act* (Andersen AFB, 2019). Sole source aquifer designation provides limited protection of ***groundwater*** resources used as drinking water supplies for 50 percent or more of an area's population and, if contaminated, would present a significant risk to public health. The NGLA supplies drinking water to approximately 80 percent of the island's residents, and potable drinking water is obtained from approximately 180 wells that tap the upper part of the NGLA. Thirteen of these wells provide drinking water to all housing and facilities at Andersen AFB, with the closest well located approximately one mile from the proposed SPCS site (Andersen AFB, 2016).

Andersen AFB monitors groundwater quality in these wells to meet the requirements of the National Primary Drinking Water Regulations and protects against groundwater contamination as part of the Installation's stormwater management practices. National Primary Drinking Water Regulations are legally enforceable primary standards and treatment techniques to protect public health by limiting the levels of contaminants in drinking water. The Guam Waterworks Authority monitors groundwater quality for the remaining drinking water wells on Guam to comply with the National Primary Drinking Water Regulations.

As further described in **Section 3.5.11**, Andersen AFB is classified as a USEPA Superfund site due to the presence of hazardous substances associated with past operations. Long-term groundwater monitoring is being conducted at the Installation to monitor groundwater contaminant plumes. The closest groundwater contaminant plume is located approximately 0.5 mile from the proposed Andersen AFB SPCS site, in the vicinity of the maintenance area near the airfield; however, the plume does not extend under the site.

Contaminated groundwater is not available for consumption because no drinking water wells are located in areas of contamination (USEPA, 2021b).

Andersen AFB topography is relatively flat, as described in **Section 3.5.6.1**, and rainfall typically percolates into the limestone karst or other depressions. ***Stormwater*** runoff from impervious surfaces is channeled through a network of stormwater channels to approximately 100 stormwater injection wells that have been drilled into the underlying and highly porous limestone karst to facilitate stormwater movement into the groundwater (Andersen AFB, 2019). Stormwater discharge to injection wells is regulated under the *Safe Drinking Water Act* by the Guam EPA, and Andersen AFB is authorized to discharge stormwater to these injection wells under an underground injection control operating permit issued by Guam EPA. Andersen AFB does not operate under a NPDES permit because there are no surface waters present on the Installation and its stormwater does not discharge to surface waters.

No stormwater or drainage ditches are present within the proposed Andersen SPCS site. Three downgradient injections wells are available to receive stormwater runoff from the site (Personal communication with B. Clark, February 26, 2021).

Wetlands. As described above, surface water percolates downward into the bedrock in the Andersen AFB area, and no surface water features are present on the Installation. Therefore, the physical setting does not support the formation of wetlands, and wetlands are not present within Andersen AFB or the proposed Andersen AFB SPCS site (Andersen AFB, 2020).

Floodplains. FEMA FIRM Panel #6600010050D indicates Andersen AFB and the proposed Andersen AFB SPCS site are located in Zone X (areas of minimal flood hazards). Some portions of the Installation abut land that is classified as Zone A, which includes areas along the shoreline within the 100-year floodplain that have a one percent chance of inundation by a flood event in any given year (FEMA, 2021). The proposed Andersen AFB SPCS site is located approximately one mile inland from the closest shoreline Zone A floodplain.

3.5.5.2 Environmental Consequences

Proposed Action – Surface Water. As described above, no natural surface water resources are present on Andersen AFB or the proposed Andersen SPCS site due to the highly permeable limestone karst that underlies the area. Stormwater runoff either percolates into the ground or is channeled through a network of drainage ditches and stormwater channels to stormwater injection wells.

As described above, the risk of potential soil erosion and sedimentation from proposed construction would be minimized through the implementation of appropriate erosion and sediment control BMPs that would be identified and implemented as part of a required SWPPP ESP and Grading, Clearing, and Stockpiling Permit ECP. These BMPs would prevent sediment, debris, and other pollutants from entering the Installation's stormwater drainage ditches, canals, and stormwater injection wells. Additionally, a required CWA Section 401 Water Quality Certification would be issued by Guam EPA, which certifies that construction would be conducted in a manner consistent with Guam water quality standards. Associated with Section 401 WQC is the required development of and adherence to an Environmental Protection Plan, which describes the methods, practices, and equipment to be used on site; expected or anticipated environmental problems during and after construction; and the methods, practices, and equipment that may be used to avoid, mitigate, or control potential effects on the environment, including surface water. Therefore, no significant direct or indirect impacts to surface water quality would occur from implementation of Alternative C.

Impervious area would increase by approximately two acres from building, parking lot, and equipment pad construction. This increase would correspondingly reduce infiltration, potentially resulting in short- and long-term increases in stormwater runoff; however, an infiltration basin or other appropriate Low Impact Development solution would be constructed to comply with UFC 3-210-10 and Section 438 of the *Energy Independence and Security Act*.

Proposed Action – Coastal Zones. As described above, the entire island of Guam, excluding lands solely under federal jurisdiction, are classified as a coastal zone under the CZMA, and the Guam Coastal Management Program is overseen by the GBSP. Generally, federal consistency requires that federal actions, within and outside the coastal zone, which have reasonably foreseeable effects on any coastal use (land or water), or natural resource of the coastal zone be consistent to the maximum extent practicable with the enforceable policies of the Guam Coastal Management Program presented in *Guidebook to*

Development Requirements on Guam (GBSP, 2020). The Proposed Action on Andersen AFB may be subject a CZMA federal consistency review by GBSP to ensure consistency with the CZMA. Construction occurring under Alternative C would be limited to one 12,000 ft^2 building, equipment pads, and a parking lot and would not affect the coastal zone. Construction occurring under Alternative C would not impact the coastal zone. Therefore, USAF would not submit a consistency determination for the Proposed Action.

The proposed SPCS site at Andersen AFB would not be considered vulnerable to SLR associated with climate change due its location on Guam's northern plateau several hundred feet above mean sea level.

