Final
ENVIRONMENTAL ASSESSMENT
for
HOME BASING OF THE MQ-9 MARINE UNMANNED AERIAL VEHICLE SQUADRON AND
KC-130J MARINE AERIAL REFUELER TRANSPORT SQUADRON
AT MARINE CORPS BASE HAWAII KANEOHE BAY
OAHU, HAWAII

December 2022

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DEPARTMENT OF DEFENSE
United States Marine Corps

FINDING OF NO SIGNIFICANT IMPACT FOR HOME BASING OF THE MQ-9 MARINE UNMANNED AERIAL VEHICLE SQUADRON AND KC-130J MARINE AERIAL REFUELER TRANSPORT SQUADRON AT MARINE CORPS BASE HAWAII KANEOHE BAY, OAHU, HAWAII

In accordance with the National Environmental Policy Act (NEPA) (42 U.S. Code §§ 4321-4370h), as implemented by the Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] §§ 1500-1508); Department of the Navy procedures for implementing NEPA (32 CFR § 775); and Marine Corps Order 5090.2, the U.S. Marine Corps gives notice that an Environmental Assessment (EA) has been prepared and, based on the analysis contained in the EA, an Environmental Impact Statement (EIS) need not be prepared to home base a Marine Corps MQ-9 Marine Unmanned Aerial Vehicle (UAV) (hereinafter "MQ-9") Squadron and a Marine Corps KC-130J Aerial Refueler Transport (hereinafter "KC-130J") Squadron at Marine Corps Base (MCB) Hawaii Kaneohe Bay. The Final EA is incorporated by reference into this Finding of No Significant Impact (FONSI).

The EA analyzed the home basing of an MQ-9 squadron and a KC-130J squadron at MCB Hawaii, Kaneohe Bay. Major project elements included replacement and modification of existing hangars and supporting infrastructure, the addition of approximately 3,000 MQ-9 and 5,280 KC-130J annual aircraft operations, and the addition of approximately 676 personnel (229 MQ-9 and 447 KC-130J personnel) plus dependents at MCB Hawaii Kaneohe Bay. This basing action will enhance the airborne and intelligence capabilities of Marine Corps forces through the integration of multi-mission aerial refueler and transport capability and persistent intelligence, surveillance, and reconnaissance unmanned aerial systems. This will meet and enhance the capability, versatility, range and ability to self-deploy Hawaii-Based Marine Corps and Joint forces beyond the Hawaiian Islands in support of theater-wide exercises and operations.

Agency Coordination and Public Involvement: Pursuant to Section 7(a)(2) of the Endangered Species Act (ESA), the Marine Corps conducted informal consultation with the U.S. Fish and Wildlife Service (USFWS) regarding potential impacts to ESA-listed species. The Marine Corps determined the proposed action may affect, but is not likely to adversely affect ESA-listed species or has no effect on ESA-listed species. The USFWS concurred with this conclusion by letter dated November 21, 2022. The State of Hawaii Office of Planning and Sustainable Development, Planning Division concurred with the Marine Corps' November 10, 2022 determination that the action falls under the Navy's Coastal Zone Management Act De Minimis Activities List and would not result in any reasonably foreseeable direct or indirect effects to uses or resources within the Hawaii Coastal Zone. In accordance with Section 106 of the National Historic Preservation Act (NHPA), the Marine Corps also engaged in extensive consultation with the Hawaii State Historic Preservation Officer (SHPO), Native Hawaiian Organizations, the Advisory Council on Historic Preservation, and other consulting parties to develop a signed December 2022 Memorandum of Agreement (MOA) resolving adverse effects to historic properties.

The Marine Corps published a notice of availability for the review of the Draft EA, including the determination of adverse effect on historic properties under the NHPA Section 106 consultation, in the Honolulu Star-Advertiser and in a press release on August 8, 2022. The public had 30 days to comment on the EA as well as the Section 106 determination. The Draft EA was made available on the State of

Hawaii's Environmental Review Program website and on the MCB Hawaii website. Prior to the release of the Draft EA, MCB Hawaii Kaneohe Bay Communication Strategy and Operations (Public Affairs) Officer and other base representatives notified the local community at monthly Neighborhood Board meetings and other public engagement opportunities about the home basing action and the associated Draft EA public comment period. In response to requests from local stakeholders and public input received at the Neighborhood Board meetings, the Marine Corps extended the comment period to allow additional time for the community to review and comment on the document. The Marine Corps published a notice in the Honolulu Star-Advertiser and in a press release on September 4, 2022 to extend the 30-day public comment period by 14 days to September 21, 2022. Ultimately, 127 comments were received and were individually addressed in Appendix B, Public Comments and Responses. Additionally, comments received outside this formal comment period, such as through the Section 106 consultation process, were considered in the development of the Final EA. All comments received were fully considered by the Marine Corps prior to rendering a decision on the proposed action.

Summary of Environmental Effects: In accordance with Council on Environmental Quality regulations, the EA focused analysis on the potential resources most affected by the proposed action (Final EA, Chapter 3), considering the context and intensity of the impacts potentially associated with the action as required under 40 CFR 1508.27. The Final EA did not identify any significant impacts on the human environment or any resource caused by the home basing proposal (Final EA, Table 3-10, Summary of Potential Impacts). The action will have less than significant impacts to seven resource categories analyzed in detail in the Final EA: Noise, air quality, water resources, cultural resources, biological resources, public health and safety, and transportation.

The proposed action slightly extends the noise contours over the installation and over open water (Final EA, Figure 3-2). In response to community concerns raised during the EA comment period, the Marine Corps supplemented this analysis, including an analysis of existing and proposed average noise levels at community points of interest (Final EA, Tables 3-1, 3-2). This revealed that locations already experiencing relatively higher noise levels (Coconut Island, 58 A-weighted decibel [dBA] Day-Night Average Sound Level [DNL] and He'eia State Park, 59 dBA DNL) would experience less than a decibel of increased noise exposure, with other points of interest experiencing either no change or a 1-3 dB DNL increase. Neither of these locations would experience levels above 65 dBA DNL, the federally recognized standard of significance. Further, these noise levels and flight totals represent a decrease in noise and operations from MCB Hawaii Kaneohe Bay activity prior to squadron deactivations in 2022 (Final EA, Section 4.4). The Marine Corps will continue to work with the community to address noise issues through scheduling and noise abatement procedures to the greatest extent consistent with safety and mission.

The short-term effects upon air quality and increased potential for storm water runoff and soil erosion during the proposed demolition and construction activities are de minimis and would be mitigated through the use of best management practices. Proposed construction would result in short-term, intermittent emissions resulting from the operation of construction equipment, vehicles, and privately-owned vehicles, and site clearing, grubbing, and grading. All construction-related emissions would be below de minimis threshold levels (Final EA, Table 3-2) and, thus, do not impact the attainment areas of Hawaii and Oahu. Following construction, aircraft flights would result in short, intermittent air quality impacts on base, but all emissions are below federal thresholds and would not affect the state of Hawaii and the island of Oahu's National Ambient Air Quality Standards attainment status (Final EA, Table 3-4).

During construction, storm water pollution control measures would comply with National Pollutant Discharge Elimination System permit conditions to minimize runoff and pollutants and sediment conveyed by surface runoff (Final EA, Section 3.3). Appropriate best management practices, compliance with applicable regulatory requirements, and implementation of interim mitigation measures (e.g., traffic/dust) will minimize these temporary, construction-related impacts. Water quality would not experience significant impacts during operations, as all activity would occur on developed areas of the airfield with adequate safety protocols, located at significant distance from sensitive water resources. All storm water runoff would be managed by existing on-site storm drainage infrastructure, and the net increase in impermeable surface on the installation is 4.25 acres, a 1% increase of impervious area on the installation.

In accordance with NHPA Section 106, the Marine Corps consulted with the Hawaii SHPO, Native Hawaiian Organizations, other interested parties, and the public regarding a determination of adverse effects to historic properties resulting from the proposed undertaking. The Section 106 consultation process involved coordination and meetings beginning with the January 7, 2022 consultation letter to the Hawaii SHPO and consulting parties. The Marine Corps held a series of consultation meetings throughout 2022 on 13 January, 10 March, 14 April, 12 May, 9 June, 14 July, 11 August, 8 September, 29 September, 21 October, and 9 November. The 29 September meeting included a tour of the flightline, including Hangars 102 and 103, the Kaneohe Naval Air Station (NAS) National Historic Landmark (NHL), which includes Bravo Ramp, Seaplane Ramps and Hangar 101, alternative locations that had been considered within the installation, and an in-person discussion. Consultations concluded with a December 2022 MOA signed by the Marine Corps, Hawaii SHPO, and the Advisory Council for Historic Preservation (ACHP).

In developing the proposed action presented during the NHPA Section 106 consultation, the Marine Corps reviewed alternatives including other military airfields on Oahu (Final EA, Section 2.2.1) and various laydowns of aircraft and support facilities for beddown on MCB Hawaii Kaneohe Bay. The Marine Corps proposed the use of historic Hangar 102 for the Marine Corps' MQ-9 aircraft and demolition of Hangar 103 to build a modern Type II hangar. Home basing options that would avoid the necessity for the demolition of historic Hangar 103 were thoroughly considered when developing the proposed action alternatives. New construction at other locations around the airfield were considered and rejected based on a variety of airfield constraints explained in the Final EA, Section 2.2.2, leaving use of existing hangar sites as the only remaining viable option. To ensure airfield safety and optimal airfield operations, the preferred location for the KC-130J is at existing Hangar 6886, which requires the MV-22 aircraft currently housed there to be relocated to a new hangar within the NAS Kaneohe Aviation Historic District. Among the existing hangars of the NAS Kaneohe Aviation Historic District, MCB Hawaii Kaneohe Bay recently rehabilitated Hangar 101 for continued aviation use, and Hangar 102 is suitable for use by the MQ-9. Hangar 104 currently supports larger aircraft that cannot be hangered elsewhere on the flightline, and Hangar 105 is "grandfathered" under an existing safety criteria waiver which precludes new construction on that site. MCB Hawaii Kaneohe Bay also explored modification of the existing historic hangars and found it was not feasible to alter them to accommodate modern aircraft like the MV-22 and KC-130J (Final EA Section 2.2.2.3).

Demolition of Hangar 103 and ancillary structures (Buildings 159, 160, 161, 183, 184), construction of the new Type II Hangar, and removal of historic materials on Bravo Ramp would have an adverse effect on the NAS Kaneohe Aviation Historic District and the Kaneohe NAS NHL. However, even though the

integrity of the Aviation Historic District and NHL may be diminished by the demolition of these six contributing resources, overall these historic districts would retain sufficient integrity to qualify for listing in the NRHP. The proposed mitigation measures contained in the MOA minimize and mitigate the adverse effects through, among other measures, public interpretation and outreach to ensure the public can learn about the important history associated with the historic properties, design review to ensure the new hangar will be sensitive to the historic characteristics of the District, and documentation and reevaluation of historic resources within the Historic District and NHL to protect against future loss of integrity. Together the design review process and the other proposed mitigation measures contained in the MOA ensure the adverse effect under NHPA Section 106 is mitigated below the level of significance under NEPA. With the implementation of these proposed mitigation measures, the proposed undertaking would allow for continued effective use of MCB Hawaii Kaneohe Bay as an operational military airfield while ensuring the airfield still retains sufficient integrity to convey its historic significance.

MCB Hawaii Kaneohe Bay conducted an informal consultation with USFWS, Pacific Islands Office under Section 7 of the Endangered Species Act (ESA) for the proposed action's potential impacts to ESA-listed species. Further, noise impacts to marine mammal species associated with take offs and landings would not rise to a point a point where marine mammal behavioral patterns are abandoned or significantly altered. USFWS concurred with the Marine Corps August 2022 determination that the proposed action would have no effect on the hoary bat, monarch butterfly, and Hawaiian yellow-faced bees, and may affect, but is not likely to adversely affect, other ESA-listed species. Construction activities would occur at previously developed and actively used areas where aircraft and machinery are in regular use, and appropriate conservation measures and best management practices would be implemented to minimize impacts to vegetation and wildlife. The proposed action would increase modeled noise contours only slightly, and the increase would occur in an area where no sensitive biological receptors or habitat is present. Further, these noise levels and flight totals represent a decrease in noise and operations from MCB Hawaii Kaneohe Bay activity prior to squadron deactivations in 2022.

The potential for impact to public health and safety was analyzed in Section 3.6 of the Final EA, which concluded that existing safety protocols and pilot training, low mishap rates for the MQ-9 and KC-130J, and existing airfield protections such as the Air Installation Compatible Use Zone (AICUZ) and Bird and Strike Hazard (BASH) program would result in no significant impact to this resource area.

Construction activities would not be expected to significantly impact local or off-base traffic as they would represent a 7% increase over normal conditions if all traffic were to occur in the same hour (Final EA, Section 3.7). While such an increase could cause delays in entering the base, even a 7% increase over baseline traffic conditions is similar to fluctuations that occur with other construction projects at MCB Hawaii Kaneohe Bay and are accommodated without affecting H-3 traffic. Bus routes, bikeways, and access to bikeways would be unaffected.

Due to the recent deactivation of several units aboard MCB Hawaii Kaneohe Bay, on-base housing and school capacity is sufficient to accommodate the proposed incoming personnel, and personnel levels proposed in this action would be below recent average base population levels. Other than a potential minor, temporary beneficial impact from construction-related jobs and purchasing, the proposed action would result in negligible changes, if any, to employment, demographic, economic, or fiscal conditions of Kailua, Kaneohe, or the County of Honolulu. Squadron personnel and their dependents are anticipated to live on and off base in levels consistent with existing conditions; as such, no impacts to off-base road

networks are anticipated. Given the lack of impact on housing, traffic, noise, air pollution, and other environmental factors, there is no "disproportionately high and adverse impact" (Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) to minority or low-income populations as a result of the proposed action.

Summary of Cumulative Effects: Cumulative impacts to noise, air quality, water, cultural, biological, public health and safety, and transportation would be less than significant for construction and operation of the proposed action. The past, present, and future actions listed in Table 4-1 of the Final EA represent routine modernization activity on the installation and would not result in significant impacts on the local population. Due to the recent deactivation of helicopter squadrons aboard MCB Hawaii Kaneohe Bay and the lack of additional proposed aircraft home basing at the installation, cumulative operational impacts would be less than significant. Future projects would consist principally of new and improved infrastructure in previously developed and disturbed areas and would not introduce new uses to MCB Hawaii Kaneohe Bay. Cumulative impacts to cultural resources are addressed in Section 4.4 of the Final EA. There is only one additional historic building (Hangar 104) proposed for demolition in connection with future projects Navy proposal to demolish and replace Hangar 104. The Marine Corps is currently engaged in NHPA Section 106 consultations with the Navy, Hawaii SHPO, Native Hawaiian Organizations, and other consulting parties on that action and anticipates that, as with the proposed action, adverse effects on historic properties will be mitigated through development of a signed MOA. While the past, present, and future Hangar 104 projects result in adverse effects on contributing resources to the Kaneohe NAS NHL and the Aviation Historic District, implementation of MOAs will mitigate these effects to ensure the Historic District and NHL will retain sufficient integrity to convey their historic significance and remain eligible for listing on the National Register. For these reasons, cumulative impacts to cultural resources are reduced to less than significant levels under NEPA.

Finding: After careful review of the EA, the Marine Corps concluded that the proposed action will not result in significant impacts to the quality of the human environment. This FONSI is based on the analysis contained in the attached EA, including the conservation measures and best management practices detailed throughout, as well as the proposed mitigation measures to which the Marine Corps has committed to in the December 2022 MOA.

The EA addressing this proposed action may be obtained by downloading an electronic copy from the State of Hawaii's Environmental Review Program website (https://planning.hawaii.gov/erp/) and on the MCB Hawaii website (https://www.mcbhawaii.marines.mil/Resources-Services/Pertinent-Information/MQ9-KC130) or by contacting: EV21 Project Mgr., MCB Hawaii Home Basing EA, Naval Facilities Engineering Systems Command, Pacific, 258 Makalapa Dr, Ste 100, Joint Base Pearl Harbor-Hickam, HI 96860-3134. Email: NFPAC-Receive@us.navy.mil.

15 DEC 2022

S. C. KOUMPARAKIS — Date

Colonel, U.S. Marine Corps
Commanding Officer
Marine Corps Base Hawaii Kaneohe Bay

Abstract

Designation:	**Environmental Assessment**
Title of Proposed Action:	**Home Basing of the MQ-9 Marine Unmanned Aerial Vehicle Squadron and KC-130J Marine Aerial Refueler Transport Squadron**
Project Location:	**Marine Corps Base (MCB) Hawaii Kaneohe Bay, Oahu, Hawaii**
Affected Region:	**City and County of Honolulu, Oahu, Hawaii**
Action Proponent:	**Headquarters Marine Corps, Deputy Commandant, Aviation**
Point of Contact:	EV21 Project Mgr., MCB Hawaii Home Basing EA Email: NFPAC-Receive@navy.mil Naval Facilities Engineering Systems Command, Pacific 258 Makalapa Dr, Ste 100 Joint Base Pearl Harbor-Hickam, HI 96860-3134
Date:	**December 2022**

The Marine Corps has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality and Department of the Navy regulations, and Marine Corps Order 5090.2. The proposed action is to home base a Marine Corps MQ-9 Marine Unmanned Aerial Vehicle Squadron (with an anticipated 6 aircraft) and a KC-130J Aerial Refueler Transport Squadron (with an anticipated 15 aircraft) at MCB Hawaii Kaneohe Bay.

This EA evaluates the potential environmental impacts of the proposed action to the following resources: noise, air quality, water resources, cultural resources, biological resources, public health and safety, and transportation.

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Summary

S.1 Proposed Action

The proposed action is to home base a Marine Corps MQ-9 Marine Unmanned Aerial Vehicle (UAV) (hereinafter "MQ-9") Squadron and a KC-130J Aerial Refueler Transport (hereinafter "KC-130J") Squadron at Marine Corps Base (MCB) Hawaii Kaneohe Bay as part of Marine Aircraft Group 24 (MAG-24) (Figure S-1). Each squadron consists of personnel, aircraft, equipment, and supporting infrastructure.

S.2 Purpose of and Need for the Proposed Action

The purpose of the proposed action is to enhance the airborne and intelligence capabilities of Marine Corps forces through the integration of multi-mission aerial refueler and transport capability and persistent intelligence, surveillance, and reconnaissance unmanned aerial systems, thereby enhancing the Marine Corps' ability to transport Hawaii-based Marines and provide them real-time situational awareness to support the United States (U.S.) Indo-Pacific Command (USINDOPACOM). The need for home basing and operations of the MQ-9 and KC-130J squadrons is to extend the capability, versatility, and range of the Hawaii-based Marine Corps and other forces through additional refueler, transport, intelligence, surveillance, and reconnaissance capabilities in support of USINDOPACOM.

S.3 Alternatives Considered

Alternatives were analyzed based upon the following screening factors, which represent the minimum requirements for home basing the two squadrons:

1. The project location must be a military-controlled airfield in Hawaii.
2. The military-controlled airfield must meet minimum airfield infrastructure requirements (or have the space to construct or improve such infrastructure), including dedicated hangars for both aircraft types.
3. The military-controlled airfield must have access to established training areas and airspace capable of supporting MQ-9 and KC-130J aircraft, and the new squadrons must be compatible with existing airfield operations.
4. The military-controlled airfield must be capable of supporting long-term sustainment and maintenance for continued operations of MQ-9 and KC-130J aircraft.