Proposed Action – Groundwater. A letter from USEPA Region 9 dated 8 March 2021 noted the location of the proposed SPCS site above a Sole Source Aquifer. As described above, Andersen AFB and the proposed SPCS site are located above the NGLA recharge area, a designated Sole Source Aquifer that Andersen AFB is required to protect from groundwater contamination. Any project that is located over the NGLA must be reviewed by Guam EPA. There is no application or permit required; however, such reviews are required to ensure protection of the NGLA from potential pollution resulting from the implementation any project.

Potential inputs of pollutants to the NGLA could occur from activities associated with the implementation of Alternative C if chemicals or petroleum products are spilled from equipment due to malfunction or refueling errors; however, appropriate spill prevention control and countermeasures identified in the required Section 401 WQC and associated EPP would be adhered to and would prevent pollutants from entering the NGLA.

Proposed Action – Stormwater. As described above, stormwater runoff on the Installation either percolates into the ground or is channeled through a network of drainage ditches and stormwater channels to stormwater injection wells. As described above, the risk of potential soil erosion and sedimentation from proposed construction would be minimized through the implementation of appropriate erosion and sediment control BMPs that would be identified and implemented as part of a required SWPPP ESP and Grading, Clearing, and Stockpiling Permit ECP. These BMPs would prevent sediment, debris, and other pollutants from entering the Installation's stormwater drainage ditches, channels, and stormwater injection wells. As described above, a required Environmental Protection Plan would be developed and implemented to avoid, mitigate, or control potential adverse effects on the environment including stormwater. Therefore, no significant direct or indirect impacts to stormwater quality would be anticipated to result from implementation of Alternative C.

Impervious area would increase by approximately two acres from building, parking lot, and equipment pad construction. This increase would correspondingly reduce infiltration, potentially resulting in short- and long-term increases in stormwater runoff; however, an infiltration basin or other appropriate Low Impact Development solution would be constructed to comply with UFC 3-210-10 and Section 438 of the *Energy Independence and Security Act*. Therefore, no significant direct or indirect impacts to stormwater quantity would be anticipated to result from increased impervious area associated with implementation of Alternative C.

Proposed Action – Wetlands. No wetlands are present within Andersen AFB or the proposed SPCS site; therefore, proposed activities under Alternative C would not impact wetlands, and implementation of the Proposed Action at this site would comply with EO 11990.

Proposed Action – Floodplains. Extreme weather events due to climate change for the territory of Guam include increases in typhoon frequency and severity, leading to more flooding events (USEPA, 2016b). Andersen AFB and the proposed SPCS site are located in FEMA FIRM Zone X (areas of minimal flood hazards); therefore, proposed activities under Alternative C would not impact floodplains and the implementation of the Proposed Action at this site would comply with EO 11988.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Andersen AFB, is not expected to adversely impact water resources. Construction activities would only occur in previously disturbed areas lacking surface water resources, and BMPs to control erosion and sedimentation would be implemented. Therefore, the proposed SPCS site is not expected to have increased vulnerability to potential flooding from predicated climate change-driven extreme weather events.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. Water resources would not change from current condition, and no impacts to water resources would be anticipated.

3.5.6 Geological Resources

3.5.6.1 Existing Conditions

The ROI for geological resources under Alternative C is the proposed SPCS site at Andersen AFB.

Regional Geology. Like the other islands that make up the Northern Mariana Islands, Guam is a volcanic island that was formed when magma was released as the Pacific Plate slid beneath the Philippine Sea Plate. As a result, volcanic rocks form the geologic and structural base of Guam, and these rocks are exposed over approximately 35 percent of the island, predominately in central and southern Guam (Andersen AFB, 2020a). Later in geologic time, limestone rocks were deposited and are exposed over approximately 60 percent of the island, mainly in northern Guam, where Andersen AFB is located (Mueller et al., 2012). Over time, limestone karst topography developed as a result of high rainfall in the region (as described in **Section 3.5.3.1**) and the high porosity and solubility of limestone rocks.

Topography. The northern portion of Guam consists of a relatively flat limestone karst plateau ranging in elevation from 98 feet to 482 feet above mean sea level. Limestone karst is a distinctive landscape formed on the northern portion of Guam by dissolution of soluble limestone rocks. This solubility creates large voids such as sinkholes and caves, and smaller epikarst features characterized by rough surfaces, little soil, and small cavities. The epikarst are conduits for surface water to percolate to the groundwater aquifer, or to channelize through connected subsurface voids or cavities (Andersen AFB, 2020a).

Andersen AFB is located in the northern portion of Guam in part because of the flat topography, and topography across the proposed Andersen SPCS site has been leveled further due to previous grading for use as a temporary laydown area for contingency operations.

Soil underlying the proposed Andersen SPCS site is mapped entirely as Guam-Urban land complex with zero to three percent slope (**Figure 3-10**). Guam-Urban land complex has a shallow soil profile of zero to 2 inches of cobbly clay loam, 2 to 8 inches of gravelly clay loam, and 8 to 12 inches of bedrock, and is typically well drained with very low runoff potential (NRCS, 2021a).

The soil underlying the proposed Andersen SPCS site and adjacent lands is not identified as ***prime farmland*** and is not in agricultural use (NRCS, 2021b).

3.5.6.2 Environmental Consequences

Proposed Action. Ground surface disturbance from construction activities associated with Alternative C would not alter geologic structures or features because underlying bedrock geology at Andersen AFB and the proposed SPCS site would not be disturbed. Ground surface disturbance from grading activities under the Alternative C would not alter geologic structures as the soil described above, while very shallow with a depth to bedrock of 8 to 12 inches, would generally not be graded to a depth exceeding 6 inches below the ground surface.