Five military airfields were evaluated: MCB Hawaii Kaneohe Bay, Joint Base Pearl Harbor-Hickam (JBPHH), U.S. Coast Guard Air Station (USCG) Barbers Point, Wheeler Army Airfield, and Dillingham Military Reservation. Only MCB Hawaii Kaneohe Bay meets all the minimum requirements and is carried forward for evaluation. On MCB Hawaii Kaneohe Bay, various laydowns of aircraft and support facilities were evaluated, with one configuration carried forward for analysis.

Under the No-Action Alternative, the proposed action would not occur. MQ-9 and KC-130J squadrons would not be home based at MCB Hawaii Kaneohe Bay. The No-Action Alternative does not meet the purpose of and need for the proposed action because it would not enable the Hawaii-based Marine Corps to enhance aerial refueling, transport and intelligence, surveillance, and reconnaissance capabilities to support the Combatant Commander in the Pacific. It is, however, included as a baseline from which to compare the impacts of the proposed action.

Figure S-1. Project Location Map

MCB Hawaii Kaneohe Bay Boundary

Gate

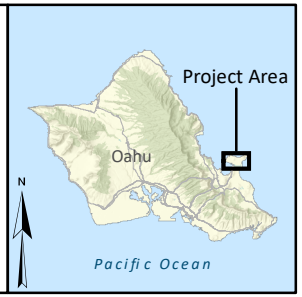
Interstate

Road

Building

0 1,000 2,000 Feet

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021



S.4 Summary of Potential Environmental Consequences of the Alternatives and Major Mitigating Actions

Table S-1 presents a summary of potential environmental impacts associated with the proposed action.

S.5 Public and Agency Participation and Intergovernmental Coordination

The Marine Corps solicited public and agency input regarding the proposed action through publication of a draft Environmental Assessment (EA) and through the National Historic Preservation Act (NHPA) Section 106 consultation process. The Final EA and Finding of No Significant Impact (FONSI) are available on the State of Hawaii's Environmental Review Program website: https://planning.hawaii.gov/erp/ and the MCB Hawaii website: https://www.mcbhawaii.marines.mil/Resources-Services/Pertinent-Information/MQ9-KC130. All comments received during the public comment period were fully considered by the Marine Corps prior to rendering a decision on the proposed action. Additionally, comments received outside this formal comment period, such as through the Section 106 consultation process, were considered in the development of the Final EA.

In accordance with Section 106 of the NHPA, the Marine Corps consulted with the Hawaii State Historic Preservation Division (SHPD), Native Hawaiian Organizations, interested parties, and the public regarding a determination of adverse effects to historic properties resulting from the proposed action. The Marine Corps initiated Section 106 consultation with the Hawaii SHPD for the undertaking on 6 January 2022. The Marine Corps determined the proposed undertaking would result in an adverse effect on historic properties, and, in a letter dated 7 February 2022, the SHPD concurred with the determination that the project would result in adverse effects to the Naval Air Station (NAS) Kaneohe Historic Aviation District. The Section 106 consultation process included meetings on 13 January, 10 March, 14 April, 12 May, 9 June, 14 July, 11 August, 8 September, 29 September, 21 October, and 9 November 2022. The 29 September meeting included a tour of the flightline, the Kaneohe NAS National Historic Landmark (NHL), Hangars 101-103, alternative locations that had been considered within the installation, and an in-person discussion. The Marine Corps worked with consulting parties to develop a Memorandum of Agreement (MOA) to mitigate any adverse effects to historic properties. The MOA was signed by the Marine Corps, the SHPD, and the Advisory Council on Historic Preservation (ACHP).

Pursuant to Section 7(a)(2) of the Endangered Species Act (ESA), the Marine Corps conducted informal consultation with the U.S. Fish and Wildlife Service (USFWS) regarding potential impacts to ESA-listed species. The Marine Corps determined the proposed action may affect, but is not likely to adversely affect ESA-listed species or has no effect on ESA-listed species. The USFWS concurred with this conclusion by letter dated 21 November 2022.

The proposed action falls under the Navy's Coastal Zone Management Act (CZMA) De Minimis Activities List (State of Hawaii CZMA letter, 9 July 2009). On 21 November 2022, the State of Hawaii Office of Planning and Sustainable Development, Planning Division concurred with the Marine Corps' 10 November 2022 determination that the action falls under the Navy's CZMA De Minimis Activities List and would not result in any reasonably foreseeable direct or indirect effects to uses or resources within the Hawaii Coastal Zone.

Table S-1 Summary of Potential Impacts

Resources	*Alternative 1*
Noise	• Less than significant impacts. No increase of the 65 dBA DNL contour acreage in populated areas off base.
Air Quality	• Less than significant impacts. Construction and operational activities would only minimally increase GHG emissions and would not substantially contribute to global warming.
Water Resources	• Less than significant impacts to groundwater, surface water, wetlands, and floodplains.
Cultural Resources	• Less than significant impacts to archaeological resources. Impacts to archaeological sites would be minimized through archaeological monitoring. • Less than significant impacts to historic resources. Impacts to these resources would be mitigated through incorporation of proposed mitigation measures developed in the NHPA Section 106 process.
Biological Resources	• Less than significant impacts to vegetation, wildlife, critical habitat, and ESA-listed species. The preferred alternative (Alternative 1) either may affect, but is not likely to adversely affect, ESA-listed species or has no effect on other ESA-listed species.
Public Health and Safety	• Less than significant impacts.
Transportation	• Less than significant impacts.

Notes: dBA = A-weighted decibel; DNL = Day-Night Average Sound Level; ESA = Endangered Species Act; GHG = greenhouse gas; NHPA = National Historic Preservation Act.

Environmental Assessment

Marine Corps Base Hawaii Home Basing of the MQ-9 Marine Unmanned Aerial Vehicle Squadron and KC-130J Marine Aerial Refueler Transport Squadron at Marine Corps Base Hawaii Kaneohe Bay

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Abbreviations and Acronyms

Item	Definition
%	Percent
ACHP	Advisory Council on Historic Preservation
AFFF	Aqueous Film-forming Foam
AICUZ	Air Installations Compatible Use Zone
APE	Area of Potential Effects
BASH	Bird/Wildlife Aircraft Strike Hazard
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	Decibel
dBA	A-weighted Decibel
DNL	Day-Night Average Sound Level
DoD	United States Department of Defense
DOH	Hawaii State Department of Health
EA	Environmental Assessment
ECU	Environmental Control Unit
EO	Executive Order
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GCS	Ground Control Station
GDT	Ground Data Terminal
GHG	Greenhouse Gas
GSE	Ground Support Equipment
HAR	Hawaii Administrative Rule
HDOT	Hawaii Department of Transportation
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
JBPHH	Joint Base Pearl Harbor-Hickam
LID	Low Impact Development
LOS	Level of Service
MAG-24	Marine Aircraft Group 24
Marine Corps	United States Marine Corps
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MOA	Memorandum of Agreement
MS4	Municipal Separate Storm Sewer System
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Systems Command
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRE	National Register Eligible

Item	Definition
NRHP	National Register of Historic Places
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
$PM_{2.5}$	Particulate Matter Less Than or Equal to 2.5 Micrometers in Diameter
PM_{10}	Particulate Matter Less Than or Equal to 10 Micrometers in Diameter
PSD	Prevention of Significant Deterioration
SHPD	State Historic Preservation Division
SO_2	Sulfur Dioxide
SWPPP	Storm Water Pollution Prevention Plan
TCP	Traditional Cultural Property
U.S.	United States
UAV	Unmanned Aerial Vehicle
UFC	Unified Facilities Criteria
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USINDOPACOM	U.S. Indo-Pacific Command
VMU	Marine Unmanned Aerial Vehicle Squadron
VOC	Volatile Organic Compound
WWII	World War II

1 Purpose of and Need for the Proposed Action

1.1 Introduction

The 2018 National Defense Strategy redirected the Marine Corps mission from countering violent extremists in the Middle East to Great-Power/Peer Competition, with special emphasis on the Indo-Pacific. This shift in mission requires adjustments in how the Marine Corps organizes, trains, and equips its forces to support United States (U.S.) combatant commanders.

The Marine Corps proposes to home base a Marine Corps MQ-9 Marine Unmanned Aerial Vehicle (UAV) (hereinafter "MQ-9") Squadron and a KC-130J Marine Aerial Refueler Transport (hereinafter "KC-130J") Squadron at Marine Corps Base (MCB) Hawaii Kaneohe Bay. Each squadron consists of personnel, aircraft, equipment, and supporting facilities. The MQ-9 is used for reconnaissance, communication, and sensing missions to support operational forces as they train for various warfare functions. KC-130J aircraft are used for transport and aerial refueling operations. The two new squadrons would join the Hawaii-based Marine Aircraft Group 24 (MAG-24).

Headquarters Marine Corps, Deputy Commandant, Aviation is the action proponent for this proposed action. The Marine Corps prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), U.S. Department of the Navy regulations (32 CFR part 775), and Marine Corps Order 5090.2.

1.2 Location

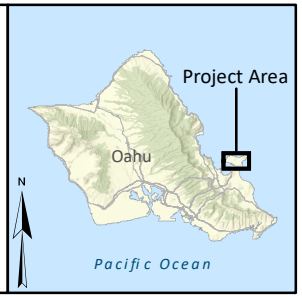
The location for the proposed action is the western shore of MCB Hawaii Kaneohe Bay, on the island of Oahu, in the state of Hawaii (Figure 1-1). MCB Hawaii Kaneohe Bay encompasses 2,951 acres on Oahu's eastern shore at Mokapu Peninsula. Mokapu Peninsula is bounded by the waters of Kaneohe Bay on the west, the Pacific Ocean to the north, Kailua Bay to the east, and residential development to the south. Kailua and Kaneohe are the communities nearest to the base. MCB Hawaii Kaneohe Bay is home to MAG-24 and its subordinate aviation squadrons, a Marine Corps Operational Support Airlift squadron, the Navy's Fleet Logistics Support squadron 51 (VR-51), the Navy Helicopter Maritime Strike squadron 37 (HSM-37), and a two-aircraft detachment of Navy P-8As. MAG-24 is the primary Marine Corps aviation asset in the Hawaiian Islands, responsible for supporting training and exercises throughout the Pacific theater. MAG-24 was activated on Oahu in 1942 and has been continuously based at MCB Hawaii Kaneohe Bay since 1968. MCB Hawaii Kaneohe Bay has historic properties, including a line of hangars between 1st Street and Bravo Ramp that are contributing resources to the National Register of Historic Places (NRHP)-eligible Aviation District (Figure 1-2). Additionally, MCB Hawaii Kaneohe Bay has a National Historic Landmark (NHL) District associated with the World War II (WWII) attacks on Hawaii.

Figure 1-1. Project Location Map

MCB Hawaii Kaneohe Bay Boundary
Gate
Building
Interstate
Road

0 1,000 2,000 Feet

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021



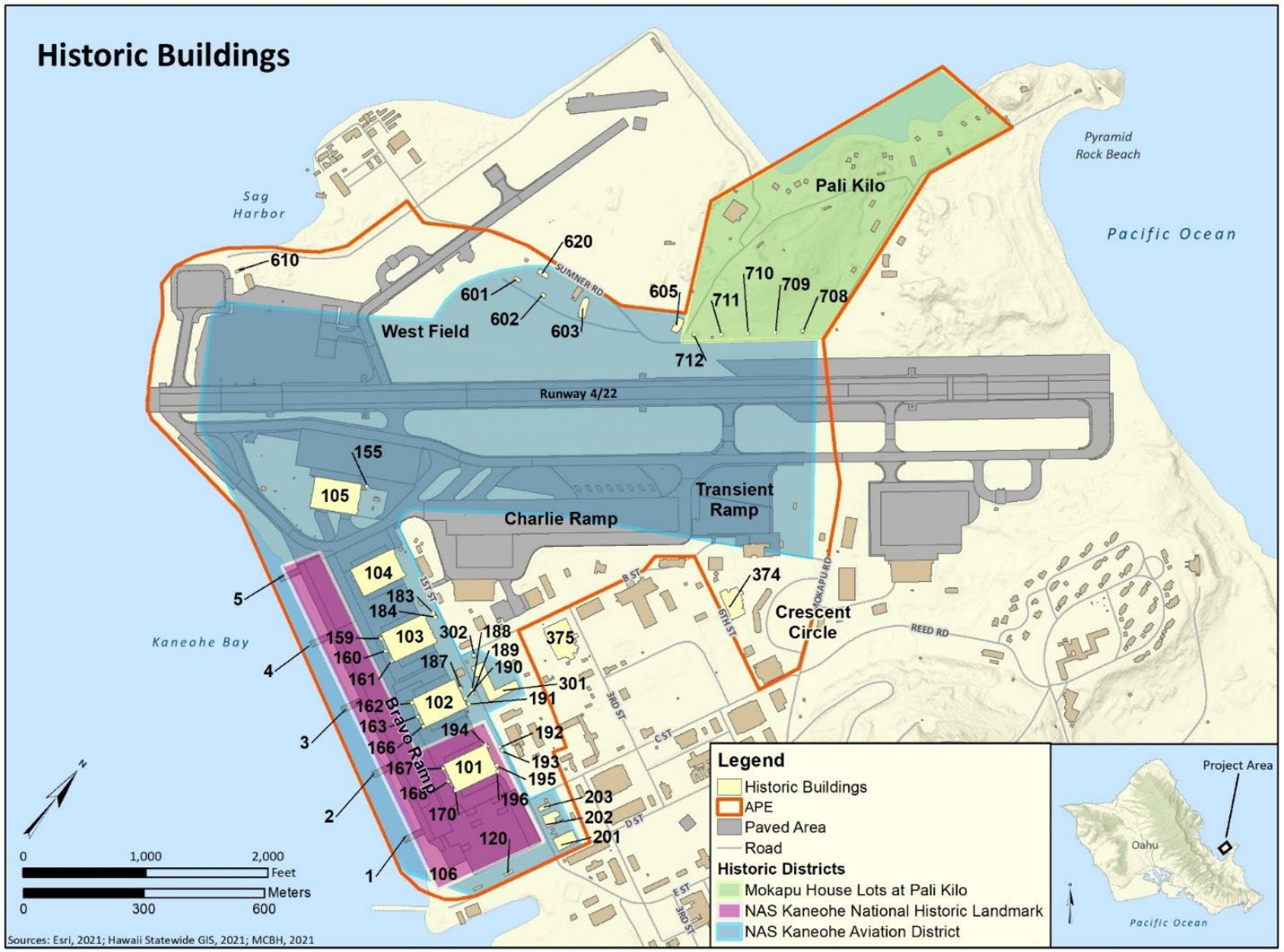


Figure 1-2 Historic Properties Including Historic Districts at MCB Hawaii Kaneohe Bay

1.3 Purpose of and Need for the Proposed Action

The purpose of the proposed action is to enhance the airborne and intelligence capabilities of Marine Corps forces through the integration of multi-mission aerial refueler and transport capability and persistent intelligence, surveillance, and reconnaissance unmanned aerial systems, thereby enhancing the Marine Corps' ability to transport Hawaii-based Marines and provide them real-time situational awareness, to support U.S. Indo-Pacific Command (USINDOPACOM). The need for home basing and operations of the MQ-9 and KC-130J squadrons is to extend the capability, versatility, and range of the Hawaii-based Marine Corps and other forces through additional refueler, transport, intelligence, surveillance, and reconnaissance capabilities in support of USINDOPACOM.

1.4 Scope of Environmental Analysis

This EA includes an analysis of potential environmental impacts associated with the proposed action. The process for identifying resources analyzed in this EA is summarized in Chapter 3, *Introduction*. The environmental resources analyzed in detail include:

- Noise
- Air Quality
- Water Resources
- Cultural Resources
- Biological Resources
- Public Health and Safety
- Transportation

1.5 Relevant Laws and Regulations

The Marine Corps has prepared this EA based upon federal and state laws, statutes, regulations, and policies pertinent to the implementation of the proposed action (Appendix A).

1.6 Public and Agency Participation and Intergovernmental Coordination

The Marine Corps solicited public and agency input regarding the proposed action through publication of a draft EA and through the National Historic Preservation Act (NHPA) Section 106 consultation process. The Marine Corps published a notice of availability for the review of the Draft EA in the Honolulu Star-Advertiser on 8 August, 2022. The public had 30 days to comment on the EA as well as the Section 106 determination. The Draft EA was made available on the State of Hawaii's Environmental Review Program website and on the MCB Hawaii website. Prior to the release of the Draft EA, MCB Hawaii Kaneohe Bay Public Affairs Officers notified the local community at monthly Neighborhood Board meetings and other public engagement opportunities about the home basing action and the associated Draft EA public comment period. In response to requests from local stakeholders and public input received at the Neighborhood Board meetings, the Marine Corps extended the comment period to allow additional time for the community to review and comment on the document. The Marine Corps published a notice in the Honolulu Star-Advertiser and a press release on 4 September 2022, to extend the 30-day public comment period by 14 days to 21 September. The Final EA and Finding of No

Significant Impact (FONSI) are available on the State of Hawaii's Environmental Review Program website: https://planning.hawaii.gov/erp/ and the MCB Hawaii website: https://www.mcbhawaii.marines.mil/Resources-Services/Pertinent-Information/MQ9-KC130. Ultimately, 127 comments were received and were individually addressed in Appendix B, Public Comments and Responses. Additionally, comments received outside this formal comment period, such as through the Section 106 consultation process, were considered in the development of the Final EA. All comments received were fully considered by the Marine Corps prior to rendering a decision on the proposed action. A detailed summary of public comments, revisions made to the Final EA in response to comments, and responses to individual comments are provided in Appendix B.

In accordance with Section 106 of the NHPA, the Marine Corps consulted with the State Historic Preservation Division (SHPD), Native Hawaiian Organizations, interested parties, and the public regarding a determination of adverse effects to historic properties resulting from the proposed action. The Marine Corps initiated Section 106 consultation with the Hawaii SHPD for the undertaking on 6 January 2022. The Marine Corps determined the proposed undertaking would result in an adverse effect on historic properties, and, in a letter dated 7 February 2022, the SHPD concurred with the determination the project would result in adverse effects to the Naval Air Station (NAS) Kaneohe Historic Aviation District. The Section 106 consultation process included meetings on 13 January, 10 March, 14 April, 12 May, 9 June, 14 July, 11 August, 8 September, 29 September, 21 October, and 9 November 2022. The 29 September meeting included a tour of the flightline, the Kaneohe NAS NHL, Hangars 101-103, alternative locations that had been considered within the installation, and an in-person discussion. The Marine Corps worked with consulting parties to develop a Memorandum of Agreement (MOA) to mitigate adverse effects to historic properties. The MOA was signed by the Marine Corps, the SHPD, and the Advisory Council on Historic Preservation (ACHP) (Appendix C).

Pursuant to Section 7(a)(2) of the Endangered Species Act (ESA), the Marine Corps conducted informal consultation with the U.S. Fish and Wildlife Service (USFWS) regarding potential impacts to ESA-listed species. The Marine Corps determined the proposed action may affect, but is not likely to adversely affect ESA-listed species or has no effect on ESA-listed species. The USFWS concurred with this conclusion by letter dated 21 November 2022 (Appendix D).

The proposed action falls under the Marine Corps' Coastal Zone Management Act (CZMA) De Minimis Activities List (State of Hawaii CZMA letter, 9 July 2009). On 21 November 2022, the State of Hawaii Office of Planning and Sustainable Development, Planning Division concurred with the Marine Corps' 10 November 2022 determination that the action falls under the Navy's CZMA De Minimis Activities List and would not result in any reasonably foreseeable direct or indirect effects to uses or resources within the Hawaii Coastal Zone (Appendix E).

1.7 Permits and Approvals

Permits and approvals necessary for the proposed action consist of an amendment to the installation National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit, which will be processed through the Hawaii State Department of Health (DOH). This is required for construction projects exceeding one acre in size.

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2 Proposed Action and Alternatives

2.1 Proposed Action

The proposed action is to home base an MQ-9 UAV squadron and a KC-130J squadron at MCB Hawaii Kaneohe Bay. Under the proposed action, the Marine Corps would replace and modify existing hangars and supporting infrastructure, perform aviation maintenance, conduct approximately 3,000 MQ-9 and 5,280 KC-130J annual aircraft operations, and station approximately 676 personnel (229 MQ-9 and 447 KC-130J personnel) plus dependents at MCB Hawaii Kaneohe Bay.

Photo: MQ-9 Aircraft

Photo: KC-130J Aircraft

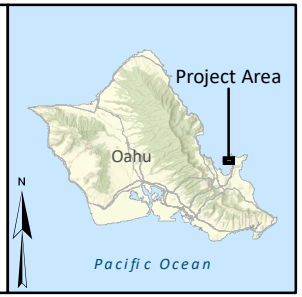
The squadrons associated with the proposed action would be the Marine Unmanned Aerial Vehicle Squadron (VMU) for MQ-9 aircraft and the Marine Aerial Refueler Transport Squadron for KC-130J aircraft. The proposed action would house the MQ-9 squadron in Hangar 102, house the KC-130J squadron in Hangar 6886 (currently occupied by an MV-22 squadron), and demolish and reconstruct Hangar 103 as the replacement hangar for the MV-22 squadron. Figure 2-1 provides a conceptual overview of the proposed action; more detailed figures for action alternatives are presented in Section 2.2, *Alternatives Development*. The proposed action would be implemented over a 5-year period from 2023 to 2027. Temporary facilities such as trailers, equipment storage, and communications connections would be located within the project footprint near the hangars and on the parking aprons and ramps to allow for partial operation of the squadrons while construction of permanent facilities are underway. MQ-9 aircraft would park on Bravo Ramp near Hangar 102, and KC-130J aircraft would park on the north end of Charlie Ramp near the transient ramp. The temporary facilities would not be sufficient to support the full set of aircraft, personnel, and operations associated with the proposed action. Home basing the full complement of MQ-9 and KC-130J aircraft, associated personnel and dependents, and all infrastructure support is anticipated to be complete by 2027.

Squadron personnel and dependents would be housed in on-base housing and off base in the community consistent with existing housing practices for military personnel at MCB Hawaii Kaneohe Bay. No additional housing would be needed for the proposed action.

Figure 2-1. Conceptual Overview of the Proposed Action Location

0 500 1,000 Feet

Sources: Google Earth, 2022; Hawaii Statewide GIS, 2021



2.1.1 Facilities

Table 2-1 lists the construction projects for the proposed action. Several of the facilities that are part of the proposed action are historic, including Hangar 102 (under construction in 1941), Hangar 103 (built in 1941), and the three ancillary aircraft spares storage buildings, Buildings 159, 160, and 161 (built in 1942), and Buildings 183 and 184 (built in 1942–1943) (Figure 1-2). Most of the proposed construction would occur on previously developed, paved areas. Approximately 4.25 acres of proposed construction would occur in undeveloped landscaped areas.

2.1.1.1 Hangars

Hangars provide shelter for servicing and repairing aircraft. Hangars include a bay high enough for sheltering aircraft and conducting maintenance and repair. They also provide space for crew, equipment, and administration. There are four types of standard U.S. Department of Defense (DoD) hangars (Types I–IV). Type I hangars are primarily used for compact Navy carrier aircraft such as MH-60s; Type II hangars primarily support Marine Corps aircraft and are used to house aircraft such as the MV-22 and KC-130J; Type III hangars are designed for patrol (P-8A) and large transport (C-40) aircraft; and Type IV hangars are used for large UAVs. MCB Hawaii Kaneohe Bay Hangars 101 through 105 (Figure 2-1) were constructed between 1941 and 1943 to support seaplanes then assigned to the installation and are not compliant with Unified Facilities Criteria (UFC) 4-211-01, *Aircraft Maintenance Hangars* (DoD, 2021). Moreover, they are undersized for current aircraft such as the KC-130J, and the orientation of their bay doors away from the main taxiways makes them inefficient for current operations. Hangar 101 is currently being renovated and will be used for a Navy helicopter squadron and to house the Fleet Readiness Center. A portion of Hangar 102 was recently renovated and houses an unmanned aerial squadron. Hangar 103 temporarily housed the Navy helicopter squadron until the Hangar 101 modifications were complete. It is now a multi-purpose hangar used for a variety of support functions. Hangar 104 houses a P-8A aircraft support facility and supports the Fleet Readiness Center until the Hangar 101 modifications are complete. Hangar 105 is used as “swing space” (i.e., additional space) for other aviation squadrons. Hangar 6886, constructed in 2020, is a Type II hangar that houses an MV-22 squadron.

Based on the planning constraints described in Section 2.2.2, the proposed action is to base the MQ-9 in Hangar 102, base the KC-130J in existing Hangar 6886 (the current MV-22 hangar), and relocate the MV-22 squadron to a new Type II hangar in place of Hangar 103. Hangar 102 would house the MQ-9 aircraft, with minor interior renovations to the hangar and associated support facilities (see Section 2.1.1.3). Hangar 103 and the associated support buildings adjacent to its southwestern side (Buildings 159, 160, 161, 183, and 184) would be demolished and a new Type II hangar on a reinforced concrete pile foundation would be constructed in their place. The new hangar would include a maintenance bay, administrative office space, and an area with associated support equipment. Ancillary improvements associated with home basing the KC-130J squadron at Hangar 6886 include interior renovations, parking apron and taxiway modifications, parking for government and privately-owned vehicles, utilities and supporting infrastructure, and construction of training facilities at the hangar for operators and maintainers. Exterior features of the hangar structure would remain the same.

Table 2-1 Proposed Facilities Construction at MCB Hawaii Kaneohe Bay

Project	*Aircraft*	*Fiscal Year*	*Description*
Hangar 102 Renovations	MQ-9	2023–2024	• Hangar 102 interior upgrades: electrical, mechanical, and communication systems • Two GCSs with up to two ECUs
Infrastructure Improvements	MQ-9	2023–2024	Two GDTs (at Keawanui Hill and adjacent to Hangar 105)
Building 4041	MQ-9/ KC-130J	2023–2024	Training simulator installation
Apron Improvements	MQ-9	2023–2024	Tie-downs and striping near end of Runway 04/22 west of Hangar 105
Charlie Ramp Upgrades	KC-130J	2023–2024	Restriping of Charlie Ramp west of Hangar 6886 and east of Taxiway A
KC-130J Support Facilities	KC-130J	2023–2024	Construction of a wash rack east of Hangar 6886
Temporary Construction Staging Laydown Area	All	2023	Establish the temporary construction laydown area to stage construction equipment and materials at the Crescent Circle area behind MCAS terminal building
Airfield Security Fencing	All	2023–2024	• Fencing on north side of Runway 04/22 • Demolish Motor-T buildings/parking lot across from Hangar 101
Bravo Ramp Upgrades	MV-22	2025–2027	• Repaving and restriping Bravo Ramp on bay side of Hangars 102, 103, and 104 • Replacing taxiway asphalt • Installing heat resistant concrete at parking spots • Tie-downs at Bravo Ramp
Hangar 103 Replacement	MV-22	2025–2027	Demolition of Hangar 103 and associated support buildings adjacent to the southwestern side (Buildings 159, 160, 161, 183, and 184), and construction of new Type II Hangar 103 to accommodate MV-22s from Hangar 6886
Hangar 6886 Renovations	KC-130J	2026–2027	Reconfiguration of Hangar 6886 interior spaces to convert from MV-22 to KC-130J use
KC-130J Support Facilities	KC-130J	2026–2027	Construction of new support facilities east of Hangar 6886: • Storage Facility • Propeller Maintenance Facility
KC-130J Aircraft Direct Refueling System	KC-130J	2026–2027	Construction of a new fuel lane with an Aircraft Direct Refueling System: • Demolition of Buildings 4000 and 5068 • Construction of concrete pavement, asphalt shoulders, striping, fuel lines from the existing fuel farm, and a drainage system with storm water detention capability

Notes: Project locations are shown in Figure 2-7.
ECU = Environmental Control Unit; GCS = Ground Control Station; GDT = Ground Data Terminal; MCAS = Marine Corps Air Station.

Source: Marine Corps, 2021.

2.1.1.2 Ramps and Aprons

Bravo Ramp is an aircraft parking apron used for aircraft taxiing to and from Hangars 101 through 104. Concrete pavement, asphalt shoulders, an apron for MQ-9 aircraft, and striping would be installed on Bravo Ramp adjacent to Hangar 102 to accommodate the MQ-9 aircraft. The access road to facilities west of Taxiway F would be realigned, and minor site grading would be required to prepare subgrades for new pavement. Vehicular access to the parking area would be provided by new asphalt pavement connected to Pali Kilo Road. Tie-downs (see photo below) for MQ-9 aircraft would be constructed near the taxiway at the west end of the runway. Additional improvements include tie-downs placed at the western end of Bravo Ramp and the restriping of Charlie Ramp.

Photo: Example Tie-Down on Bravo Ramp

Portions of Bravo Ramp and Taxiway B would be repaved for the MV-22 and MQ-9 (approximately 10 acres). Portions of Charlie Ramp and Taxiway A would be restriped for the KC-130J (approximately 7 acres). KC-130J aircraft at Hangar 6886 would use Taxiway A to access the hangar, parking ramp, and runway.

2.1.1.3 Support Facilities

Support facilities for MQ-9 aircraft would include two ground control stations (GCSs), two ground data terminals (GDTs), and a ground support equipment (GSE) shed (see photos below). The GCSs and GSE shed would be located at Hangar 102. The GCSs are the "cockpit" of the MQ-9, providing command and control linkage between the UAV pilot and the aircraft. The two GDTs provide system and power redundancies to ensure positive control of the MQ-9 aircraft by the pilot. Each GDT would be installed on construction mats and have a backup generator. One GDT would be installed on top of Keawanui Hill (requiring the removal of surface vegetation within a 30-by-30-foot area) and one near Hangar 105 on existing pavement. Power at Keawanui Hill would be supplied through the existing overhead electrical line. A fiber-optic communication cable would be installed along the existing overhead electrical poles. The GDTs would be tied down using stakes or 5,000-pound concrete blocks. While the GDT antennas would normally remain emplaced, they can be lowered when necessary, such as during high wind events.

Photo: Representative GCS Console

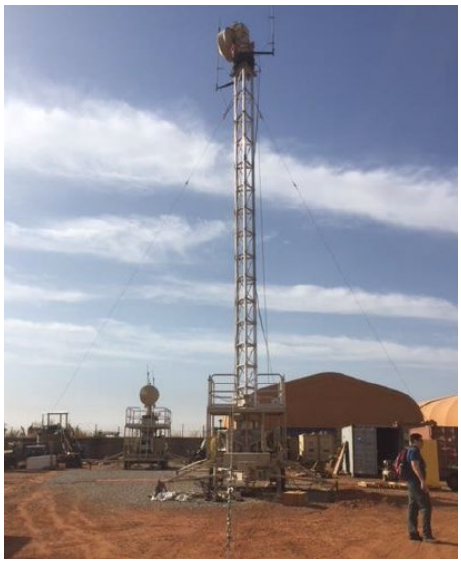


Photo: Representative GDT, Extended with Guy Wires

Support facilities for the KC-130J aircraft include a propeller maintenance facility, storage facility, a wash rack (see photo below), and an Aircraft Direct Refueling System (see photo below) that enables expeditious aircraft refueling. The propeller maintenance facility and storage facility would be built west of Building 1631, and the wash rack would be built west of Building 5069. The propeller maintenance facility provides the space, utilities, and equipment required to perform specialized propeller maintenance and repairs for the KC-130J aircraft. It also stores propellers, engines, fuselage tanks, mission gear, aviation refueling kits, and other equipment which require dehumidification and temperature control to prevent corrosion. The wash rack facility is a multi-level maintenance platform and support utility building to service the KC-130J aircraft. Each KC-130J is washed every 105 days, resulting in an average of one aircraft wash per week for corrosion prevention. Each wash typically uses 300–350 gallons of water. Wash water is captured, treated, and subsequently discharged into the sanitary sewer system. Construction of the Aircraft Direct Refueling System requires demolition of Buildings 4000 and 5068 and construction of concrete pavement, asphalt shoulders, striping, and fuel lines coming from the fuel farm. The proposed Aircraft Direct Refueling System would be accessed from the transient ramp.

The proposed Aircraft Direct Refueling System and wash rack would be designed to minimize the potential for spills and maximize the collection of wash water, thereby minimizing the potential for soil and water contamination. Design features include incorporation of oil/water separators directly connected to the wastewater system, which prevents contamination from entering the storm water system. Once the oil is separated and stored in separate tanks, the removed water is disposed of through the on-base wastewater treatment facility. These facilities and their oil/water separator systems are subject to regular inspection and maintenance. The oil extracted during these procedures is disposed of in accordance with standard operating procedures for handling petroleum products on base. Low Impact Development (LID) techniques such as bioretention, vegetated swales, and vegetated filter strips would be installed to meet Clean Water Act (CWA) permit requirements for the management of storm water. In accordance with UFC 3-460-01, spill prevention and containment systems would be installed.

Photo: Representative KC-130J Wash Rack

Photo: Representative Aircraft Direct Fueling System

2.1.1.4 Utilities Infrastructure

Water, sewer, and electrical utilities would be improved within the construction footprint. All new facilities would be constructed with LID elements and appropriate conservation measures to maintain storm water discharges to pre-development hydrologic conditions.

2.1.2 Personnel

The proposed action would station approximately 229 MQ-9 and 447 KC-130J military personnel, for a total of approximately 676 personnel plus dependents at MCB Hawaii Kaneohe Bay. The deactivation of the existing AH-1/UH-1 and CH-53E helicopter squadrons and divestment of RQ-21 aircraft at MCB Hawaii Kaneohe Bay, to be complete in 2022, results in a reduction of 841 personnel plus dependents from MCB Hawaii Kaneohe Bay. The deactivation and divestment actions combined with the proposed action are anticipated to result in a net reduction of approximately 165 personnel plus dependents at the base.

2.1.3 Operations

Elements from both the MQ-9 and KC-130J squadrons would initially operate using existing and temporary facilities and equipment until full construction is complete in 2027. Squadron personnel and operational tempo would increase gradually throughout the construction period, but full operational tempo would not occur until construction is complete.

KC-130J and MQ-9 aircraft detachments deployed in the Indo-Pacific area are key enablers to military training, which is coordinated with other Marine Corps aviation units for mutual benefit. Training other than local takeoff and landing operations analyzed in this EA would continue to occur away from MCB Hawaii Kaneohe Bay in established airspace. This includes existing Special Use Area restricted airspace on the island of Oahu, at the U.S. Navy training range (Pacific Missile Range Facility Barking Sands) on the island of Kauai, and at the U.S. Army Pohakuloa Training Area on the island of Hawaii under existing environmental analyses and Federal Aviation Administration (FAA) airspace designations.

Table 2-2 is a summary of existing and proposed aircraft loading. It is anticipated that two MQ-9 aircraft would be based at MCB Hawaii Kaneohe Bay in 2023, and an additional four MQ-9 aircraft would arrive in Fiscal Year (FY) 2024. It is anticipated that 6 KC-130J aircraft would be based at MCB Hawaii Kaneohe Bay in 2023, increasing to a total of 15 aircraft in FY 2025. The number of KC-130J and MQ-9 aircraft and associated personnel at the installation at any one time would vary throughout the year depending on operational cycles and required detachment support.

Table 2-2 Proposed Aircraft Loading at MCB Hawaii Kaneohe Bay

	Existing	*Change*	*Total*
MV-22	26	0	26
C-20	2	0	2
MH-60	15	0	15
P-8A	2	0	2
C-40	2	0	2
MQ-9	0	6	6
KC-130J	0	15	15
Total	**47**	**21**	**68**

Table 2-3 is a summary of existing and proposed aircraft operations at MCB Hawaii Kaneohe Bay. An aircraft operation is defined as a single event such as a takeoff or landing. Thus, a “touch” (landing) and “go” (takeoff) exercise is counted as two aircraft operations. Changes in aircraft operations at the airfield include an increase of approximately 3,000 annual MQ-9 aircraft operations and approximately 5,280 KC-130J annual operations. The existing use of the airfield by other tenant Marine Corps and Navy squadrons and by non-tenant (transient) aircraft squadrons would not change. While the proposed operations are an increase from existing conditions (28,758 to 37,038), they are less than the 41,512 total annual aircraft operations that were occurring just prior to the 2022 deactivation of the two helicopter squadrons and RQ-21 divestment. Thus, aircraft operations following implementation of the proposed action would be approximately 11 percent less than what was occurring at MCB Hawaii Kaneohe Bay before May 2022. Nighttime operations occurring from 10 p.m. to 7 a.m. are only a small portion (2%) of proposed aircraft operations. Fixed wing aircraft using Runway 04/22 typically fly over Kaneohe Bay when approaching and departing the runway to avoid directly overflying residential communities such as Kaneohe and Kailua.

Table 2-3 Proposed Aircraft Operations at MCB Hawaii Kaneohe Bay

	Day (7 a.m. – 10 p.m.)	*Night (10 p.m. – 7 a.m.)*	*Total*
Existing (Based)			
MV-22	13,771	463	14,234
MH-60	6,872	488	7,360
P-8A	280	4	284
C-40	259	7	266
Existing (Transient)			
Fighters	750	0	750
Heavy Jet	4,052	0	4,052
Helicopters	1,066	0	1,066
Transient KC-130J	54	0	54
Other Light	746	0	746
Subtotal Existing	*27,850*	*962*	*28,812*
Proposed			
MQ-9	2,934	66	3,000
KC-130J	5,209	71	5,280
Subtotal Proposed	*8,143*	*137*	*8,280*
Total	**35,993**	**1,099**	**37,092**

2.2 Alternatives Development

NEPA's implementing regulations require agencies to consider reasonable alternatives, defined as alternatives to a proposed action that would avoid or minimize adverse impacts and are practical and feasible and meet the purpose and need of the proposed action.

2.2.1 Alternatives Screening Analysis

Screening criteria for each squadron were developed based on their minimum infrastructure and operating requirements to determine if other Hawaii military-controlled airfields could meet the purpose and need of the proposed action.

The four screening criteria for home basing the squadrons are:

1. Military-Controlled and Secured Facilities. The project location must be at an airfield that affords access to separate military-controlled and secured facilities. Aircraft operations for MQ-9 and KC-130J aircraft can occur at a non-military-controlled airfield, but home basing of the military aircraft with its associated maintenance, command and control, and security protocol requires a military-controlled and secured area.
2. Minimum Airfield Infrastructure. The military-controlled airfield must meet minimum airfield infrastructure requirements (or have the space to construct such infrastructure), including dedicated hangars for both aircraft types. The runway must meet minimum airfield characteristics to include length, width, and runway surface, including minimum weight-bearing requirements. The MQ-9 requires a runway 7,500 feet long and at least 75 feet wide, with taxiways a minimum of 50 feet wide. The KC-130J requires a Class B runway 200 feet wide and 6,000 feet long with a weight-bearing capacity of 175,000 pounds single tandem (i.e., a wheel configuration with single wheel one in front of the other). Vertical obstructions for both aircraft must be in accordance with DoD airfield safety clearances. The minimum hangar requirement

for the KC-130J is a Type II hangar, and the MQ-9 requires a Type IV hangar. Each aircraft squadron requires its own dedicated hangar.