Activities associated with Alternative C would occur entirely on the proposed SPCS site. Ground surface disturbance from construction activities associated with Alternative C present the risk of potential short- and long-term increases in soil erosion and sedimentation; however, this risk would be low given the flat topography of the proposed site, low runoff potential of the soil, and the implementation of appropriate erosion and sediment control BMPs. BMPs would be identified and implemented as part of a SWPPP ESP that would be developed and adhered to in compliance with a required NPDES Construction General Permit. Additionally, a required Clearing, Grading, and Stockpiling permit issued by Guam EPA, and associated ECP with enforceable measures to prevent soil erosion and protect water quality, would be adhered to. Therefore, construction activities associated with Alternative C would not result in any significant direct or indirect impacts to soil resources.

Projects proposed under Alternative C would have no impact to prime farmlands.

The Proposed Action, in addition to the past, present, and reasonably foreseeable future actions on and off Andersen AFB, would have negligible effects to geological resources during construction activities, which would occur in previously disturbed areas. BMPs and compliance with permits would minimize the effect on soils.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. Soils would not change from current condition, and no impacts to soils would be anticipated.

Figure 3-10 Site Soils–Andersen AFB

3.5.7 Land Use

3.5.7.1 Existing Conditions

The ROI for land use under Alternative C is Andersen AFB. Andersen AFB is located in Yigo at the northern tip of Guam and covers approximately 15,400 acres. The Installation is currently divided into 10 land use categories, with approximately 50 percent of the Installation consisting of open space, 35 percent devoted to airfield, airfield operations, and industrial uses, and 15 percent categorized as urbanized and containing administrative, housing, community/commercial and recreational land uses (Andersen AFB, 2017). The proposed Andersen SPCS site is classified as family housing and is currently vacant. Land use categories for adjacent parcels include commerce, family housing, and administration (**Figure 3-11**).

The proposed SPCS site at Andersen AFB has been largely unutilized since the 1980s apart from serving as a laydown area for contingency operations, including tents for the housing of temporary contingency personnel. Prior to the 1980s, the proposed SPCS site housed semi-permanent structures that were used

as dormitories for Maintenance Airmen during the Vietnam War and as housing for Vietnamese refugees in 1975; remaining buildings that survived Super Typhoon Pamela in 1976 were used as offices into the 1980s. During the 1950s, the parcel housed tents and/or stick-built structures on freshly disturbed limestone. While the exact use of the subject property is not clear, evidence does support that this land has been disturbed at least twice since WWII.

3.5.7.2 Environmental Consequences

Proposed Action. No impacts to land use would be anticipated to occur under Alternative C. Construction activities associated with this alternative would occur entirely within the existing boundaries of Andersen AFB. Projects that would be anticipated to occur under Alternative C would be implemented in areas of existing land use that include community/commercial, administration, unoccupied housing, and medical, and would be compatible with these adjacent land uses.

The Proposed Action, in addition to the past, present, and reasonably foreseeable future actions on and off Andersen AFB, would not be expected to have significant land use impacts, as the overall land use as a military installation would remain unchanged.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. Land use would not change from current conditions, and no impacts to land use would be anticipated.

3.5.8 Socioeconomics

3.5.8.1 Existing Conditions

The ROI for socioeconomics under Alternative C includes Andersen AFB and the surrounding environs. For the purposes of this analysis, socioeconomic conditions on Guam were compared to those of Hawaii, as Alternatives A and B are located in Hawaii and Guam is similar in size to the state.

Population. The proposed SPCS site is located in the municipality (village) of Yigo, which encompasses the entirety of Andersen AFB. Population in this municipality has increased by approximately 4.6 percent between 2010 and 2019, which a current population of 21,480 people. Yigo has experienced the same growth rate as Guam since 2010 (**Table 3-21**) and has grown at a faster rate than Hawaii. The northern region of Guam, in which Yigo is located, is home to approximately 53.4 percent of the population of Guam (Guam Housing and Urban Renewal Authority, 2020).

A total of approximately 8,430 permanent party personnel, active rotational personnel, dependents, civilians, and contractors make up the community on Andersen AFB (Andersen AFB, 2017). It is estimated that the community will grow to approximately 10,870 personnel by 2025 due to anticipated additions of a Marine Corps Aviation Combat Element, Army Air Defense Artillery Brigade Headquarters, and the Navy TRITON mission (Andersen AFB, 2017).

Employment. Approximately 65,000 people on Guam were employed in 2018 (Guam Housing and Urban Renewal Authority, 2020) and the average unemployment rate was 5.6 percent. The Guam unemployment rate was higher than the average unemployment rate in Hawaii of approximately 2.5 percent, but the unemployment rate on Guam has dropped considerably since the early 2010s, when it hovered around 13 percent (Guam Housing and Urban Renewal Authority, 2020).

Figure 3-11 Land Use–Andersen AFB

Table 3-21
Population in the Andersen AFB Region of Influence as Compared to Guam and the United States (2010–2019)

Geographic Area	2010	2019	Growth Rate 2010–2019 (Percent)
Yigo Municipality	20,539	21,480	4.6
Guam	159,358	166,661	4.6
Hawaii	1,363,621	1,415,872	3.8

Source: USCB, 2020a; Guam Housing and Urban Renewal Authority, 2020

U.S. Bureau of Labor Statistic data and information on Guam's largest employers show that employment in the area is dominated by the Office and Administrative Support sectors, which reflects the predominance of the U.S. military on the island. The second largest industry on Guam is the Food Preparation and Serving Related sector, which reflects the importance of the tourism industry. The Office and Administrative Support sector accounts for 14.4 percent of employment on Guam, while the Accommodation and Food Services sector accounts for 11.2 percent of employment on the island (U.S. Bureau of Labor Statistic, 2019b).

Housing. Guam Housing and Urban Renewal Authority estimates show that housing vacancy rates on Guam for homeowner and rental housing in 2020 were below the Hawaii average (**Table 3-22**). There are nearly 10,000 vacant units on Guam (Guam Housing and Urban Renewal Authority, 2020). The percentage of homes that are owner-occupied on Guam (50.0) is well below the Hawaii average of 60.2 percent, while the 50.0-percent rental-occupied rate is higher than the Hawaii rate of 39.8 percent.