3. Access to Training Areas and Airspace. The military-controlled airfield must have access to established training areas and airspace capable of supporting MQ-9 and KC-130J aircraft, and the new squadrons must be compatible with existing airfield operations.
4. Sustainment and Support. The military-controlled airfield must be capable of supporting long-term sustainment and maintenance for continued operations of MQ-9 and KC-130J aircraft. This includes availability and access to secure communications networks. Support services include fuel services, maintenance, supply, and avionics support equipment. The MQ-9 and KC-130J squadrons require access to Secure Internet Protocol Router Networks and associated storage facilities and workspaces.

Five Hawaii military airfields were evaluated against the four criteria. The locations included MCB Hawaii Kaneohe Bay, Joint Base Pearl Harbor-Hickam (JBPHH), U.S. Coast Guard (USCG) Air Station Barbers Point, Wheeler Army Airfield, and Dillingham Military Reservation (Figure 2-2). Application of the screening criteria to these five bases is described below.

2.2.1.1 MCB Hawaii Kaneohe Bay

MCB Hawaii Kaneohe Bay satisfies all criteria. It is a military-controlled airfield with a 7,800-foot runway that meets length and weight-bearing airfield requirements for both aircraft types. MCB Hawaii Kaneohe Bay has an existing hangar that can be configured for the MQ-9 (Hangar 102). For KC-130J aircraft, the base could accommodate the aircraft in the existing MV-22 hangar, 6886, and relocate the MV-22 squadron to a Hangar 103 replacement hangar. The operations of the proposed two new squadrons are compatible with existing base operations. The base also has existing services capable of supporting MQ-9 and KC-130J requirements and has the capacity to accommodate additional required services. In addition, MCB Hawaii Kaneohe Bay has secure communications network/facility access and Secure Internet Protocol Router Networks and associated storage facilities and workspaces available for the two squadrons.

2.2.1.2 JBPHH

JBPHH is a military-controlled airfield, but it does not meet Criteria 2, 3, or 4. It has a 12,300-foot runway that meets length and weight-bearing airfield requirements for the MQ-9 and KC-130J; however, it does not satisfy Criterion 2 because all its hangars are fully committed to Air Force uses (JBPHH, 2021). In addition, the base is fully developed with no undeveloped space available to construct the necessary home basing infrastructure. It does not satisfy Criterion 3 because FAA restrictions forbid unmanned aircraft operations of any type in the vicinity of the Honolulu International Airport. The DoD cannot operate Group 5 unmanned aircraft like the MQ-9 out of JBPHH. It has aircraft support services similar to those required for supporting MQ-9 and KC-130J aircraft; however, it does not satisfy Criterion 4 because JBPHH cannot provide support services for two new squadron operations without adversely affecting existing base operations (JBPHH, 2021).

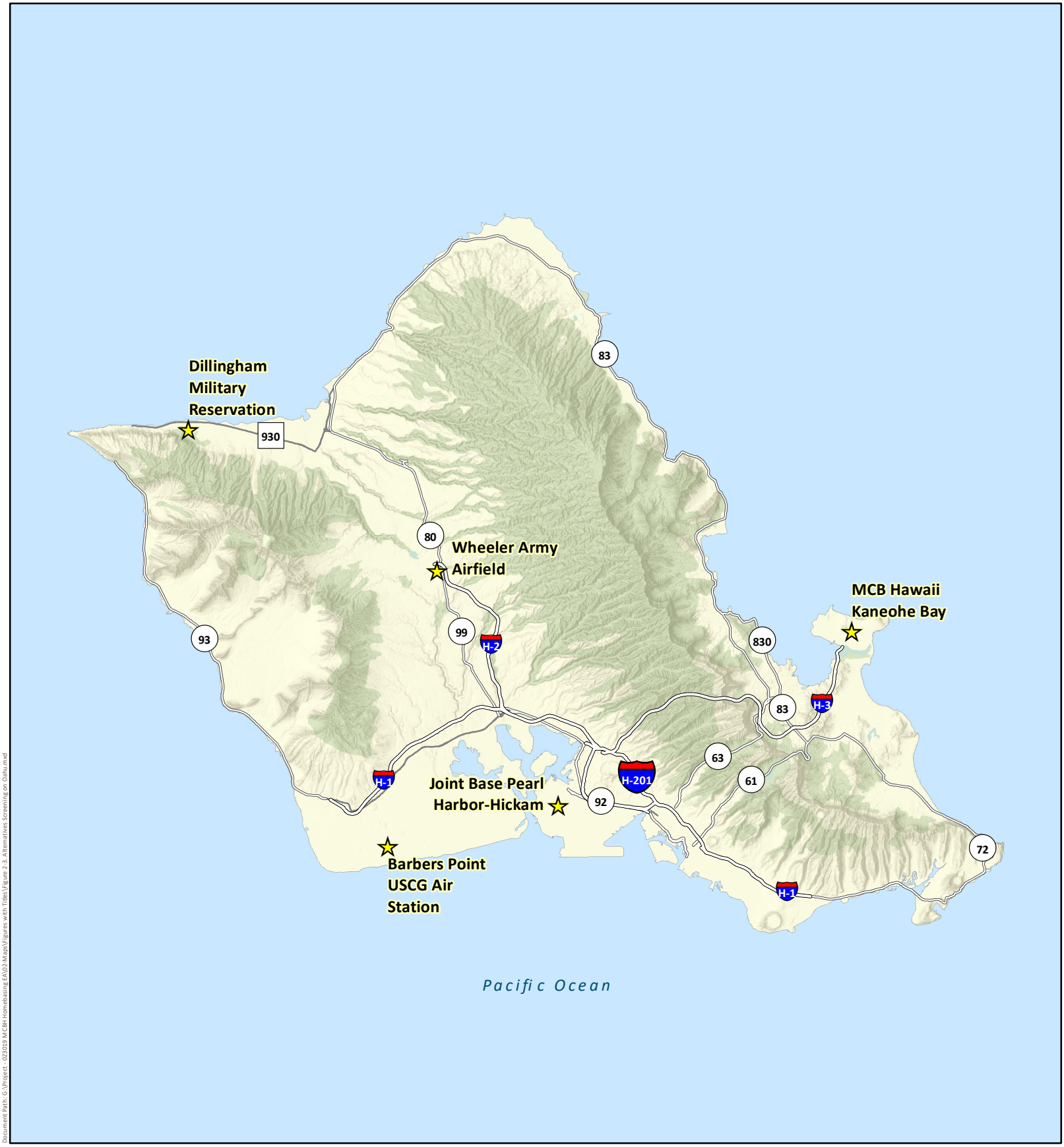


Figure 2-2. Alternatives Screening on Oahu

Candidate Military Airfield Locations

Interstate

State Highway

County and Local Highway

Land Use

Forest

Waterbody

0 2.5 5 Miles

Sources: DoD, 2019; Esri, 2021; Hawaii Statewide GIS, 2021

State of Hawaii

N

Pacific Ocean

Document Path: G:\Project - 023019 MCBH Homebasing EA\02-Maps\Figures with Titles\Figure 2-3 Alternatives Screening on Oahu.mxd

2.2.1.3 USCG Air Station Barbers Point

USCG Air Station Barbers Point is a military-controlled portion of the Kalaeloa airfield, but it does not meet Criteria 2, 3, or 4. It has an 8,000-foot state-controlled runway operated under a joint use agreement with Hawaii Department of Transportation (HDOT). The runway meets length and weight-bearing airfield requirements; however, it does not satisfy Criterion 2 because it does not have adequate hangars even for its existing HC-130J aircraft, nor the space to construct new hangars. The amount of space required to construct new hangars and supporting infrastructure for two new squadrons is approximately 32 acres. The DoD coordinated with HDOT to discuss the availability of suitable land for the proposed action. While the current operating agreement shows 106 acres of Navy property adjacent to the airfield (Naval Facilities Engineering Systems Command [NAVFAC], 2021), only a small, disaggregated portion of that acreage is possibly developable. This collection of disparate parcels is insufficient to accommodate the minimum footprint for the hangars, apron, and supporting facilities. USCG Air Station Barbers Point does not satisfy Criterion 3 for the same reason as JBPHH — FAA restrictions forbidding unmanned aircraft operations of any type in the vicinity of the Honolulu International Airport. USCG Air Station Barbers Point does not satisfy Criterion 4 because the limited undeveloped acreage is insufficient for the additional infrastructure required to home base two new squadrons, and the base secure communications network is not compatible with the Naval Force Secure Requirement.

2.2.1.4 Wheeler Army Airfield

Wheeler Army Airfield satisfies Criteria 1 and 3: it is a military-controlled airfield, and operations of the proposed two squadrons are compatible with existing base operations. However, it does not satisfy Criterion 2 because its 5,600-foot runway is too short for MQ-9 and KC-130J aircraft and cannot be extended on DoD property due to public roadways and non-DoD land on either end of the runway. In addition, Wheeler Army Airfield lacks existing hangar space for MQ-9 and KC-130J aircraft; has an insufficient amount of undeveloped land to accommodate the minimum footprint for the hangars, apron, and supporting facilities; and the airfield is fully developed and committed to other aircraft operations. Wheeler Army Airfield does not satisfy Criterion 4 because, like USCG Barbers Point, the secure communications network is not compatible with the Naval Force Secure Requirement.

2.2.1.5 Dillingham Military Reservation

Dillingham Military Reservation satisfies Criterion 3 as it has access to training areas and airspace, but it does not meet Criteria 1, 2, or 4. Dillingham Military Reservation does not satisfy Criterion 1 because it is not a military-controlled airfield. The U.S. Army currently leases the property to HDOT, which manages the airfield for predominantly general aviation purposes. The lease does not allow for construction and operation of the necessary home basing infrastructure, and HDOT has given no indication it is receptive to modifying its lease. Regarding Criterion 2, the base has a 5,000-foot runway within a 9,007-foot paved area; however, the runway does not meet requisite weight-bearing requirements for a single-tandem aircraft at 175,000 pounds and is in fact closed to aircraft heavier than 12,500 pounds. The entire runway would require demolition and reconstruction to accommodate the weight of KC-130J aircraft. The airfield is fully developed and committed for general aviation operations and lacks enough undeveloped acreage for construction of the infrastructure required to home base two new squadrons. In addition to the lack of developable acreage, Dillingham Military Reservation does not satisfy Criterion 4 because it does not have a secure communications network or facility access, and its use as a civilian

airfield is incompatible with these security requirements and basing support services such as an Aircraft Direct Refueling System.

Only MCB Hawaii Kaneohe Bay satisfies all the minimum installation and operating criteria required to meet the proposed action purpose and need (Table 2-4). Therefore, no other locations are carried forward for analysis in this EA.

Table 2-4 Alternatives Screening Analysis Summary

Screening Criteria[1]	*1) Military-Controlled and Secured Facilities*	*2) Minimum Airfield Infrastructure*	*3) Access to Training Areas and Airspace*	*4) Sustainment and Support*
MCB Hawaii Kaneohe Bay	**Yes**	**Yes**	**Yes**	**Yes**
JBPHH	**Yes**	**No**	**No**	**No**
USCG Air Station Barbers Point	**Yes**	**No**	**No**	**No**
Wheeler Army Airfield	**Yes**	**No**	**Yes**	**No**
Dillingham Military Reservation	**No**	**No**	**Yes**	**No**

Notes: [1]Alternatives screening analysis details are in the text of Section 2.2.1.
JBPHH = Joint Base Pearl Harbor-Hickam; MCB = Marine Corps Base; USCG = United States Coast Guard.

2.2.2 Alternate Siting Locations at MCB Hawaii Kaneohe Bay

The Marine Corps conducted planning for the proposed action with due consideration for the historic nature of the MCB Kaneohe Bay Aviation District. Reuse through rehabilitation of facilities was initially considered for both aircraft. The Marine Corps was able to rehabilitate Hangar 102 for home basing the MQ-9. As described below, the Marine Corps considered several alternatives to demolishing Hangar 103 during the alternatives' development process. This included assessment of alternative locations on base and reuse of Hangars 104 and 105.

2.2.2.1 Planning Requirements

In 2021, the Marine Corps analyzed MCB Hawaii Kaneohe Bay's capability for growth. This planning process considered currently developed areas along the flightline as well as the partially developed areas (Figure 1-2) of West Field, north of the western end of the runway; Green Field, east of the transient ramp on the southern side of the runway; and Pali Kilo across from Green Field on the north side of the runway. Development of MCB Hawaii Kaneohe Bay flightline layout alternatives for the proposed action were governed by the planning requirements summarized below:

- Airfield Safety Clearances. The runway requires a 750-foot lateral clearance from the runway centerline on each side, and then a transitional surface sloping upward with a ratio of seven horizontal units for each unit of vertical rise, rising perpendicularly away from the runway. This restricts the height of facilities near the runway. Figure 2-3 shows airfield safety clearances established for fixed wing and helicopter air stations in UFC 3-260-01.

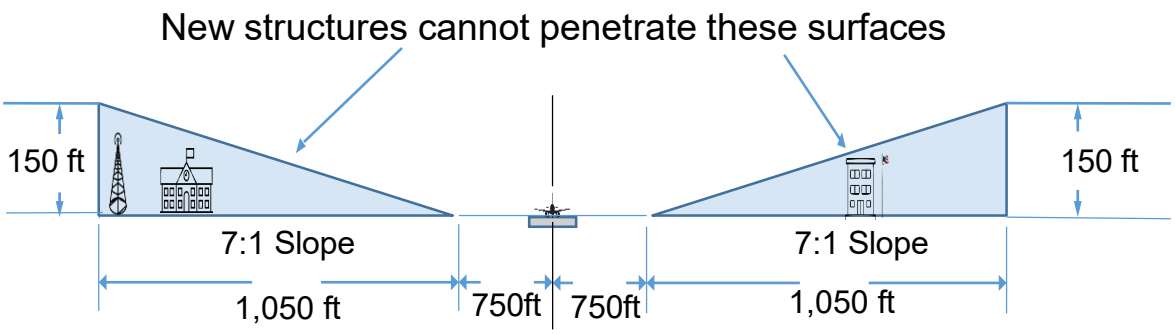


Figure 2-3 Airfield Safety Clearances

- Explosive Safety Quantity Distance (ESQD) Arc. ESQD requirements are applicable to ammunition and explosives and other hazardous material at DoD activities. Hangars cannot be within an ESQD arc.
- Compass Calibration Pad Magnetic Quiet Zone. An aircraft magnetic compass is checked on a frequent, routine schedule at a compass calibration pad. The center of the pad must be at least 500 feet from magnetic objects such as large parking lots, buildings, busy roads, railroad tracks, high-voltage electrical transmission lines or cables carrying direct current (either above or below ground) to prevent interference with the calibration of the compass.

In applying these requirements, the resulting flightline layout coordinates functional and locational relationships among the runway, taxiways, aircraft parking areas, and flightline support facilities such as hangars, wash racks, air traffic control, and mission support.

2.2.2.2 Alternative Locations

Figure 2-4 shows planning constraints at the airfield and Figure 2-5 shows planning constraints specific to Green Field. With interior renovations, Hangar 102 can accommodate the smaller MQ-9 airframe. During the siting process, in addition to the location and configuration described in Alternative 1, the Marine Corps considered three alternative locations for the KC-130J hangar: West Field, Green Field, and Pali Kilo.

- West Field. Development at West Field for KC-130J facilities is constrained by ESQD arcs associated with the Combat Aircraft Loading Apron and the Ordnance Assembly Area (Figure 2-4), the magnetic quiet zone around the compass calibration pad, taxiway obstacle-free areas, and flood hazards. In addition, West Field's proximity to the runway and other airfield surfaces results in an inability to place a suitably sized hangar and apron at this site (Figure 2-4). Relocating the Combat Aircraft Loading Apron and Ordnance Assembly Area is not feasible because there are no available open spaces on the installation that would allow siting of the ESQD arc without impacting current operations and facilities. Relocation of the magnetic quiet zone and ensuring that taxiway obstacle-free areas remain as such pose similar challenges. Finally, placing a hangar and apron at this location would increase the amount of vehicle traffic needing to access the north side of the runway. Transportation to the north side of West Field is currently constrained because there is no perimeter road, requiring all vehicles and personnel to use the Mokapu Road crossing over the active runway, which is frequently closed due to aircraft operations. To accommodate the proposed action's increased mission traffic while ensuring operational availability of the runway, any hangar development north of the Mokapu Road crossing would require construction of an underground tunnel beneath the runway at the current Mokapu Road crossing. This is infeasible because construction of such a tunnel would require frequent and extended closure of the runway, unacceptably impacting the base's mission; the high-water table in the area; the high potential to impact subsurface archaeological resources; and would be unreasonably expensive at an estimated cost of more than $200 million. For these reasons, West Field site is not a reasonable alternative for location of a new KC-130J hangar.