There are a total of 1,339 housing units on Andersen AFB. While housing supply is adequate for the current population on Andersen AFB, the estimated population increase of 2,400 personnel due to anticipated additions of a Marine Corps Aviation Combat Element, Army Air Defense Artillery Brigade Headquarters, and the Navy TRITON mission will require the construction of additional housing, which has already been planned in the Installation Development Plan (Andersen AFB, 2017). Vacant housing on Andersen AFB that does not meet current standards will be demolished and new housing will be constructed in its place in order to accommodate the increase in personnel.

Table 3-22
Housing on Guam

Attribute	Guam	Hawaii
Total Units	55,562	550,328
Owner-occupied	50%	60.2%
Renter-occupied	50%	39.8%
Vacant Units	9,918	85,029
Homeowner Vacancy Rate[a]	0.7%	1.4%
Rental Vacancy Rate[b]	7.3%	8.8%
Median Value[c]	$271,000	$669,200

Source: Guam Housing and Urban Renewal Authority, 2020
Notes:
a. Homeowner vacancy rate is the proportion of the homeowner inventory that is vacant "for sale."
b. Rental vacancy rate is the proportion of the rental inventory that is vacant "for rent."
c. Median value of owner-occupied single-family homes

Schools. The Guam Department of Education (Guam DOE) administers the public-school system on the island of Guam. Guam DOE encompasses 41 schools, including 26 elementary schools, 8 middle schools, 6 high schools, and 1 alternative school. Enrollment totaled approximately 30,000 students (Guam DOE, 2021). Most children associated with Andersen AFB attend public schools in the Guam DOE, with children living on Base generally attending schools Andersen Elementary School and Andersen Middle School on Base, McCool Elementary and Middle School at Apra Heights, and Guam High School at Nimitz Hill. There are also approximately 25 private schools on Guam, the majority of which are religious in nature and associated with Christian denominations. Institutions of higher education in the region include the University of Guam, Guam Community College, and Pacific Islands Bible College.

The estimated population increase of 2,400 personnel due to anticipated additions of a Marine Corps Aviation Combat Element, Army Air Defense Artillery Brigade Headquarters, and the Navy TRITON mission will require the construction of an additional elementary school on Andersen AFB to support the student population. The construction of the new elementary school is described in the 2017 Installation Development Plan.

3.5.8.2 Environmental Consequences

Proposed Action. Environmental consequences for socioeconomic under Alternative C at Andersen AFB are expected to be the same as those under Alternative B at JBPHH (see **Section 3.4.8.2**).

Under Alternative C, construction of a new building, equipment pad, and parking lot would result in a temporary increase of 20 to 50 construction personnel, which would have no impact on the socioeconomic condition on the region. Of the potential 115 additional personnel that would beddown under the Proposed Action at Andersen AFB, it is estimated that a maximum of 18 personnel would be full-time employees, while the remainder would be drill-status guardsmen who already live and work on Guam. Of the 18 full-time personnel, a maximum of 5 personnel would be new to Guam and would need to acquire housing on the island. This would represent a small increase in the total persons permanently assigned to and working at Andersen AFB, where currently over 8,430 military and civilian personnel are employed. Adequate housing and educational resources are available in the ROI to accommodate the small increase in personnel; therefore, no significant impacts on employment, housing, or educational resources would occur under implementation of Alternative C.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions, such as the additions of a Marine Corps Aviation Combat Element, Army Air Defense Artillery Brigade Headquarters, and the Navy TRITON mission, would substantially increase the population on Andersen AFB and would increase the demand for housing on and off Base. Construction and renovation activities associated with the projects listed above will be implemented to address the shortage of on Base housing and classroom capacity. Construction and demolition projects would result in a beneficial impact, as local sales and payroll taxes would increase.

In scoping comments dated 2 March 2021, USEPA Region 9 requested clarification on the need for additional infrastructure and housing to support the beddown of additional troops under the Proposed Action at Andersen AFB.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. No expenditures would occur locally or regionally to support the action alternatives. There would be no change to socioeconomic conditions under the No Action Alternative.

3.5.9 Environmental Justice and Protection of Children

3.5.9.1 Existing Conditions

The most recent available information regarding the percentage of the population below poverty and the percentage of the population classified as a minority for Yigo and Guam is from the 2000 Census, and this information is reflected in **Table 3-23**. In 2000, Yigo and Guam had a higher percentage of minorities in the population compared to Hawaii, with 85.4 percent and 93.2 percent of the population, respectively (USCB, 2004). Compared to Hawaii, Yigo and Guam have a much higher percentage of the population that is considered Native Hawaiian or Pacific Islander (23.3 percent, 46.2 percent, and 58.5 percent, respectively). This includes people of Chamorro origin, which is the native community of Guam. Yigo reports a lower total percentage of the population that is classified as minority, or Native Hawaiian or Other Pacific Islander, due in large part to the heavy military presence associated with Andersen AFB. Note that the percentage of the population classified as minority on Guam includes indigenous individuals of NHO or other Pacific Island descent, including the Chamorros, due to the dispersion of economic power on the island.

Over the same period, Yigo had a lower rate of poverty than the island of Guam and a higher rate of poverty than Hawaii (**Table 3-23**); the percentage of the population below poverty in Yigo in 2000 was 21.6 percent, while the percent below poverty on Guam and in Hawaii is 23.0 percent and 10.7 percent, respectively. The lower rate of poverty in Yigo may also be attributed to the heavy military presence associated with Andersen AFB and local businesses that support the Installation. The percentage of children in Yigo was higher than the percentage of children on Guam and in Hawaii (**Table 3-23**) (USCB, 2020b).

Table 3-23
Total Population and Populations of Concern on Guam (2000)[a]

Geographic Area	Total Population	Percent Minority	Percent Native Hawaiian or Other Pacific Islander	Percent Below Poverty	Percent Youth[b]
Yigo Municipality	19,474	85.4	46.2	21.6	38.1
Guam	154,805	93.2	58.5	23.0	35.4
Hawaii	1,211,537	75.7	23.3	10.7	24.4

Source: USCB, 2004
Notes:
a. The most recent available Census data for Guam and Yigo is from 2000.
b. Percent youth are all persons under the age of 18.