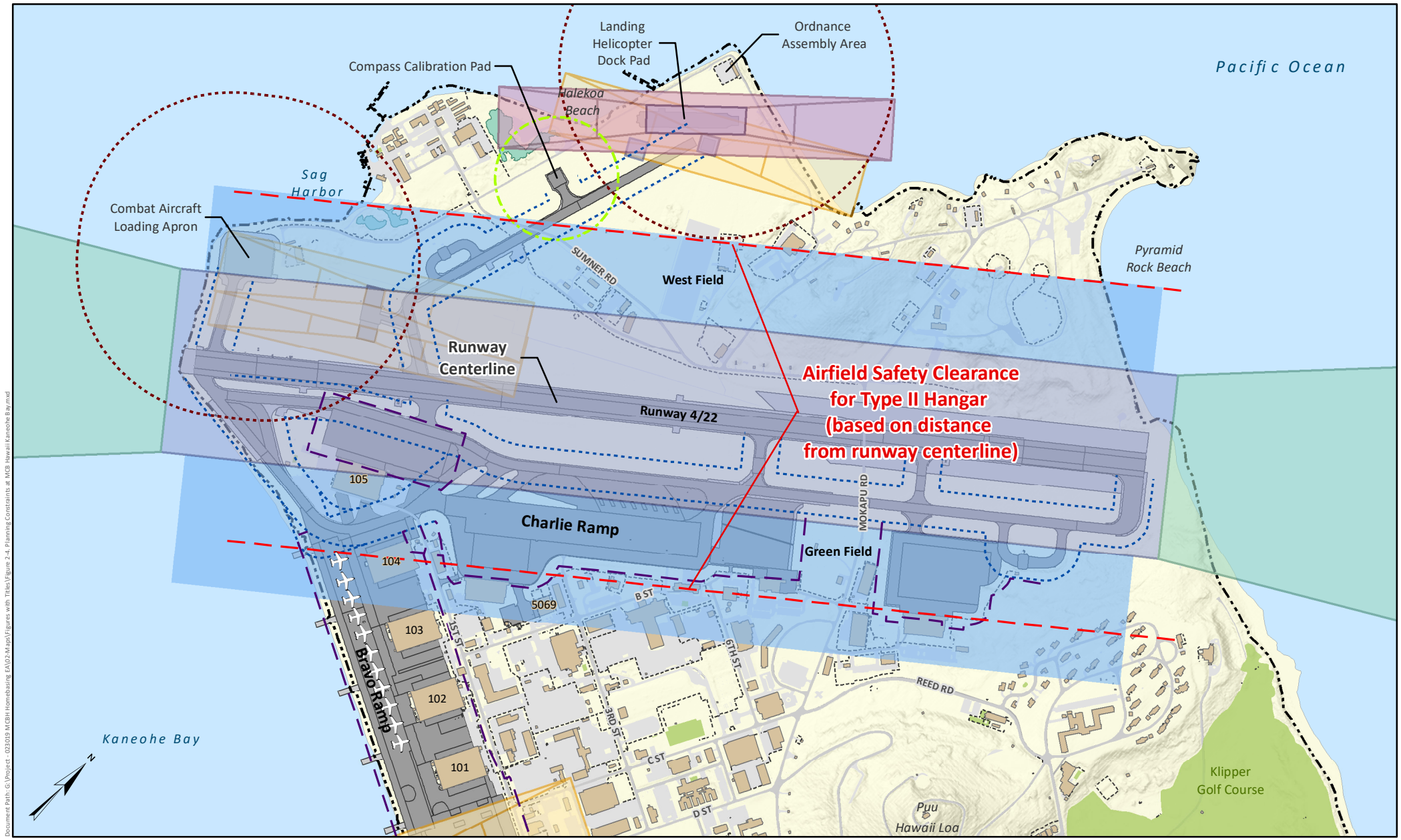


Figure 2-4. Planning Constraints at MCB Hawaii Kaneohe Bay

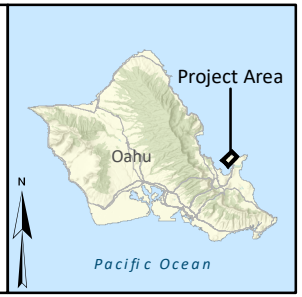
- MCB Hawaii Kaneohe Bay Boundary
- Installation Fence
- Airfield Pavement/Apron
- Airfield Road
- Building
- Installation Road
- Parking Area
- Recreation Area
- Wetland
- Notional Airplane
- Airfield Safety Clearance for Type II Hangar
- Apron Obstacle Free Area
- ESQD Arc
- Quiet Zone
- Taxiway Obstacle Free Area

Imaginary Surface

- Clear Zone III
- Primary Surface
- Transitional Surface
- Helipad Imaginary Surface
- LHD Imaginary Surface

0 1,000 2,000 Feet

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021



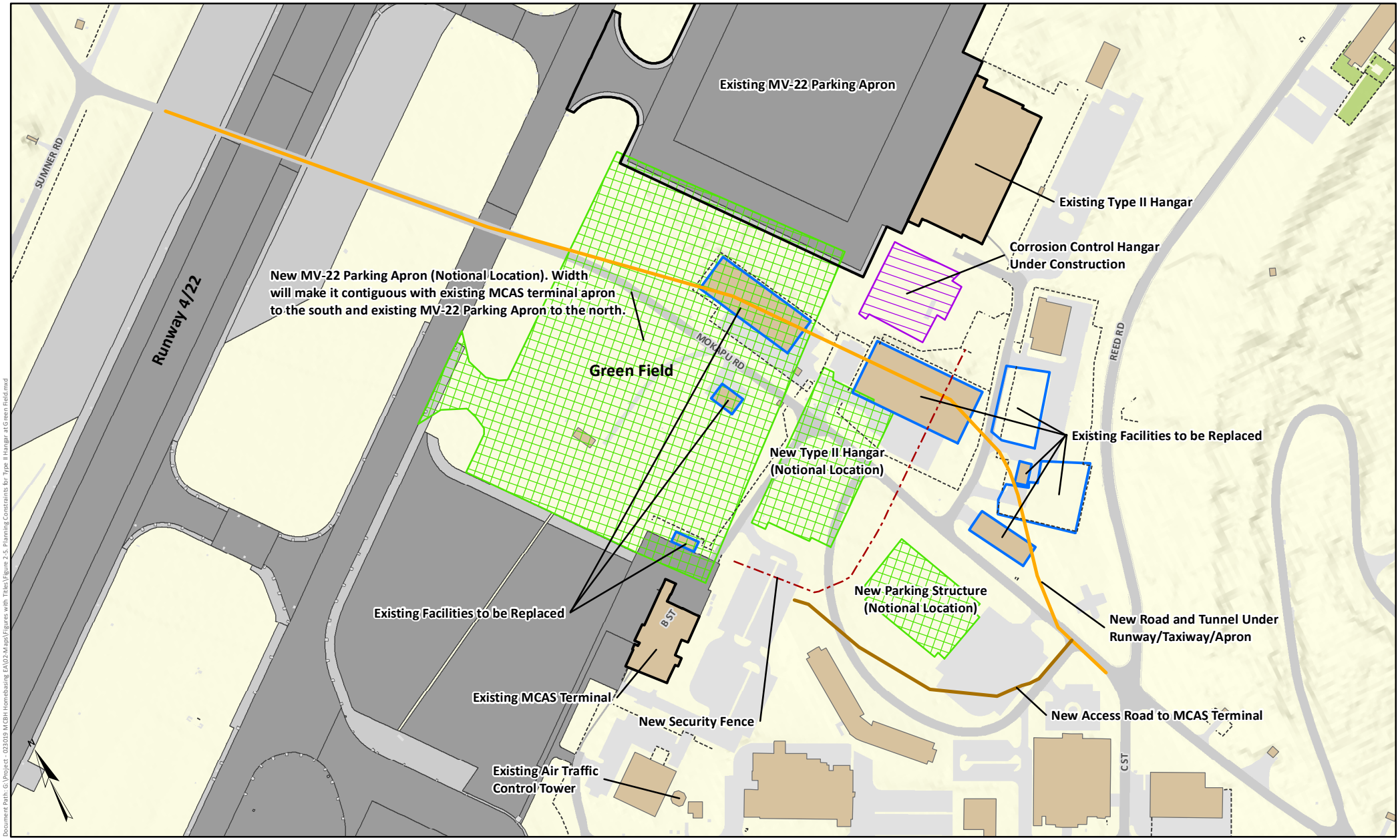


Figure 2-5. Planning Constraints at Green Field

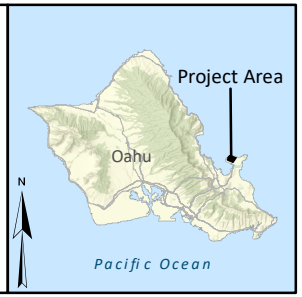
MCB Hawaii Kaneohe Bay Boundary
Installation Fence
Airfield Pavement/Apron
Airfield Road
Building
Installation Road
Parking Area

Planning Constraints at Green Field
Conceptual New Access Road to MCAS Terminal
Conceptual New Road and Tunnel Under Runway/Taxiway/Apron
Conceptual New Security Fence

Conceptual New Structure
Existing Structure
Replacement of Existing Facilities
Under Construction

0 250 500 Feet

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021



- Green Field site (see Figure 2-5). This is an 8-acre partially undeveloped area located between the transient ramp and Mokapu Road. It consists of storage sheds, meteorological equipment, and open space. The Visiting Aircraft Line is immediately adjacent to the Green Field site. Development of a new hangar on this site is unreasonable for several reasons. Construction of a hangar at this location would adversely impact the line-of-sight for the air traffic control tower by blocking air traffic control's view of aircraft movements on the ground and in the air. The site does not allow for sufficient airfield safety clearance between Taxiway A, the air terminal, and Mokapu Road for the aircraft parking apron, taxiways, and associated pavement. The setback from the runway centerline would place the hangar further east than the air terminal due to the hangar height. Mokapu Road and existing major utilities (electrical, potable water, sewer, and communications) would need to be relocated. The air terminal mechanical plant, storage facilities, parking, photovoltaic systems, access road to the terminal, and two warehouse facilities near Mokapu Road would need to be demolished and replaced. The complex used to store and process hazardous material/waste (Buildings 6407, 6408, 6409, 6474, and 6685) would need to be relocated and replaced. There is an ESQD arc near the air terminal building associated with storage of small ordnance and survival equipment that provide support for the units that transition through the facility and a new site would need to be identified for this mission. Large commercial and military aircraft park proximate to Green Field, creating conflicts associated with jet blast, wingtip clearance, and personnel and equipment movement. Finally, relocation of the displaced facilities would delay hangar construction for the proposed action by 10–12 years. For these reasons, this site is not a reasonable alternative for location of a new KC-130J hangar.
- Pali Kilo. This location would also be located on the north side of the runway and would require construction of an underground tunnel. In addition, Pali Kilo is within the airfield safety zone of the helicopter landing pads (see Figure 2-4). The required setback from the runway centerline would place the hangar and parking aprons within the tsunami evacuation zone. Finally, this site would require excavation into Keawanui Hill resulting in extensive amounts of cut and fill in an area known to have subsurface archaeological sites. For these reasons, this site is not a reasonable alternative for location of a new KC-130J hangar.

2.2.2.3 Use of Hangars 104 and 105

Relocating the MV-22B or KC-130J to existing Hangars 104 or 105 is not supportable, as they do not meet DoD UFC. UFC requirements are applicable to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with DoD Directive 4270.5 (Military Construction) and USD(AT&L) Memorandum dated 29 May 2002. UFC requirements provide facilities planning, design, construction, sustainment, restoration, and modernization criteria. Hangars 104 and 105 cannot physically accommodate the greater heights of U.S. Marine Corps transport and tiltrotor aircraft. Specifically, the maximum tail height of a KC-130J is 39 feet 2 inches, and the MV-22B rotor blades extend up to 39 feet in height. Hangars 101 through 104 cannot accommodate these aircraft as their interior and door heights are 32 feet 6 inches or less. Modification to support these tail and rotor heights is not possible due to the existing interior height limitation, requirement for a usable interior bridge crane, and the fact that full aircraft entry into the hangar bay is required for maintenance and protection from inclement weather. In the case of the MV-22B, this tiltrotor aircraft requires rotation of its engine "nacelles" (i.e., fairings) and rotors during maintenance, a procedure which places the rotor tips at 39 feet above the hangar floor. This height again conflicts with interior height constraints of the

hangars, and the need for unencumbered operation of the overhead bridge crane. Hangar 105 has the same constraints and is also presently utilized to accommodate other missions such as the installation's C-20 and transient aircraft.

UFC 4-211-01 provides criteria for planning and design of aircraft maintenance hangars. The Type II hangar is for USMC MV-22B and KC-130J aircraft, while the Type III hangar is for transport aircraft such as the C-40 and patrol aircraft. Hangar dimensions (length, width, and height) differ between the Type II and Type III hangars. Type II hangars also require a 7-ton overhead bridge crane. To be effective, this crane must be usable across the hangar bay and above the vertical tail and/or rotor of the aircraft.

For each distinct hangar type, interior dimensions are standardized to allow the squadron to conduct required maintenance on the appropriate number of aircraft for that particular type of unit. Modern hangar design, which features wide front doors, allows individual aircraft to be moved in and out of the hangar without requiring other aircraft undergoing maintenance to first move out of the way. Existing Hangars 101 through 105 do not allow for this capability; these hangars, which were designed with two side-by-side hangar doors, require aircraft near the doors to be removed from the hangar in order to reposition aircraft located deeper in the hangar.

UFC 3-260-01 establishes airfield safety criteria, including safety clearance surfaces from the runway and aircraft movement areas such as taxiways and parking aprons. Construction of a Type II or Type III hangar at the Hangar 105 site is not feasible, as it would violate the airfield primary and transitional surfaces. The runway requires a 750-foot lateral clearance from the runway centerline on each side, and then a transitional surface sloping upward with a ratio of seven horizontal units for each unit of vertical rise, rising perpendicularly away from the runway (see Figure 2-3). This restricts the height of facilities near the runway. Construction of a new Type II or Type III hangar at Hangar 105 would exceed the allowable height for buildings at this distance from the runway centerline.

A Type III hangar can fit at the Hangar 104 site without violating airfield safety criteria, while also accommodating sufficient aircraft parking at a location capable of larger aircraft movements.

Hangar 104 is located at a vital airfield location adjacent to Taxiway "B" and Charlie Ramp. This location is functionally suitable for larger aircraft operations supported by Type III hangars. Recognizing this importance, the NAS Barbers Point Base Realignment and Closure (BRAC) of 1993 resulted in basing of Navy P-3 patrol aircraft at Hangar 104.

As shown in Figure 2-6, construction of a Type II hangar at the Hangar 104 site would represent an unacceptable loss of strategic flightline capability. The purpose of Bravo Ramp is to enable movement of aircraft from the flightline to Hangars 101-103, allow movement of aircraft in and out of hangars, and park aircraft. Patrol and transport aircraft have wingspans that are too large for them to use Bravo Ramp to taxi to and from the flightline to Hangars 101-103 while other aircraft are present on Bravo Ramp. Therefore, support for transport and patrol sized aircraft on Bravo Ramp is limited to the Hangar 104 site. Re-purposing Hangar 104 for smaller aircraft would functionally evict larger planes from using Bravo Ramp and would eliminate the ability to support patrol or comparably sized transport aircraft at a critical location in an already constrained airfield.

The Marine Corps considered additional hangar construction; however, reuse of existing hangars and sites is strongly preferred, and an alternative siting location is not feasible. An alternative site would require approximately eight additional years to implement, thereby not meeting the purpose and need for the proposed action. It would also disrupt (and require duplication of) existing communication and

support infrastructure and result in a constrained and non-optimized flightline, degrading mission capability.

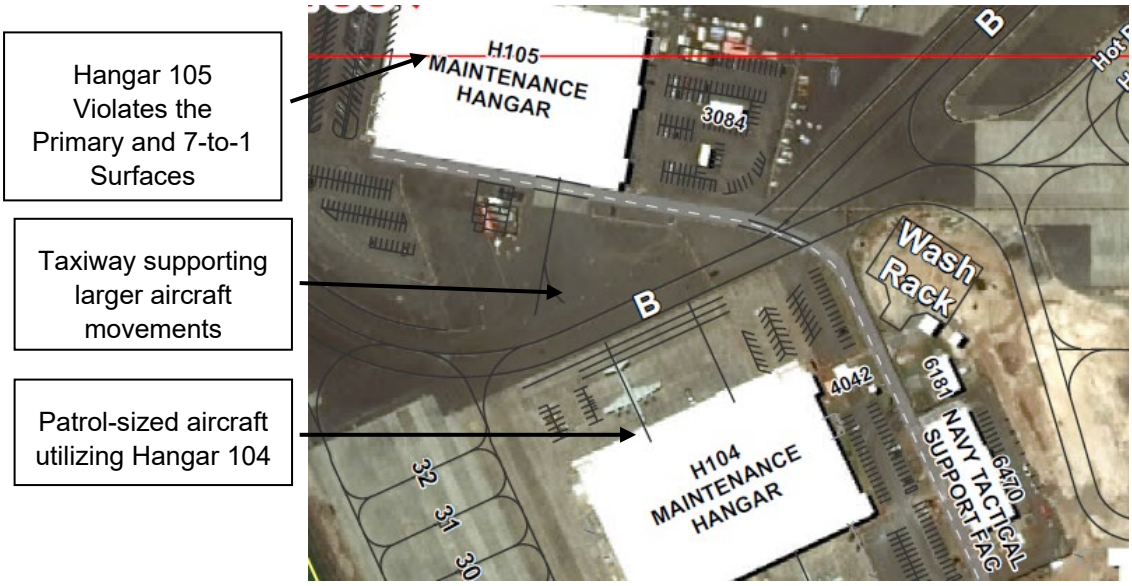


Figure 2-6 Hangar 104 and Hangar 105 Constraints

2.2.2.4 Conclusion

The Marine Corps considered all reasonable alternatives to the demolition of Hangar 103 in order to support the continuing military mission. The Marine Corps takes its obligations under NHPA very seriously, and this assessment of potential reuse of Hangars 104 or 105 was made with due consideration for the historic nature of the airfield. Reuse through rehabilitation of facilities is the first alternative the Marine Corps explores for a number of reasons including historic preservation. The Marine Corps considered reuse of existing Hangars 101 through 105 and concluded that reuse was not feasible for the MV-22B or KC-130J aircraft, but it was an acceptable alternative for the MQ-9 aircraft in Hangar 102. The Marine Corps also considered alternative sites such as Hangar 104 and Hangar 105 for a replacement Type II Hangar, and dismissed them for the reasons outlined above. For the reasons described above, the Marine Corps considered and rejected the alternatives of avoiding Hangar 103 demolition.

2.2.3 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur. The Marine Corps would not base the MQ-9 and KC-130J squadrons in Hawaii with its attendant personnel and would not undertake the infrastructure upgrades necessary to accommodate the squadrons. Current permanently based platforms would remain, including the MV-22 Osprey, C-20G, P-8A Poseidon, C-40, and MH-60.

The No-Action Alternative does not meet the purpose of and need for the proposed action because it would not enable the Hawaii-based Marine Corps to enhance aerial refueling, transport and intelligence, surveillance, and reconnaissance capabilities to support USINDOPACOM. The No-Action Alternative is included here as the baseline for assessing the impacts of the proposed action.

2.3 Conservation Measures

Conservation measures are existing policies, practices, and measures that the Marine Corps would adopt to reduce the environmental impacts of designated activities, functions, and processes. Conservation measures mitigate potential impacts by avoiding, minimizing, or eliminating impacts. They are distinguished from proposed mitigation measures because conservation measures are either specific requirements applicable to the proposed action or established regularly occurring practices routinely implemented for Marine Corps projects. In other words, the conservation measures identified in this document are inherently part of the proposed action and are not proposed mitigation measures specifically identified as part of this NEPA environmental review process. Table 2-5 lists conservation measures that would be implemented as part of the proposed action. Proposed mitigation measures are discussed separately in Chapter 3.