3.5.9.2 Environmental Consequences

Proposed Action. Environmental justice impacts resulting from Alternative C were evaluated using SPCS #4 personnel requirements for ANG space operators and operations support personnel for an offensive mission, as the 88 to 115 new personnel required are higher than the 62 to 105 personnel associated with the SPCS #5 and thus provide a more conservative estimate for impacts. Under Alternative C, the increase in the number of personnel at Andersen AFB supporting the addition of a SPCS would not result in a disproportionate impact on minorities, low-income (characterized as living below the poverty line as established by the U.S. Census Bureau), and youth populations because there would be adequate housing, community resources, and community services in the ROI to support the increase in personnel due to the proposed construction efforts for housing, schools, and other resources to support the anticipated additions of a Marine Corps Aviation Combat Element, Army Air Defense Artillery Brigade Headquarters, and the Navy TRITON mission. Additionally, ample housing is available off Base and the population in Yigo reports a lower rate of poverty than Guam as a whole. The 115 additional personnel and their families supporting Alternative C would not disproportionately affect the availability of these resources to minorities, low-income populations, or children.

The impact assessment for each of the resource topics considered in the preceding sections identified only negligible-to-low impacts on the physical, natural, and human environment (see **Table 2-2**). Implementation of Alternative C would not result in the disproportionally high and adverse impacts on minority, low-income, or youth populations.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Andersen AFB, is not expected to have a disproportionate impact on minority and low-income populations or children.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. No expenditures would occur locally or regionally to support the action alternatives. There would be no change to minority, low-income, or youth populations under the No Action Alternative.

3.5.10 Cultural Resources

3.5.10.1 Existing Conditions

The APE for cultural resources is a 0.25-mile radius around the proposed SPCS site.

Archaeological, Traditional Cultural, and Architectural Properties. Four prior studies (three historic architectural surveys and one archaeological survey) have been conducted within a 0.25-mile radius around the proposed SPCS site (Dixon and Walker, 2011; Mohlman, 2014; Mohlman, 2018; Yoklavich and Tuggle, 2004).

Thirty-six cultural resources, all of which are buildings, were recorded within a 0.25-mile radius around the proposed SPCS site (**Figure 3-12** and **Table 3-24**). Thirty-five of these resources have been determined not eligible for inclusion in the NRHP due to loss of integrity and/or lack of significance under any NRHP criterion.

One resource has been determined eligible for listing in the NRHP. Facility 25011 is the Tinian Hall Dormitory built in 1955. It has been determined to be eligible for listing in the NRHP under the Advisory

Table 3-24
Cultural Resources Recorded within a 0.25-mile Radius around the Andersen AFB Proposed SPCS Site

Facility #	Date Recorded	Resource Name	NRHP Status
10032	2014	Volleyball Court	Not eligible
23010	2014	Mobility Response Headquarters Building	Not eligible
23022	2014	736 Security Force Headquarters Building	Not eligible
23028	2018	36 MSG Headquarters Building	Not eligible
25001	2014	Old Clothing Sales Store	Not eligible
25005	2014	Bowling Center	Not eligible
25008	2014	Communications Facility	Not eligible
25011	2018	Tinian Hall Dormitory	Eligible
25014	2018	Air Conditioning Plant Building	Not eligible
26006	2014	Top of the Rock Club	Not eligible
26050	2014	Utility Screen	Not eligible
27000	2014	Bachelor Officers Quarters	Not eligible
27030	2018	Latte Stone Food Court	Not eligible
28005-28020, 28044-28052	2014	Fleming Heights Houses	Not eligible

Source: Dixon and Walker, 2011; Mohlman, 2014; Mohlman, 2018; Yoklavich and Tuggle, 2004
AFB = Air Force Base; SPCS = Space Control Squadron

Council for Historic Preservation's 2006 Program Comment for Unaccompanied Personnel Housing (1946–1974), and the responsibilities for compliance under Section 106 have been mitigated programmatically.

No archaeological sites have been identified within the 0.25-mile radius around the proposed SPCS site.

TCPs may include traditionally used plants and animals, trails, and certain geographic areas. Types of resources that have been specifically identified in recent studies include, but are not limited to, rock art sites; "power" rocks and locations; medicine areas; and landscape features such as specific peaks or ranges, hot springs, meadows, valleys, and caves. No recorded TCPs, sacred areas, or traditional-use areas have been identified on Andersen AFB. The only recorded potential TCP consists of the Tarague District on Andersen AFB, which is located along the coast north of the airfield.

Tribal Lands. There are no tribal lands on Guam, as listed in NCSL (2021).

3.5.10.2 Environmental Consequences

Proposed Action – Archaeological Resources and Traditional Cultural Properties. Alternative C includes construction activities that would require ground disturbance at the Proposed SPCS site. No archaeological resources on Andersen AFB have been identified as eligible for NRHP listing within the APE. The proposed SPCS site has been partially surveyed for archaeological resources and is located in a developed area that is considered to have low probability of archaeological discoveries. Aerial imagery indicates that the area has been subject to periods of grading. Andersen AFB has no recorded TCPs and there are no federally recognized tribes located on Guam as listed in NCSL (2021). In the event that archaeological resources are discovered during implementation of Alternative C, Standard Operating Procedures for the inadvertent discovery of archaeological or human remains, as detailed in the ICRMP, would be followed (Andersen AFB, 2015).

Proposed Action – Architectural Properties. Thirty-six architectural resources were recorded within a 0.25-mile radius around the proposed SPCS site. One building, Facility 25011 (Tinian Hall Dormitory built in 1955), has been determined eligible for NRHP listing. This building falls within the 0.25-mile buffer for indirect effects but outside of the direct APE. No impacts to architectural properties would be anticipated from implementation of Alternative C, as construction of the proposed SPCS facility would not disturb the historical setting for the NRHP-eligible property.

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Andersen AFB, would not result in incremental impacts to cultural resources, archaeological resources, historic resources, or TCPs. The NGB reached a determination of *No Historic Properties Affected* for the Proposed Action. The Guam SHPO concurred with this finding in a letter dated 6 April 2021 (see **Appendix A**).

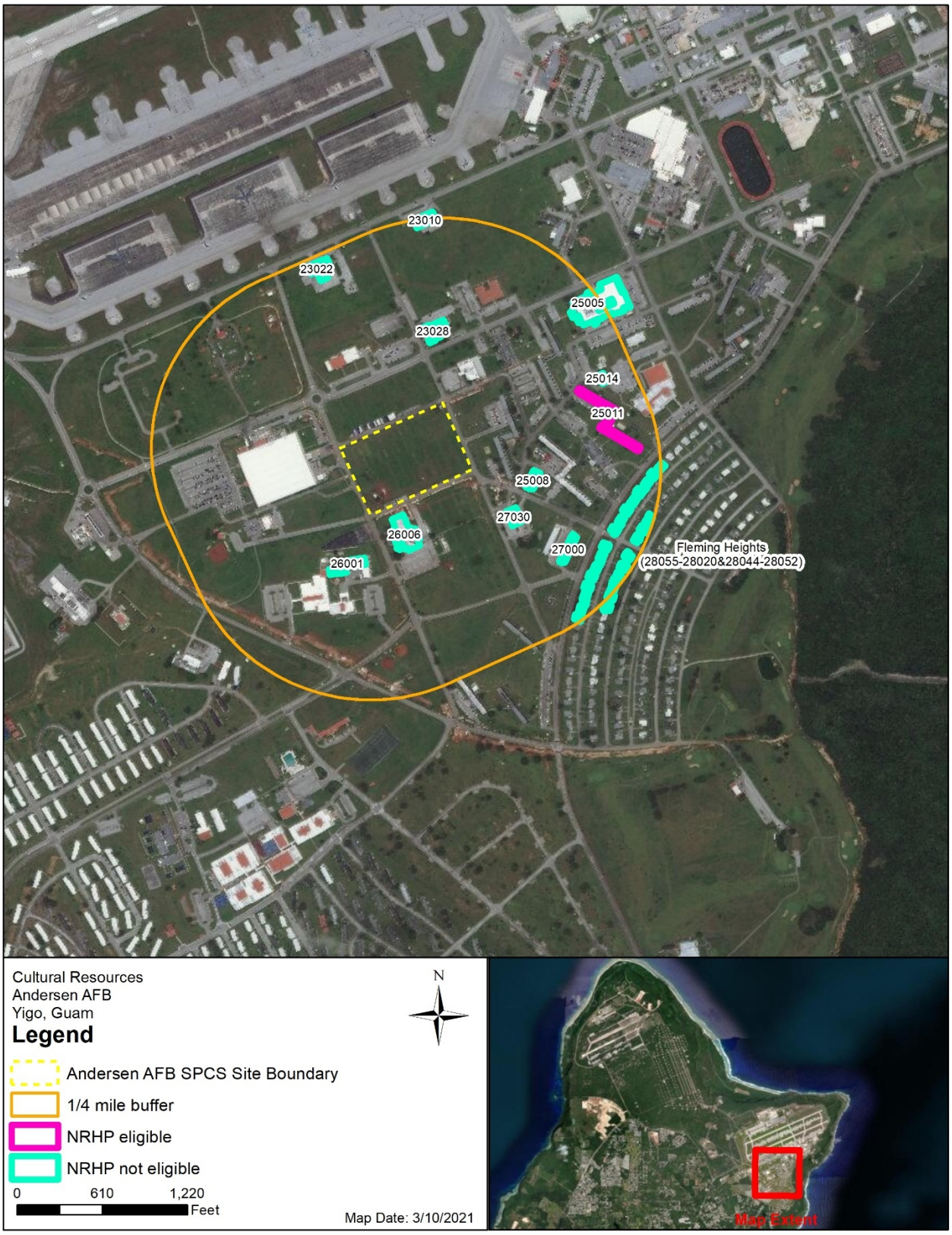

Figure 3-12 Cultural Resources–Andersen AFB

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. There would be no effects to cultural resources under the No Action Alternative.

3.5.11 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

3.5.11.1 Existing Conditions

The ROI for this resource under Alternative C is the proposed SPCS site and vicinity at Andersen AFB.

Hazardous wastes on Guam are regulated under guidance from USEPA and Guam EPA. Rules and regulations specific to Guam include Guam Administrative Rules and Regulations, Title 22, Guam EPA, Division VI, Hazardous Waste Management, Chapter 30 Hazardous Waste Management, as well as Guam Code Annotated, Title 10 Health and Safety, Division 2, Environmental Health, Part 2, Guam EPA, Chapter 51 Solid Waste Management and Litter Control, Article 1, Solid Waste Management.

Andersen AFB is classified as a large-quantity hazardous waste generator as defined by the USEPA, generating more than 2,200 pounds of nonacute hazardous waste per month. Andersen AFB operates 21 IAPs, where up to 55 gallons of "total regulated hazardous wastes" or up to 1 quart (2.2 pounds) of "acutely hazardous wastes" are accumulated. IAP managers are responsible for properly segregating, storing, characterizing, labeling, marking, packaging, and transferring all hazardous wastes for disposal from the IAP to an established 90-day storage area according to federal, state, local, and U.S. Navy regulations. The Hazardous Waste Program Manager is responsible for characterizing and profiling each waste stream. Andersen AFB also operates one 90-day accumulation site, where hazardous waste accumulates before transfer to licensed contractors who ultimately dispose of the hazardous waste at permitted off-island disposal facilities.