Figure 2-7. Alternative 1

MCB Hawaii Kaneohe Bay Boundary
Installation Fence
Airfield Pavement/Apron
Airfield Road
Building
Installation Road
Parking Area

Proposed Action
MQ-9 Ground Data Terminal (Notional Location)
New Security Fence
Construction
Demolition
Renovation
Apron/Ramp Improvement
Construction Laydown and Staging Area

0 500 1,000 Feet

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021

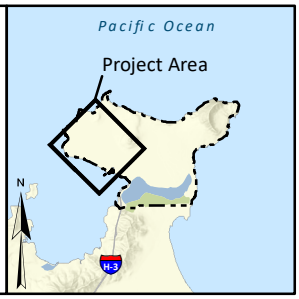


Table 2-5 Proposed Conservation Measures

Conservation Measure	*Impacts Reduced/Avoided*	*Description*	*Applicability*
Storm Water Management	Minimize pollutants in storm water flows	Conservation measures used near or on the runways are filter socks around and filter fabric inside the storm drains to prevent pollutants from getting into the MS4. Any sediment stockpile on the ramps would require filter socks and be frequently watered down using a water truck for dust control. Plastic tarps are not used in the vicinity of active aircraft operations. At contractor trailer/staging areas, conservation measures include stabilized construction entrance and exits, boundary fencing with fabric, filter socks around perimeter, and/or silt fencing.	Construction
Storm Water LID Techniques	Minimize pollutants in storm water flows	LID techniques such as bioretention, vegetated swales, and/or vegetated filter strips would be used during construction.	Construction
Storm Water Permit Requirements	Minimize pollutants in storm water flows	Requirements of the NPDES permit required for the discharge of storm water associated with construction activity, including a SWPPP.	Construction
Storm Water Detention Basin	Minimize attraction of birds	The detention basin would be covered in a manner to avoid attracting birds.	Construction
Windows	Minimize attraction of birds	Windows facing or adjacent to the flightline that have the potential to attract birds to the flightline would have design features to minimize their attraction, including tinted glass or film with a visible light transmittance value of 30% or less (inside to outside).	Construction
Hangar Doors	Minimize attraction of birds	Aircraft hangar doors will not be translucent or have windows. The hangar doors should be solid and not allow any interior light to pass through. If a hangar door has a window requirement, tinting is recommended.	Construction
Hangar Doors	Minimize attraction of birds	Unless nighttime operations are in progress, doors should be shut at night to prevent light emitting outward. This could include partially closing doors and turning off lighting when operations not occurring, as well as incorporation of a light switching system that allows for rapid on and off lighting. Doors should allow for quick open and closure to ensure that hangar doors can be operated at night to minimize light emitting outward.	Operation

Table 2-5 Proposed Conservation Measures

Conservation Measure	*Impacts Reduced/Avoided*	*Description*	*Applicability*
Lighting	Bird/bat disorientation/fallout	Exterior lighting would follow MCB Hawaii standards (MCB Hawaii, 2022a). When exterior lighting is required, all exterior lights for new construction, replacement of existing fixtures, and renovations would meet or exceed USFWS, NOAA, and/or IDA standards unless otherwise required by the military mission, per the MCB Hawaii INRMP (MCB Hawaii, 2017, pg. C2-15). New and renovated buildings along the flightline constructed and operated to minimize/prevent seabirds from being attracted to areas with aircraft operations. These include: • Shield exterior lighting (points downward) and full cutoff. • Actively control/manage lighting. Only activate lights when needed and have ability to manually shut off lighting when not required. • Timers and motion-activated lighting to minimize unnecessary night lighting. • Minimize light trespass. Only light the required area. • Minimize brightness. Install adjustable light switches where possible so light is no brighter than necessary. • Minimize blue light emissions. • Use full cutoff downward/shielded bollards in parking areas and sidewalks, and full cutoff downward/shielded wall packs for walkways and entrances/exits. • Locate light fixtures as low as possible to the ground. • All nighttime construction work and construction lighting would be pre-approved with Environmental Compliance & Protection Division, Natural Resources. • Use warm light sources for exterior lighting.	Construction/ Operation
Lighting	Minimize attraction of birds	Limit use of lights during the seabird fledging period.	Operation
Windows	Minimize attraction of birds	For windows facing or adjacent to flightline that have the potential to attract birds to the flightline, install tinted glass or film with a visible light transmittance value of 30% percent or less (inside to outside) on all glass windows, doors, and walls within line-of-sight of the flightline.	Construction

Table 2-5 Proposed Conservation Measures

Conservation Measure	*Impacts Reduced/Avoided*	*Description*	*Applicability*
Hangars	Minimize bird nesting	Interior portions of the hangars would be constructed with netting or slanted surfaces to keep birds from nesting in the hangar.	Construction/ Operation
Fencing	Minimize hoary bat entanglement	The proposed fencing would not use barbed wire fencing that could entangle foraging Hawaiian hoary bats.	Construction
Education	Minimize indirect effects to ESA-listed species from contractors, personnel, and dependents	All construction contractors and aircraft squadron personnel would participate in MCB Hawaii Kaneohe Bay's existing natural resources education program. The program would include, at a minimum, the following topics: (1) occurrence of natural resources (including ESA-listed species); (2) sensitivity of the natural resources to human activities; (3) legal protection for certain natural resources; (4) penalties for violations of federal law; (5) general ecology and wildlife activity patterns; (6) reporting requirements; (7) measures to protect natural resources; (8) personal measures that users can take to promote the conservation of natural resources; and (9) procedures and a point of contact for ESA-listed species observations.	Construction/ Operation

Notes: % = percent; ESA = Endangered Species Act; IDA = International Dark-Sky Association; INRMP = Integrated Natural Resources Management Plan; LID = Low Impact Development; MCB = Marine Corps Base; MS4 = Municipal Separate Storm Sewer System; NOAA = National Oceanic and Atmospheric Administration; NPDES = National Pollutant Discharge Elimination System; SWPPP = Storm Water Pollution Prevention Plan; USFWS = United States Fish and Wildlife Service.

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3 Affected Environment and Environmental Consequences

This chapter presents a description of the existing environment and an analysis of the potential direct and indirect effects of Alternative 1 (cumulative effects are presented in Chapter 4). The level of detail and analysis for each resource varies with the level of potential environmental impact. Each resource section in this chapter defines a distinct region of influence for that resource.

"'Significantly,' as used in NEPA, requires considerations of both the degree of effects and the affected environment, such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant." (40 CFR Part 1501.3(b)). An impact can be significant or less than significant.

Environmental impacts carried forward for analysis in this EA are noise, air quality, water resources, cultural resources, biological resources, public health and safety, and transportation.

Potential impacts to the following resource areas are negligible or nonexistent and, therefore, are not carried forward for further analysis in this EA:

Socioeconomics: Socioeconomic analysis considers the effects of the proposed action outside the base on the population; employment/industry characteristics; demand for schools, housing, recreational facilities; and demographic, economic, and fiscal impacts on Kaneohe, Kailua, and the County of Honolulu. The entire proposed action, to include construction and operation, would be located exclusively on MCB Hawaii Kaneohe Bay and in airspace around the installation. Under the proposed action, personnel levels would be below the levels supported by MCB Kaneohe Bay and the surrounding community over the last decade. Due to the recent deactivation of several units aboard MCB Kaneohe Bay, on-base housing and school capacity would be sufficient to accommodate the new personnel. It is anticipated that the ratio of on-base to off-base housing remains consistent. As such, given the overall reduction in personnel, the proposed action would result in negligible changes, if any, to populations outside the base, with similarly negligible corresponding impacts to employment or industry characteristics; demand for schools, housing, and recreational facilities; and changes to the demographic, economic, and fiscal environment of Kailua, Kaneohe, and the County of Honolulu. The construction may provide some minor, temporary beneficial impacts to the local economy from construction-related jobs and purchasing, but no long-term increase in employment would result from the addition of the two new squadrons. Given there would be negligible to potential minor positive impacts to socioeconomic factors, further analysis is not required.

Environmental Justice: The proposed action would have no disproportionate impacts to minority or low-income populations. The proposed action would occur almost exclusively on MCB Kaneohe Bay, with off-base impacts limited to approach and departure of aircraft as well as potential for some personnel seeking off-base housing. Following the 2022 deactivation of the two helicopter squadrons, the two new squadrons represent an increase in aircraft operations above existing conditions, but a decrease in operations compared to activity over the past decade, resulting in a net decrease in noise when compared to operations at the installation in years prior to the 2022 deactivations and divestment. Flight operations would occur over water, and all construction and non-aerial operations, such as aircraft maintenance activities, would take place entirely on MCB Hawaii Kaneohe Bay and/or in previously disturbed areas. Finally, as described further in Chapter 3, the analysis indicates the proposed action would result in less than significant impact on the physical and natural environment such as air

quality, water resources and biological resources. As noted in Socioeconomics, the ratio of on-base to off-base housing is anticipated to remain constant. Considering any changes to the airfield noise environment would be minimal (see Section 3.1, *Noise*), and the proposed action's less than significant impacts on socioeconomics and environmental resources, there would be no disproportionate adverse impacts on any minority or low-income population. As such, Environmental Justice is not evaluated further in this EA.

Geologic Resources: The proposed action would require construction of an updated hangar and ancillary support buildings, improvements to aircraft parking aprons, and utility upgrades. Except for 4.25 landscaped acres, all construction would be in areas that are developed or have been previously disturbed. As such, there would be no impact to geological resources and thus this resource is not evaluated further in this EA.

3.1 Noise

Noise is unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. Noise may be intermittent or continuous, steady or impulsive, and stationary or transient. Stationary sources are normally related to specific land uses, e.g., an amusement park or industrial plant. Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flight tracks around airports), or randomly. Responses to noise vary according to the type of noise and the characteristics of the sound source, the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal).

The physical characteristics of noise (unwanted sound) include its intensity, frequency, and duration. The unit used to measure the intensity of sound is the decibel (dB). Sound intensity varies widely (from a soft whisper to a jet engine) and is measured on a logarithmic scale to accommodate this wide range. Human hearing ranges up to 120 dB, at which point sound causes physical discomfort.

The frequency of sound is measured in cycles per second, or hertz. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined by "weighting." The human ear is most sensitive to frequencies in the 1,000 to 4,000 hertz range. Sound meters calibrated to emphasize frequencies in this range are termed "A-weighted," and sound is identified in terms of A-weighted decibels (dBA). Unless otherwise stated in the EA, dB units refer to dBA-weighted sound levels.

The duration of a noise event and the number of times it occurs are also important considerations in assessing noise impacts. For example, at approximately 3 feet, sound from normal human speech ranges from 63 to 65 dBA, operating kitchen appliances range from about 83 to 88 dBA, and rock bands approach 110 dBA.

The primary metric supporting the assessment of noise from aircraft operations within this EA is the Day-Night Average Sound Level (DNL). The DNL is an A-weighted cumulative noise metric that measures noise based on an annual average of daily aircraft operations. DNL is the U.S. government standard for modeling cumulative noise exposure and assessing community noise impacts. The DNL has two time periods of measurement: daytime and nighttime. Daytime hours are from 7:00 a.m. to 10:00 p.m. local time. Nighttime hours are from 10:00 p.m. to 7:00 a.m. local time. The DNL weights operations occurring during nighttime by adding 10 dB to their single event sound level. Note that "daytime" and "nighttime" in calculating DNL are sometimes referred to as "acoustical day" and "acoustical night" and always correspond to the times given above. This is often different from the "day" and "night" commonly found in military aviation, which are directly related to the times of sunrise and sunset and vary throughout the year with the seasonal changes.

Aircraft operations can be heard in the local community and cause short-term disruptions to daily activities. Extensive research has been conducted regarding noise effects including general annoyance, disruption, speech interference, sleep disturbance, noise-induced hearing impairment, nonauditory health effects, performance effects, noise effects on children, effects on domestic animals and wildlife, and effects on property values, structures, terrain, and archaeological sites (e.g., Federal Interagency Committee on Noise, 1992 and FAA, 2022). There is no demonstrated causal connection between intermittent exposure to aviation noise and health effects in local communities. The principal effect of aircraft noise on exposed communities is annoyance, defined by U.S. Environmental Protection Agency (USEPA) as any negative subjective reaction on the part of an individual or group. There is a consistent

relationship between DNL (the noise metric used in the impact analysis) and the level of community annoyance (Federal Interagency Committee on Noise 1992). The FAA has adopted 65-dBA DNL as the threshold for potential land use incompatibility, and this metric is used for aircraft noise analyses nationwide. Anything less than 65 dBA DNL is considered compatible with all residential land uses, including consideration of health effects listed above such as sleep, hearing, and nonauditory health effects.

3.1.1 Affected Environment

The predominant noise sources in the project area and region of influence are the aircraft using the MCB Hawaii Kaneohe Bay airfield. This includes approaches and departures at the runway, taxiing between the runway and the Bravo and Charlie ramps, and use of the helicopter pads and West Field facilities. Figure 3-1 shows noise exposure contours from aircraft activity associated with existing operations at MCB Hawaii Kaneohe Bay. The contours represent levels of the A-weighted DNL metric for the existing conditions using calendar year 2019 to avoid any anomalies from COVID-19 pandemic-related operational levels.

3.1.2 Environmental Consequences

3.1.2.1 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and there would be no change to noise.

3.1.2.2 Alternative 1

Construction Impacts

Construction would result in short-term, intermittent noise impacts from the operation of heavy equipment, power and hand tools, and construction vehicles throughout the project area. Heavy equipment operation would occur sporadically throughout daytime hours. Noise would also be generated by trucks delivering materials to the construction site and construction worker vehicles. There are no sensitive human receptors within the proposed construction footprint and most of the construction would occur in the airfield environment, which is already subject to industrial and aircraft noise. All construction would be confined to MCB Hawaii Kaneohe Bay, be short term and temporary in nature, limited to regular daytime working hours, consistent with existing noise in the airfield environment, and conducted in accordance with Hawaii Administrative Rule (HAR) Chapter 11-46, Community Noise Control. At 50 feet, the loudest construction equipment (a bulldozer) would generate a noise level of 82 dB, at 500 feet this level would decrease to approximately 54 dB resulting in noise levels that would be indistinguishable within the acoustic environment.

Because all construction would occur on the installation and would not be audible to residents outside MCB Hawaii Kaneohe Bay, a Construction Noise Permit is not required from the DOH (see HAR 11-46). Considering the nature of the construction noise and its location, Alternative 1 construction would have less than significant noise impacts.

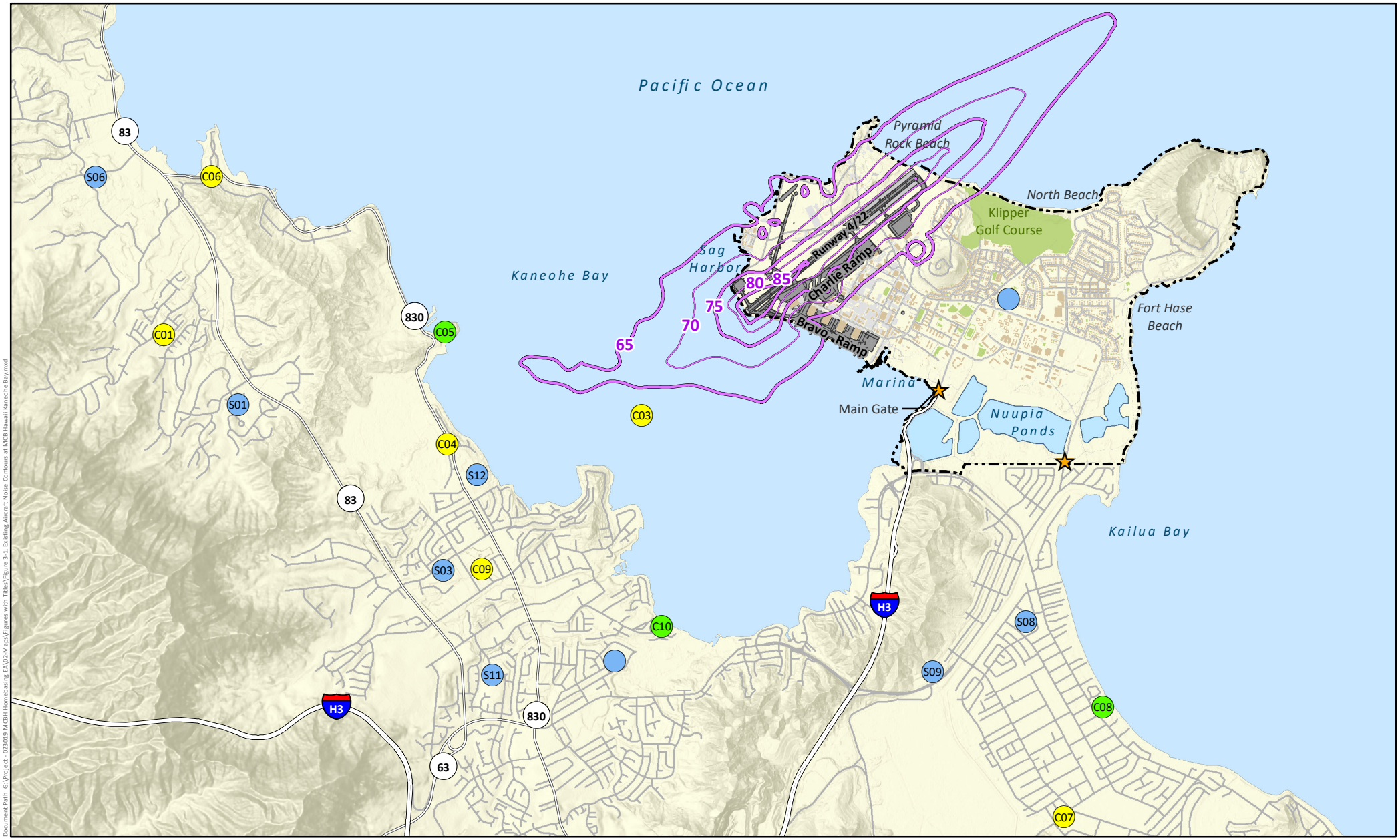


Figure 3-1. Existing Aircraft Noise Contours at MCB Hawaii Kaneohe Bay

Operational Impacts

The noise model used in this analysis accounts for the sound levels associated with each aircraft type to accurately characterize average noise levels for existing conditions and the proposed action. It accounts for engine settings, speed, distance and altitude, anticipated flight locations, and operation of the aircraft on the ground for taxiing and maintenance activities. The general flight locations (approaches, departures, and patterns) would not change from existing aircraft operations. Each aircraft has unique location, altitude and power setting factors that are incorporated into the noise model. Ground operations are also incorporated into the noise model; this includes taxiing on ramps and runways (e.g. Bravo Ramp) and maintenance activities, including those conducted in Hangars 101 to 104. The noise model also accounts for topography, including the location, size, and configuration of the Koʻolau mountain range.

Figure 3-2 shows contours associated with proposed aircraft operations at MCB Hawaii Kaneohe Bay. Table 3-1 shows a comparison of acreages within each contour (MCB Hawaii, 2022d). Table 3-2 shows approximate changes to average noise levels at specific locations surrounding the installation (see Figures 3-1 and 3-2 for locations). The figure depicts the proposed action contours (in yellow) to the existing contours (in purple). The addition of the KC-130J and MQ-9 squadrons would result in a slight increase in the contours throughout the airfield when compared to the No-Action Alternative. All the noise areas exposed to 65 dBA DNL and greater occur on base or over water. The most notable area of increase is at the very north end of the airfield, in the vicinity of Pyramid Rock, where the contours would increase over the water due to the left crosswind turns by KC-130J aircraft turning out just past the numbers painted on the upwind runway to accomplish a left closed visual flight rules pattern. This noise increase would not result in a perceptible change to humans or wildlife because it occurs in an area without sensitive human or wildlife noise receptors. MV-22 ground maintenance activities previously conducted on Charlie Ramp would be conducted at Bravo Ramp under Alternative 1. This shift would not result in a notable change to average noise levels; specifically, the 65 dBA DNL contour would not change because of these activities.

Community and school locations around MCB Hawaii Kaneohe Bay currently experience an average noise level of 40 dBA DNL, well under the 65 dBA DNL compatibility level. Under Alternative 1, these same community and school locations would experience an increase of only 1-3 dBA DNL (Table 3-2), with an average increase of 1 dBA DNL. This small proportional increase over existing average noise levels would not result in a noticeable change to the noise environment. In addition, the larger increases identified in Table 3-2 (i.e., 2-3 dBA DNL) would occur in areas of low average noise, and these areas would remain at low average noise levels of approximately 40 dBA DNL, which is equivalent to noise in quiet rural areas (FAA, 2022). The only places where the 65-dBA DNL contour would grow under the proposed action are on base (near the location of aircraft parking areas) and over the water almost directly underneath the locations of the flight tracks. There would be no increase of the 65 dBA DNL contour acreage in populated areas off base, and no residential areas would be exposed to noise above 65 dBA DNL. The areas closest to the air station (Coconut Island and Heʻeia State Park) that currently have the highest existing average noise levels would experience a half decibel increase in DNL and would remain at less than 60 dBA DNL under Alternative 1.

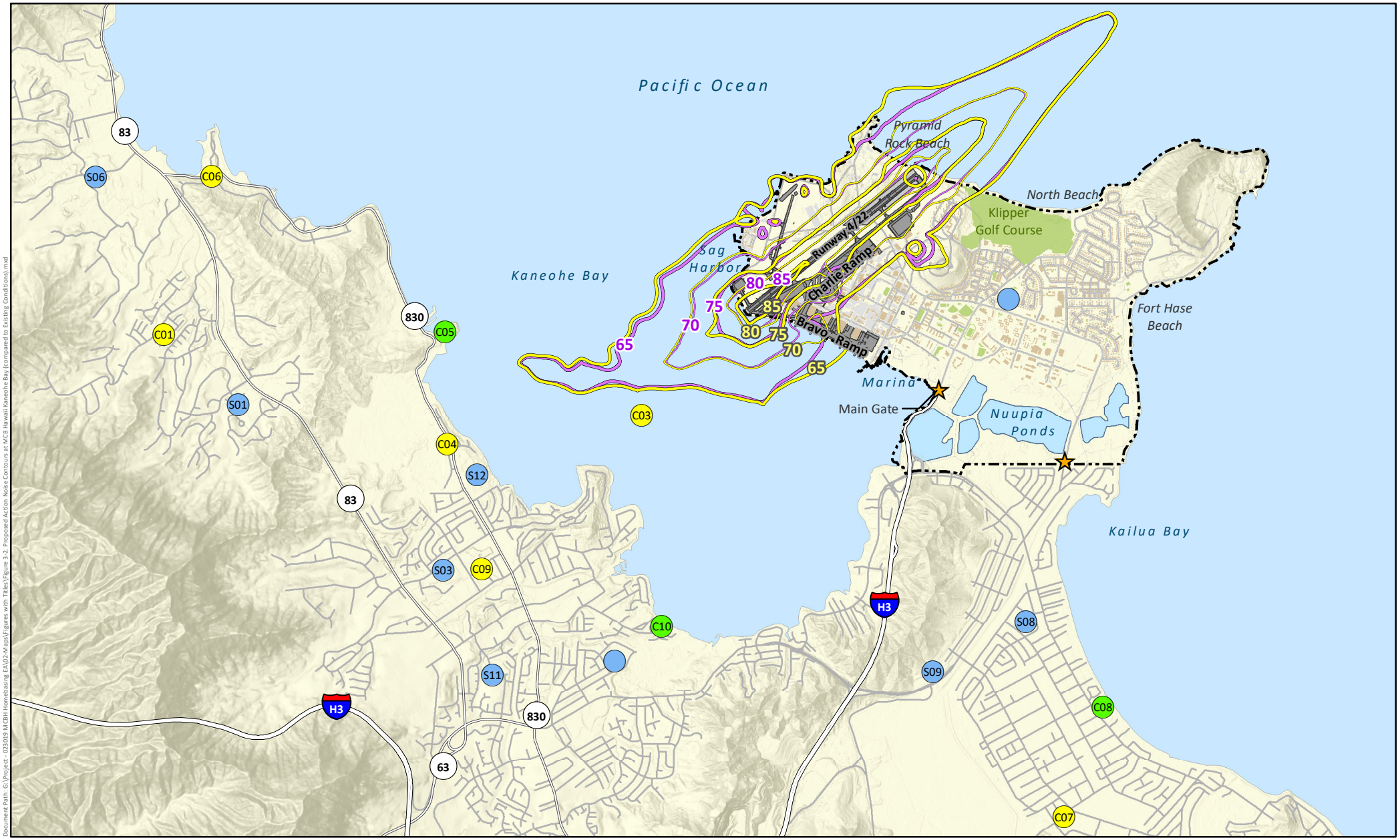


Figure 3-2. Proposed Action Noise Contours at MCB Hawaii Kaneohe Bay (compared to Existing Conditions)

MCB Hawaii Kaneohe Bay Boundary
Gate
Interstate
State Highway
Road
0 0.5 1 Miles

Airfield Pavement/Apron
Airfield Road
Building
Parking Area
Recreation Area

Point of Interest
Community Place
Park
School

Existing Aircraft Contours (DNL)
65 dB
70 dB
75 dB
80 dB
85 dB

Proposed Action Contours (DNL)
65 dB
70 dB
75 dB
80 dB
85 dB

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021

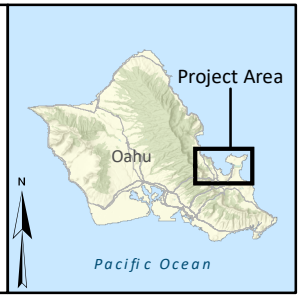


Table 3-1 Noise Contour Acreages at MCB Hawaii Kaneohe Bay

Noise Contour	*Existing Acreage*	*Proposed Acreage*	*Change*
65+	1,818	2,006	+188
70+	813	887	+74
75+	394	427	+32
80+	174	194	+20
85+	33	44	+11

Table 3-2 Existing and Proposed Average Noise Levels at Community Points of Interest

Point of Interest	*Existing*	*Proposed*	*Change*
Community			
C1: Ahuimanu	37	39	2
C2: Aikahi Community Park	44	45	1
C3: Coconut Island	58	58	<1
C4: He'eia	48	48	<1
C5: He'eia State Park	59	59	<1
C6: Kahulu'u	39	41	2
C7: Kailua	37	39	2
C8: Kalama Beach Park	38	40	2
C9: Kaneohe	43	43	<1
C10: Kaneohe Beach Park	50	50	<1
Schools			
S1: Ahuimanu Elementary School	39	40	1
S3: He'eia Elementary School	42	44	2
S4: James B. Castle High School	40	41	1
S5: Ka'ohao Public Charter School	36	39	3
S6: Kahalu'u Elementary School	37	39	2
S7: Kailua Intermediate School	37	39	2
S8: Kainalu Elementary School	39	40	1
S9: Kalaheo High School	39	41	2
S10: Kaneohe Elementary School	40	41	1
S11: Kapunahala Elementary School	40	41	1
S12: King Intermediate School	49	50	1

Note: Locations are shown in Figures 3-1 and 3-2.

The Marine Corps also compared the proposed action to noise levels from aircraft operations prior to the 2022 deactivation of the helicopter squadrons (MCB Hawaii, 2022d). Due to the historically higher number of operations and louder aircraft types (helicopters are louder than the proposed MQ-9 and KC-130J aircraft), this comparison indicates the proposed action would actually result in a decrease in noise levels compared to aircraft operations at the installation prior to 2022.

The Marine Corps appreciates the need to minimize aircraft noise in communities surrounding MCB Hawaii Kaneohe Bay and makes every effort to minimize noise consistent with their mission to ensure safe and effective operations of Marine Corps squadrons. Efforts to minimize noise includes providing the community with advance notice of busy air operations (e.g., air shows or large training events such as Rim of the Pacific, or "RIMPAC"), adjusting engine testing maintenance hours, adjusting and modifying flight tracks associated with arrivals and departures, and flying at higher altitudes. For example, local course rules direct aircraft to avoid residential areas generally, as well as avoid direct

overflight of Coconut Island on departure from Runway 22. On arrival to Runway 04, smaller and more maneuverable aircraft, such as the proposed MQ-9 aircraft, adopt nonstandard approach patterns to avoid Coconut Island entirely, notwithstanding it lies directly in the approach path of that runway. Larger and heavier aircraft are less maneuverable and may require overflight of the island to ensure safe arrival at the air station. These efforts to minimize aircraft noise experienced in residential areas would continue and are represented in the noise modeling results shown in Figure 3-2 and Tables 3-1 and 3-2.

For the reasons described above, Alternative 1 operations would have less than significant noise impacts on and around MCB Hawaii Kaneohe Bay.

3.2 Air Quality

This discussion of air quality includes criteria pollutants, standards, sources, permitting, and greenhouse gases (GHGs). The concentration of various pollutants in the atmosphere defines the air quality in a region or at a specific location. Many factors influence a region's air quality, including the type and quantity of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

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

3.2.1 Affected Environment

The air quality region of influence includes the east side of the island of Oahu in Honolulu County, where MCB Hawaii Kaneohe Bay is located, and the state of Hawaii for GHGs and climate change effects. The latest data from the DOH (2019) indicates the state is in attainment except for exceedances for sulfur dioxide (SO_2) and particulate matter less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$) in communities near the volcano on Hawaii Island (State of Hawaii, 2021), which is considered by the USEPA as a natural, uncontrollable event. Because the state is in attainment of the National Ambient Air Quality Standards (NAAQS), it is not subject to the Clean Air Act's (CAA's) General Conformity Rule.

Emission sources in operation at MCB Hawaii Kaneohe Bay generally include fuel combustion by aircraft engines and motor vehicles, boilers, and generators. A corrosion control hangar operates under a DOH Clean Air Branch "non-covered" (i.e., minor) emissions permit (NAVFAC Pacific, 2018).

3.2.2 Environmental Consequences

This analysis evaluates the effects on air quality based on estimated direct and indirect emissions associated with the proposed action.

3.2.2.1 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and there would be no change to air quality.

3.2.2.2 Alternative 1

Because the state of Hawaii is in attainment of the NAAQS, Alternative 1 is not subject to the CAA's General Conformity Rule. Alternative 1 would involve a change in aircraft operations and a modification to the existing minor stationary source air permit because of new and reconfigured buildings. Construction activities during implementation of Alternative 1 would generate short-term, temporary air emissions such as fugitive dust and combustion of fossil fuels from construction equipment.

Construction Impacts

The bulk of the proposed construction and demolition activities would be related to aircraft hangars and pavement. The proposed construction activities would occur over 5 years from 2023 to 2027. To predict air emissions from construction activities, this analysis estimated construction crew and equipment requirements and productivity based on data presented in:

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

This analysis first determined the type and quantity of equipment necessary to construct the proposed action. This evaluation assumes all equipment would be diesel-powered unless otherwise noted. Estimates of equipment emissions were based on the estimated hours of usage and emission factors for each anticipated mobile source. This analysis evaluated nitrogen oxides (NO_x), volatile organic compound (VOC), carbon monoxide (CO), carbon dioxide (CO_2), particulate matter less than or equal to 10 micrometers in diameter (PM_{10}), $PM_{2.5}$, and SO_2 related to heavy-duty diesel equipment and on road trucks and commuter vehicles from the USEPA's Motor Vehicle Emission Simulator emission factor model (USEPA, 2020). The earth disturbance related fugitive dust emissions were estimated based on the areas with potential ground disturbance and USEPA AP-42 PM emission factors. Table 3-3 summarizes the predicted annual construction emissions under Alternative 1.

The CAA Prevention of Significant Deterioration (PSD) Program applies to major stationary sources of air pollutants and requires a determination that a source does not significantly deteriorate the air quality in attainment areas. Under the PSD Program, the CAA identifies Significant Emission Rates for modifications of an existing major source. The emissions shown in Table 3-3 are used to determine *de minimis* emission rates for attainment areas within the region of influence.

Table 3-3 Alternative 1 Construction Activity Air Emissions Inventory

Year	*Emission (tons)*						
	VOC	***NO_x***	***CO***	***$PM_{2.5}$***	***PM_{10}***	***SO_2***	***CO_2***
2023	0.05	0.47	0.75	4.70	0.04	0.00	184.66
2024	0.04	0.38	0.72	0.02	0.04	0.00	160.52
2025	0.03	0.23	0.56	0.01	0.02	0.00	118.90
2026	0.07	0.59	1.59	0.03	0.06	0.00	300.30
2027	0.07	0.59	1.59	0.03	0.06	0.00	300.30
PSD Thresholds	40	40	100	10	15	15	–

Legend: CO = carbon monoxide; CO_2 = carbon dioxide; NOx = nitrogen oxides; PSD = Prevention of Significant Deterioration; Particulate Matter (PM: PM_{10} and $PM_{2.5}$ are particles with aerodynamic diameters less than or equal to a nominal 10 and 2.5 micrometers, respectively); SO_2 = sulfur dioxide; VOC = Volatile Organic Compound.

Proposed construction would result in short-term, intermittent air quality impacts on base due to the operation of construction equipment, vehicles, and privately-owned vehicles. Site clearing, grubbing, and grading would result in localized increases in particulate matter; however, all construction-related emissions would be below *de minimis* PSD threshold levels (see Table 3-3), and thus do not significantly deteriorate the attainment areas of Hawaii and Oahu. All construction activities would comply with the provisions of HAR 11-60.1-33, *Fugitive Dust*, and employ dust management Best Management Practices (BMPs) such as regular watering.

As a result of the temporary nature of the impacts, the distance to the closest downwind sensitive receptors (approximately 1 mile to the nearest residential area on Coconut Island), application of BMPs, and the prevailing northeast trade winds around MCB Hawaii Kaneohe Bay (Figure 3-3) that quickly disperse air pollutants, Alternative 1 construction would have less than significant impacts to air quality.

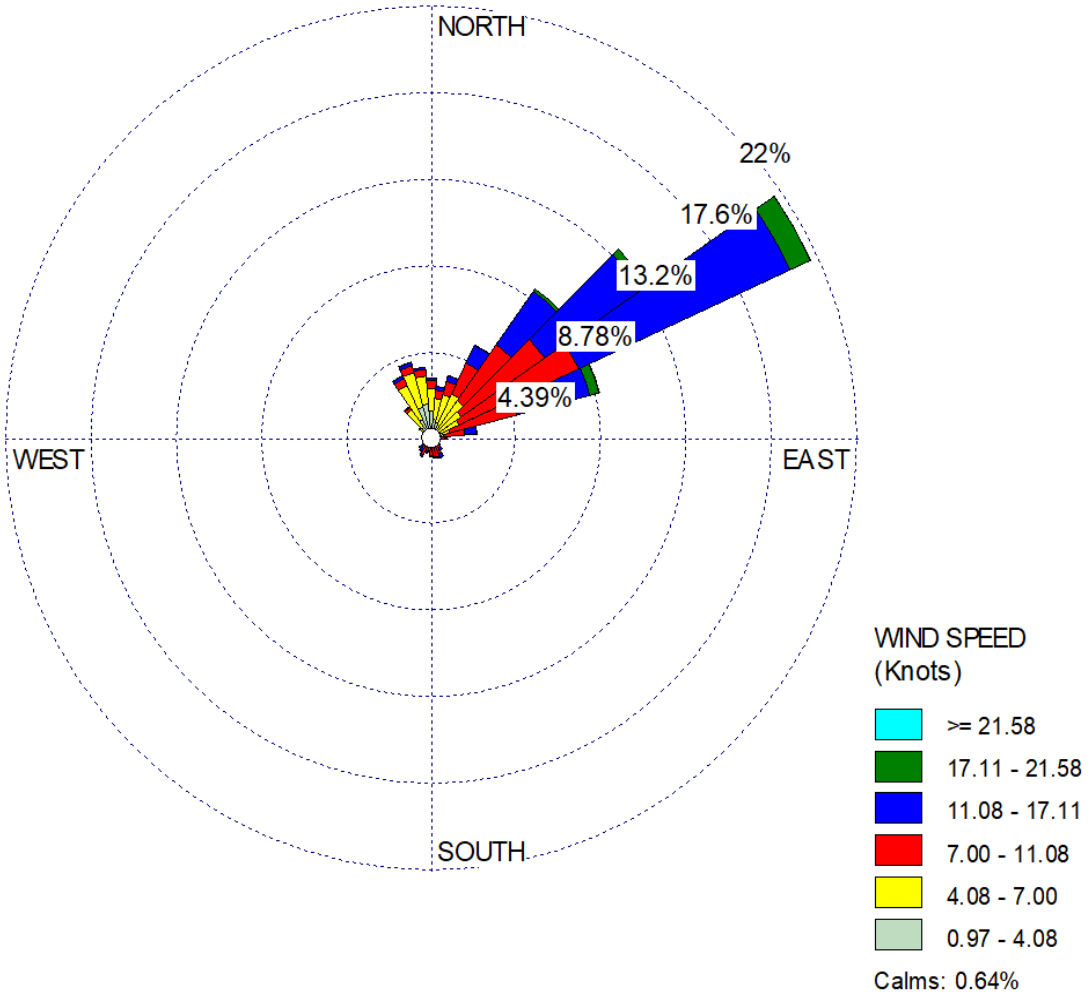


Figure 3-3 Wind Rose, Honolulu 5-year (2014-2018) Hourly Winds

With regard to GHGs, the total GHG emissions in terms of CO_2 generated within the state of Hawaii from the 5-year construction period would be approximately 1,065 tons. Construction activities associated with Alternative 1 would temporarily increase GHG emissions compared to the No-Action Alternative. Based on the statewide GHG projection of 12.85 million tons of GHGs for 2020 (DOH, 2021a), the estimated annual average GHG increase over the 5-year construction period would be less than 0.002 percent of the 2020 GHG projection. Such a temporary and small annual increase results in a less than significant impact to GHG emissions.

Operational Impacts

Alternative 1 would introduce new air emission sources from the new MQ-9 and KC-130J aircraft squadrons. Table 3-4 summarizes the estimated number of additional operations as compared to the No-Action Alternative on an annual basis.

Table 3-4 Net Change in Annual Aircraft Operations and Engine Maintenance Activities

Scenario	*MQ-9*		*KC-130J*	
	LTO	*Pattern*	*LTO*	*Pattern*
Net Change from No-Action Alternative to Alternative 1	250	0	640	1,973

Legend: LTO = landing and takeoff; Pattern = closed-loop pattern flights near airfield.

Air emissions occur during all phases of aircraft operation (landing and takeoff, idling, and in-flight). However, only those emissions emitted in the lower atmosphere's mixing layer have the potential to result in ground-level ambient air quality impacts. The mixing layer for aircraft emission calculations is the air layer extending from ground level up to 3,000 feet (USEPA, 1992). Table 3-5 summarizes the increase in aircraft emissions using the expertise from the Navy's Aircraft Environmental Support Office and the Air Force's *Air Emissions Guide for Air Force Mobile Sources* (Air Force Civil Engineer Center, 2018).

Table 3-5 Incremental Annual Operation Air Emissions

Scenario	*Emissions (tons/year)*						
	VOC	*NO_x*	*CO*	*$PM_{2.5}$*	*PM_{10}*	*SO_2*	*CO_2*
Net Increase from No-Action Alternative to Alternative 1	3.4	11.8	6.6	5.5	5.5	0.0	4,723
PSD Thresholds	40	40	100	10	15	40	–

Legend: CO = carbon monoxide; CO_2 = carbon dioxide; NO_x = nitrogen oxides; PSD = Prevention of Significant Deterioration; Particulate Matter (PM: PM_{10} and $PM_{2.5}$ are particles with aerodynamic diameters less than or equal to a nominal 10 and 2.5 micrometers, respectively); SO_2 = sulfur dioxide; VOC = Volatile Organic Compound.

While proposed operations would result in short, intermittent air quality impacts on base due to increased aircraft operations below the 3,000-foot mixing height, all emissions are well below PSD thresholds. As such, they would have no effect on the NAAQS attainment status for the state of Hawaii and the island of Oahu (see Table 3-5). In addition, the prevailing northeast trade winds around MCB Hawaii Kaneohe Bay (see Figure 3-3) quickly disperse air pollutants, and the closest downwind sensitive receptors (the nearest residential area), are approximately 1 mile away. This results in Alternative 1 operations having less than significant impacts to air quality.

Implementation of Alternative 1 would result in an increase of 4,723 tons per year of CO_2 as compared to the No-Action Alternative. This increase in GHG emissions from Alternative 1 was compared to the GHG emissions in Hawaii (DOH, 2021a). As of 2017, the statewide GHG emission limit of 15.28 million metric tons had been reached, and statewide GHG projections indicate Hawaii is on target to meet its statewide GHG emissions limit of 8.88 million metric tons for 2030 (DOH, 2021a). Based on this, the estimated GHG increase of 4,723 tons per year (4,284 metric tons per year), represents a.0005 percent increase in CO_2 as compared to 2030 GHG projections, and, as such, would not significantly impact Hawaii's ability to meet its GHG goals. In addition, the Marine Corps compared the proposed action to aircraft operations prior to the 2022 deactivation of the helicopter squadrons (MCB Hawaii, 2022d). This comparison indicates the proposed action would result in a decrease in aircraft operations compared to historic aircraft operations at the installation prior to 2022, with a corresponding decrease in GHG emissions.