Andersen AFB as a whole has been listed on the USEPA's National Priorities List since 14 October 1992 and is classified as a USEPA Superfund site. The Installation was placed on the National Priorities List due to the presence of hazardous substances associated with Base operations, including solvents such as trichloroethane and paint thinners; dry cleaning fluids and laundry products; fuels such as JP-4 and gasoline; pesticides; antifreeze; aircraft cleaning compounds; PCBs; metals; and military munitions. These substances were found in unlined landfills, drum storage and disposal areas, chemical storage areas, fire training areas, waste storage areas, laundry facilities, and industrial and flight line operations (USEPA, 2020a).

Hazardous materials at Andersen AFB are managed by the Installation's Hazardous Materials Pharmacy, under the Logistics Readiness Squadron (Andersen AFB, 2018b). This pharmacy was established with the mission of overseeing, procuring, and minimizing the use of hazardous materials. The Andersen AFB Hazardous Materials Pharmacy reduces the need to store large quantities of hazardous materials elsewhere on Base and allows these materials to be efficiently reordered on an as-needed basis. Unused hazardous materials are turned in to Hazardous Materials Pharmacy or Defense Reutilization Marketing Office for reissue or disposal.

IRP Sites. There are two IRP sites located within 1 mile of the proposed SPCS site at Andersen AFB. The Hazardous Waste Storage Area is located approximately 4,200 feet west of the site, while Landfill 19 is located approximately 4,300 feet southeast of the site. The Hazardous Waste Storage Area is Site 27a and has a status of No Further Action as of April 1999. Landfill 19 is Site 14a and is located adjacent to the golf course on Andersen AFB. The site has land use controls for contaminants left in place along the sea cliff. The landfill is a soil-covered cliffside dump site that is known to contain wastes that include asbestos and PCB. See **Section 3.1.11** for a discussion on IRP sites.

Asbestos. No asbestos is located at the proposed SPCS site since the site is currently vacant. An underground asbestos-cement transite pipe currently runs under the site. This transite pipe would be abandoned in place as part of Alternative C.

LBPs. No LBPs are located on the proposed SPCS site since the site is currently vacant.

Radon. Radon testing has not been performed for the proposed SPCS site since it is currently vacant. However, elevated radon levels are present on Andersen AFB. An interview with the Andersen AFB Installation Radiation Safety Officer indicated that elevated radon levels have been detected in buildings in the vicinity of the property. The USEPA recommends that indoor radon levels higher than 4 pCi/L be mitigated in order to prevent health effects resulting from exposure to radon (USEPA, 2020b). Four

buildings are located in the parcels immediately surrounding the proposed SPCS site. Radon levels for the buildings are noted in **Table 3-25**.

Table 3-25
Radon Levels at Buildings in Andersen AFB Proposed SPCS Site Vicinity

Building Number	Building Name	Radon Level	Interim Mitigation Received Within 3 Weeks	Distance from Proposed SPCS Site (feet)
25001	Deployed Ops Center	119.4	Yes, <20 pCi/L after corrections	220
24016	Base Exchange AAFES	5.1	Not applicable	275
26006	Top of the Rock Club	3.1	Not applicable	110
25007	Saipan Hall	1.0	Not applicable	215

AFB = Air Force Base; SPCS = Space Command Squadron

3.5.11.2 Environmental Consequences

Proposed Action – Hazardous Materials and Wastes. Environmental consequences for hazardous materials and waste under Alternative B at JBPHH are expected to be the same as those under Alternative A for PMRF-Barking Sands (see **Section 3.3.11.2**). Construction contractors would be responsible for monitoring exposure to hazardous materials. Adherence to the Andersen AFB *Hazardous Waste Management Plan* would minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal hazardous materials regulations (Andersen AFB, 2018b). Therefore, short-term, negligible to minor impacts would be anticipated to result from the use of hazardous materials and petroleum products during the proposed construction activity. There would be no impacts to Andersen AFB's status as a Superfund site under Alternative C.

Proposed Action – IRP Sites. The proposed SPCS Site is not located within any existing IRP sites. Two IRP sites are located within 1 mile of the site. However, these sites would not be disturbed by proposed construction activity. Therefore, no impacts on IRP sites would be anticipated in response to proposed construction associated with Alternative C.

Proposed Action – Asbestos and LBP. The proposed SPCS site is currently vacant. No demolition or renovation activities would be associated with Alternative C, and the asbestos concrete transite pipe that underlies the proposed SPCS site would not be disturbed as a result of proposed construction activities. Therefore, disturbance of asbestos and LBP at Andersen AFB would not occur.

Proposed Action – Radon. Radon levels at Andersen AFB are elevated with nearby locations to the proposed SPCS site having levels of radon above 4 pCi/L. Based on elevated radon levels reported in buildings surrounding the proposed SPCS site, any building constructed on the site could have elevated levels of radon above 4 pCi/L. Should levels of radon above 4 pCi/L be detected, the Installation Radiation Safety Officer would work with Installation civil engineering personnel to develop an interim mitigation plan and a long-term mitigation plan to bring the radon levels down below 4 pCi/L.

Proposed Action – PCBs. The proposed SPCS site is currently vacant and does not house any permanent structures. Therefore, disturbance of PCBs at Andersen AFB would not occur.

The Proposed Action, in addition to the past, present, and reasonably foreseeable future actions on and off Andersen AFB, would have negligible effects to hazardous materials and wastes. Elevated radon levels that are present on Andersen AFB would remain regardless of the implementation of future actions, including the Proposed Action.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur, and no change to hazardous materials, contaminated sites, or toxic substances would occur.

3.5.12 Infrastructure, Transportation, and Utilities

3.5.12.1 Existing Conditions

The ROI for this resource under Alternative C is Andersen AFB.

Sanitary Sewer. The existing Andersen AFB wastewater collection system consists of a network of gravity sewers totaling 38 miles (61 km), with four major wastewater pump stations and force mains located on the south side of Andersen AFB Main Base. The four major wastewater pump stations are located at Facility 1295, Facility 24101, Facility 1098, and Facility 1881. The system collects wastewater generated by the

industrial and residential areas on Base and discharges wastewater off Base into the Guam Waterworks Authority sewage collection system at a sewer manhole located near the Andersen AFB Main Gate.

The Guam Waterworks Authority owns and operates most of the wastewater treatment plants on Guam, except for the Apra Harbor Plant, which is a DoD asset that primarily serves Naval Base Guam. The off-Base collection systems on the island are all owned and operated by the Guam Waterworks Authority, except for those that are part of the Apra Harbor Plant. The on-Base wastewater collection systems are owned by the DoD, but feed into main lines owned by the Guam Waterworks Authority (except for those feeding into the Apra Harbor Plant). The wastewater systems include sewers, pumps, treatment plants, and ocean outfalls.

Solid Waste. The main municipal solid waste landfill on Guam is the Layon Landfill owned by GovGuam. Transfer stations are located around Guam and facilitate municipal solid waste transportation to the Layon Landfill. The DoD currently has one recycling center and one transfer station on Andersen AFB but disposes its municipal solid waste at the Layon Landfill. The DoD owns and operates two landfills on their installations (i.e., Naval Base Guam and Andersen AFB). The U.S. Navy is currently coordinating with the Guam EPA regarding the status of the permit for the Naval Base Guam Landfill. Facilities associated with Alternative C would be consistent with solid waste permit terms and conditions.

Transportation. Andersen AFB Main Base has two existing access gates. The Main Gate provides access between Route 1 and Arc Light Boulevard. Arc Light Boulevard is the main roadway on Base and provides an east/west route across the Base. The Santa Rosa Gate is located approximately 1.1 miles southeast of the Main Gate and provides access between Route 15 and Santa Rosa Boulevard. Santa Rosa Boulevard passes through housing areas on Base. All of the Base roadways are two lanes (one lane in each direction), with additional separate turning lanes at major intersections. All of the on Base intersections are currently controlled by two- or all-way stop signs.

The Andersen AFB Traffic and Safety Engineering Study (Andersen AFB 2009) concluded that most of the on Base intersections were operating at acceptable level of service with the exception of several intersections along Arc Light Boulevard.

Utilities. There are three distinct potable water systems on Guam. One system is owned and operated by Guam Waterworks Authority, which serves the general civilian population on Guam. The other two systems are owned and operated by the DoD and serve most of the military installations on Guam. The DoD systems consist of the U.S. Navy and USAF systems. While these systems are being transitioned for operation by the U.S. Navy under a joint region arrangement, they have not yet been fully integrated. The water systems include water production wells, surface impoundments, springs, transmission lines, water treatment facilities, pump stations, storage tanks, and distribution lines. Most water production for the central and northern parts of Guam is derived from water wells fed by the NGLA. Most water production for the southern parts of Guam is derived from springs and surface water impoundments, principally Fena Reservoir, a DoD resource.

Andersen AFB receives electrical power through the Guam Power Authority.

Project Infrastructure. The SPCS structure at Andersen AFB would comply with all applicable building codes. These include UFC 3-301-01, *Structural Engineering*, which includes design requirements for wind, tsunami loads, and seismic loads.

3.5.12.2 Environmental Consequences

Proposed Action – Solid Waste. Short-term, minor impacts on solid waste management would be anticipated to occur during construction. No long-term impacts on solid waste management would be anticipated to occur under Alternative C because construction and operation of the proposed SPCS facility would not appreciably increase the amount of solid waste generated on the Base from everyday functions.

Proposed Action – Sanitary Sewer. Short-term, negligible impacts on the sanitary sewer and wastewater treatment system would occur during construction when existing lines are connected or capped as appropriate. Long-term, negligible impacts would occur because the operation of the new buildings would increase the demand on the sanitary sewer and wastewater treatment system. Changes in demands would be minimal, and the sanitary sewer and wastewater treatment system has the capacity required to meet new demands.

Proposed Action – Transportation. Andersen AFB roadways would experience temporary impacts on transportation and circulation from construction-related traffic (i.e., heavy construction equipment and construction worker vehicles) during construction proposed under Alternative C. Construction vehicle entry through Andersen AFB's two primary entrances may result in minor delays during the peak hours of 7:00 am and 4:00 pm; however, the overall impact on traffic at Andersen AFB would be temporary and minor. Construction equipment and vehicle staging would occur on previously developed or disturbed areas; therefore, impacts to parking in the vicinity of the proposed construction would be temporary and minor.

Up to 115 personnel would be added to the Andersen AFB workforce under Alternative C. There would be a slight increase of traffic as a result of the additional personnel. However, no impacts to roads or intersections would occur at Andersen AFB.

Proposed Action – Utilities. Climate change may lead to a longer dry season in Guam, which could decrease the availability of drinking water during that time of the year (USEPA, 2016b). Short-term, negligible impacts on the potable water supply system would occur during construction when existing lines are connected capped as appropriate. Long-term, negligible impacts would occur because the operation of the new building would increase the demand on the potable water supply system. Changes in demand would be minimal, and the potable water supply system has the capacity required to meet new demands.

Construction and operation of the proposed SPCS facility would cause a slight increase in electricity demand; however, energy efficient construction to decrease energy consumption consistent with EO 13693 would be implemented. Therefore, net changes in long-term demand are anticipated to be minimal, and the electrical system has the capacity required to meet new demands.

The Proposed Action, in addition to the past, present, and reasonably foreseeable future actions on and off Andersen AFB, would have negligible impacts related to utilities and infrastructure. Therefore, the proposed SPCS site would not be expected to contribute to overall decrease in drinking water availability that could result from longer dry seasons.

Proposed Action – Project Infrastructure. Extreme weather events due to climate change for the territory of Guam include increases in hurricane frequency and severity, leading to more wind events (USEPA, 2016b). The proposed SPCS structure at Andersen AFB would comply with seismic, tsunami, and wind design codes. Therefore, the site would not be expected to have increased vulnerability to wind, tsunami, or seismic events.

Under the ***No Action Alternative***, no activities associated with Alternative C would occur. No changes to infrastructure, transportation, or utilities would occur.

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