3.3 Water Resources

Water resources include marine waters, groundwater, surface water, wetlands, floodplains, and drainages. This section identifies the existing condition of water resources and analyzes the impacts of the proposed action on those resources. The project area is the construction footprint of the proposed action and immediately adjacent lands. The region of influence for water resources includes the project area as well as the adjacent marine waters of Kaneohe Bay.

3.3.1 Affected Environment

Figure 3-4 shows the water features in the region of influence. Proposed activities occurring in the portion of the project area near the Kaneohe Bay shoreline would consist of demolition, renovations, and construction upon impervious surfaces that would follow standard construction conservation measures for control of runoff. Construction of the new washdown and refueling areas near Hangar 6886 would create 4.25 acres of new impervious surface.

3.3.1.1 Marine Waters

The Bravo Ramp portion of the airfield is adjacent to the marine waters of Kaneohe Bay. HAR 11-54, *Water Standards*, classifies Kaneohe Bay as marine water quality Class AA (DOH, 2021b). Fresh water enters this portion of Kaneohe Bay from rainfall, intermittent small streams, and surface drainage from MCB Hawaii Kaneohe Bay. Water in this shallow area mixes slowly with deeper waters of the bay (Kaneohe Bay Information System, 2022). Freshwater mixing within the bay occurs more in the winter; during the summer, fresh water remains at the surface.

3.3.1.2 Groundwater

Groundwater results from the infiltration of water through surface soils and permeable rock materials. The proposed project area is located on the western side of Mokapu Peninsula. Mokapu's thin layer of surface soil, combined with its layer of rock and sediments, provide little depth for groundwater drainage. Groundwater resources at Mokapu Peninsula, including the project area, consist of an unconfined, low salinity caprock aquifer above a confined, freshwater basalt aquifer. There are no potable water wells on the base because the peninsula sits atop an area of brackish basal groundwater (Mink and Lau, 1990; Stearns and Vaksvik, 1935; U.S. Geological Survey, 1968).

3.3.1.3 Surface Water

Surface water resources generally consist of ponds, lakes, rivers, and streams. The project area is located within the Koolau Poko watershed (a 65-square mile watershed subdivided into 19 sub-watersheds) and specifically within the Puu Hawaiiloa sub-watershed. Rainfall averages 40 inches per year (Rainfall Atlas of Hawaii, 2022). There are no freshwater surface waters in the project area. The closest surface water to the proposed action occurs at the Nuupia Ponds Complex, an estuarine system approximately 0.75 miles southeast of the proposed action. The project area collects and directs storm water runoff from inland areas of Mokapu Peninsula south to the Nuupia Ponds Complex, ultimately connecting to Kaneohe Bay.

3.3.1.4 Wetlands

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

Document Path: G:\Project - 023019 MCBH Homebasing EA\02-Maps\Figures with Titles\Figure 3-4. Water Resources and Flood Zones at MCB Hawaii Kaneohe Bay.mxd

Figure 3-4. Water Resources and Flood Zones at MCB Hawaii Kaneohe Bay

MCB Hawaii Kaneohe Bay Boundary
Installation Fence
Airfield Pavement/Apron
Airfield Road
Building
Installation Road
Parking Area
0 500 1,000 Feet

Groundwater Sample Location

Stormwater Features
Culvert
Drop Inlet
Other Feature

Wetland
Point
Polygon

Inundation
Extreme Tsunami Evacuation Zone
Tsunami Evacuation Zone
Safe Zone

FEMA Flood Zones
AE - The base floodplain where base flood elevations are provided
D - Areas with possible but undetermined flood hazards.
VE - Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves.

Proposed Action
MQ-9 Ground Data Terminal (Notional Location)
Fence
Construction
Demolition
Renovation
Ramp Improvement
Construction Staging Area

Pacific Ocean
Project Area
N
H-3

Sources: Esri, 2021; FEMA, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021

Wetlands generally include "swamps, marshes, bogs and similar areas." Eight protected wetland complexes are located at MCB Hawaii Kaneohe Bay: (1) Hale Koa Wetland; (2) Sag Harbor Wetland; (3) Salvage Yard Wetland; (4) Percolation Ditch Wetland; (5) Motor Pool Wetland; (6) Kaneohe Klipper Golf Course Ponds; (7) Temporary Lodging Facility Wetland; and (8) Nuupia Pond Complex, a designated and protected Wildlife Management Area that harbors endangered flora and fauna. There are no wetlands located within the project area. The closest wetland is the Sag Harbor Wetland, which is about 0.45 miles west of Charlie Ramp (see Figure 3-4). The Hale Koa Wetland is located along the coast, northeast of the Sag Harbor Wetland, about 0.5 miles northwest of Runway 04/22 and adjacent to West Field.

3.3.1.5 Floodplains

There are two types of flood-designated areas at MCB Hawaii Kaneohe Bay: flood zones designated by the Federal Emergency Management Agency (FEMA) and shown in Flood Insurance Rate Maps; and floodplains specific to the Mokapu Central Drainage Channel (NAVFAC Pacific, 2017). The project area is in FEMA Zone D, an area where flood hazards are possible, but undetermined (see Figure 3-4). Coastal regions adjacent to the project area to the west and north are in FEMA Zones VE (1 percent [%] or greater annual chance of coastal flooding and an additional hazard of storm waves), and AE (1% annual chance of flooding). Portions of the proposed action are within the Extreme Tsunami Evacuation Zone.

The proposed action is in a developed area with the runway and aviation facilities dominating the western area and a portion of the south edge along Kaneohe Bay. Box culverts drain the runway area southward to the bay. Other box drains discharge runoff west of the runway to the ocean. The base main cantonment area east of the runway is drained by a series of pipe drain systems primarily to Kailua Bay. A narrow center portion of the base covering an area east of G Street to Craig Avenue is drained by a channel discharging southward into Kaneohe Bay. The east side of the base drains southward via pipe systems and a channel into the Nuupia Ponds.

3.3.2 Environmental Consequences

This analysis focuses on the potential impacts of the proposed action on marine waters, groundwater, surface water, wetlands, and floodplains. No changes to both the on-base or off-base wastewater management systems would be required for the proposed action. Groundwater analysis focuses on the potential for impacts to the quality, quantity, and accessibility of groundwater; and marine and surface water quality considers the potential for impacts to improve or degrade current water quality. The impact assessment of wetlands considers the potential for impacts to the hydrology, soils, and vegetation that support a wetland. The analysis of floodplains considers if any new proposed construction is within a floodplain and whether the project may impede the functions of floodplains and drainage systems in conveying floodwaters.

3.3.2.1 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and there would be no change to water resources.

3.3.2.2 Alternative 1

Construction Impacts

The construction supporting the proposed action would involve renovation and replacement of facilities with new facilities constructed in impervious surface areas, with two exceptions: the proposed KC-130J Aircraft Direct Refueling System and a portion of the proposed KC-130J wash rack and storage facility

(see Figure 2-7). Construction of these two projects would disturb 4.25 acres of landscaping, but would not disturb marine waters, groundwater, surface waters, or wetlands. The project design features in Table 2-5 (such as bioretention, vegetated swales, and pervious pavement), are designed to manage storm water volumes to prevent any potential flooding or ponding at or near the project area. As such, there would not be an increase in the volume of water entering wetlands.

Coastal regions adjacent to the project area to the west and north are in FEMA flood zones. Per Executive Order 13690, it is the policy of the United States to improve the resilience of federal assets against the impacts of flooding. The proposed action would be designed to account for this increased flood risk potential. In addition, the project design features in Table 2-5 would be implemented to manage storm water volumes and minimize any potential flooding or ponding at or near the project area. The adjacent Construction Staging Area would be managed with appropriate conservation measures to reduce any temporary risk of increases in runoff and pollution. This project area does not overlie a drinking water source and is not located near any freshwater surface waters or wetlands.

During all construction activities, site preparation, grading, grubbing, demolition of existing facilities, and utility trenching may indirectly result in soil erosion, sedimentation, and transport of pollutants with a potential to reach downstream waters. A CWA-mandated NPDES permit would be required for the proposed action. This NPDES storm water permit would include development of a site-specific construction Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would identify BMPs such as runoff detention basins and silt fencing to reduce the potential for soil, sediment, and pollutants to be transported off-site. Application of conservation measures described in Section 2.3, along with the additional NPDES permit conditions and LID site design features, would minimize runoff and any pollutants and sediment conveyed by surface runoff, ensuring that adverse impacts to wetlands and surface waters are less than significant. Conservation measures for sediment control include the use of silt fences, storm drain inlet protection measures, sediment traps, and sediment basins. Removed materials, debris, and soil resulting from construction activities would be contained and properly disposed of in accordance with applicable regulations.

Operational Impacts

Following construction, all storm water runoff from operations would be managed by existing on-site storm drainage infrastructure. The proposed KC-130J Aircraft Direct Refueling System would have a 3.77-acre footprint located approximately 0.5 miles from any water resource, and it would be managed like the other refueling locations at the airfield. In addition, this location is not near drinking water sources because there are no potable water wells on base. The KC-130J Aircraft Direct Refueling System would contain UFC 3-460-01 spill prevention and containment systems and be located on an impervious surface with dedicated valving, meters, control valves, and instrumentation designed to capture and contain any potential fuel spills. The proposed Aircraft Direct Refueling System would also include oil/water separators. These are connected to the wastewater system, further isolating these areas from the storm water system. Following oil separation and its storage in separate tanks, the remaining water is then discharged to the on-base wastewater treatment facility. These sites and the oil/water separator systems are subject to regular inspection and maintenance. In addition, LID techniques such as bioretention, vegetated swales, and vegetated filter strips would be installed to meet CWA permit requirements for the management of storm water. Finally, the proposed location is being sited approximately 3,000 feet from freshwater resources and 1,800 feet from the nearest point of Kaneohe Bay to further reduce the possibility of any potential spill impacting freshwater resources or Kaneohe Bay.

The proposed wash rack would have a footprint of 0.45 acre and is located approximately 1,500 feet from any water resource. It would be constructed in a partly open area near Hangar 6886 and consist of an impervious surface like other wash racks at the airfield. The wash rack would be designed and operated in accordance with LID protocol and include an oil/water separator similar to the one proposed for the Aircraft Direct Refueling System to handle the rinse water before it is discharged into the on-base sewer system. The Marine Corps conducts required periodic water quality testing for all wash rack facilities. The oil/water separators are cleaned and analyzed for volatiles, polychlorinated biphenyls, oil range organics, and metals on a normal maintenance schedule.

Approximately 4.25 acres of new impervious surface area at the installation would result from the proposed action. This is a small change in impervious area at the installation representing only a 2% increase in impervious areas along the flightline and less than 1% increase of the impervious areas on the installation. As discussed above, all new facilities would be constructed with LID elements and appropriate conservation measures to maintain storm water discharges to pre-development hydrologic conditions and the storm water pollution control measures would comply with the installation NPDES MS4 permit. As such, this small increase in impervious surface consisting of activities presently found on MCB Hawaii Kaneohe Bay, results in less than significant impacts to the amount and type of storm water flow going into Kaneohe Bay.

There would be less than significant impacts to drinking water because there are no potable water wells on the base. MCB Hawaii coordinates with the City and County of Honolulu Board of Water Supply regarding drinking water use. Although the proposed action would introduce an increase in personnel and flight operations compared to baseline conditions, the net change would be a decrease of personnel and operations compared to historic personnel populations at the installation prior to 2022 (see Chapter 4, *Cumulative Impacts*).

The proposed action would utilize the fire response systems currently in use at the installation and within the hangars. Per- and polyfluoroalkyl substances (PFAS) and perfluorooctanoic acid (PFOA) chemicals in aqueous film-forming foam (AFFF) are no longer allowed for use in fire response systems, and all PFAS/PFOA AFFF has been removed from MCB Hawaii. This PFAS/PFOA AFFF had been replaced with approved military specification AFFF (PFAS/PFOA free), but this will also be phased out of use in 2023. In the event of inadvertent release of military specification AFFF within a hangar or by firefighting crews, actions would be taken to contain the AFFF, preventing release to nearshore waters or the installation's wastewater and storm water sewer systems. Marine Corps guidance for managing any AFFF releases has been established and implemented to provide direction. The new hangar constructed to replace Hangar 103 would comply with UFC 4-211-01, *Aircraft Maintenance Hangars* (DoD, 2021), which calls for a Low Level Water fire protection system in lieu of AFFF.

For the reasons described above, Alternative 1 would have less than significant impacts to water resources.

3.4 Cultural Resources

Cultural resources are the physical evidence or places of current and past human activity. This analysis of cultural resources addresses two major categories: archaeology and architecture. Archaeological resources are locations where human activity measurably altered the earth and/or left deposits of physical remains, and architectural resources include standing buildings, structures, and other built-environment resources of historic or aesthetic significance. Archaeological and architectural resources can be grouped together to comprise a district or landscape.

Traditional cultural properties are "eligible for inclusion in the NRHP based on associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community" (National Park Service, 2012). No known traditional cultural properties (TCPs) exist in the project area or on the Mokapu Peninsula (Tomonari-Tuggle, 2014; MCB Hawaii, 2018). MCB Hawaii contacted Native Hawaiian Organizations affiliated with Mokapu Peninsula, and they did not identify TCPs associated with the project area, nor did they propose new TCPs for listing. Therefore, no further analysis of TCPs is included in this EA.

The Marine Corps initiated Section 106 consultation with the Hawaii SHPD for the undertaking on 6 January 2022 and concluded the proposed undertaking would result in an adverse effect on historic properties. In a letter dated 7 February 2022, the SHPD concurred with the determination of adverse effect and directed the Marine Corps to take into consideration comments received from the public and interested parties, which may result in the identification of additional historic properties and/or raise additional concerns regarding project impacts, as part of the Section 106 consultation process. Consultations concluded with a MOA signed by the Marine Corps, the SHPD, and the ACHP.

3.4.1 Affected Environment

The project area of potential effects (APE) includes the location of the proposed action, as well as areas outside the project area that may be affected by construction activities or the presence of the new facilities. The APE for the project consists of the NAS Kaneohe NHL District; the NAS Kaneohe Historic Aviation District (Aviation District); the Mokapu House Lots Archaeological District at Pali Kilo; and areas adjacent to the Aviation District along First Street, in West Field, south and east of Charlie Ramp, and north and east of the transient ramp (Figure 3-5).

3.4.1.1 Historical Background

The project area is in the western portion of the Mokapu Peninsula, which lies within the traditional Hawaiian moku (district) of Koolaupoko. One of six districts of Oahu, Koolaupoko is divided into 11 *ahupua'a* (traditional land divisions that are further divided into *'ili* [traditional land subdivisions]). Mokapu Peninsula falls within two different *ahupua'a*: Heeia in the west and Kaneohe in the east (Tuggle and Hommon, 1986). The peninsula was divided further into seven *'ili*, including the westernmost *'ili* of Mokapu.

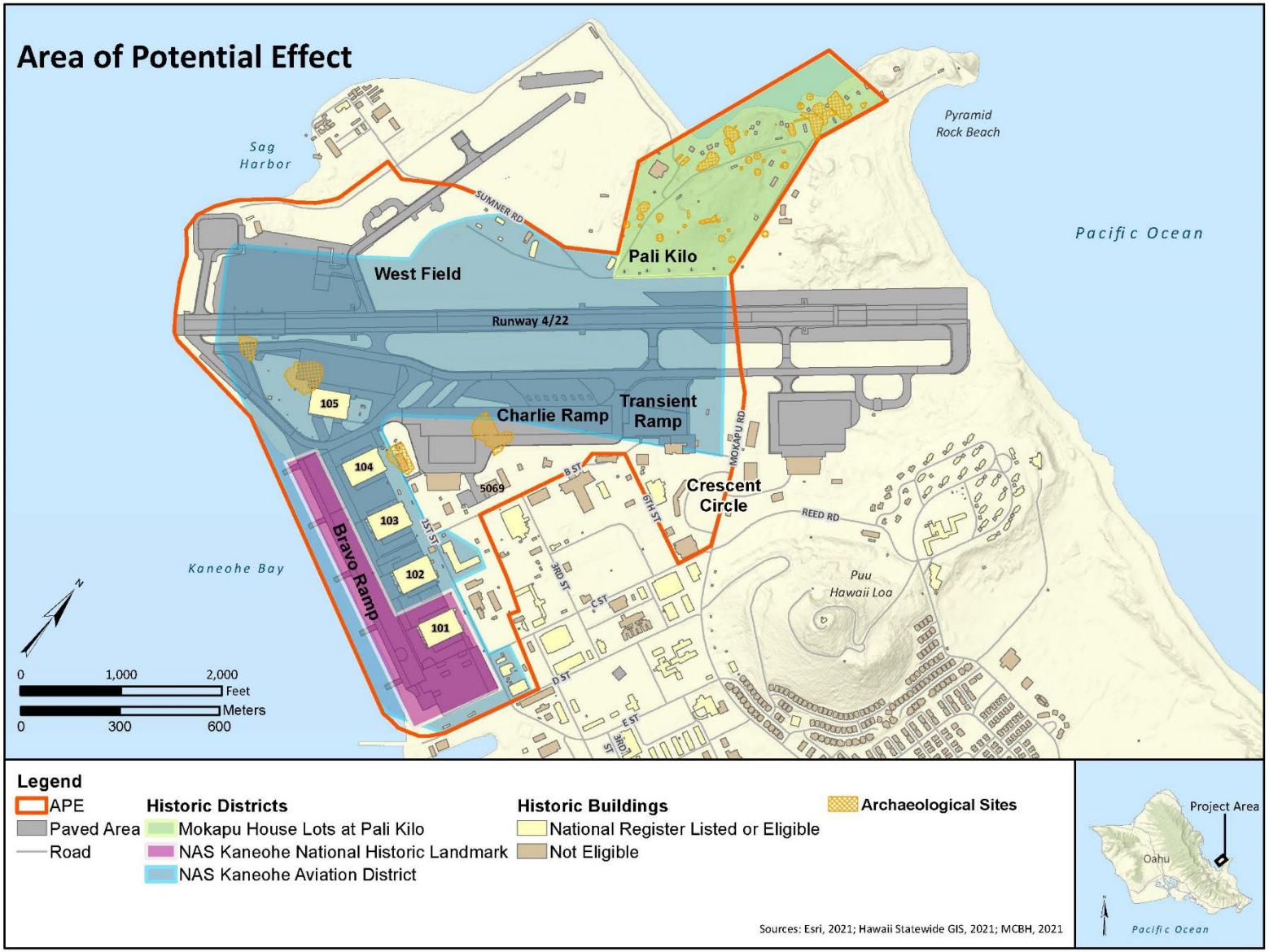


Figure 3-5 Area of Potential Effects

Archaeological evidence indicates that people lived on or came to Mokapu Peninsula at least 500 to 800 years before Western contact (Tomonari-Tuggle and Clark, 2021). The occupants of the peninsula employed small-scale subsistence farming and fishing and intermittently inhabited areas for resource cultivation or gathering. They developed fisheries, fishponds, fish traps, and fishing shrines as part of a robust system of aquaculture, fishing, and marine resource collection. The inhabitants of the peninsula most likely continued their traditional way of life based on fishing and subsistence farming well after Western contact in 1778 and into the 19th century. In Hawaiian archaeology, the year 1778 is typically defined as the divide between the "Pre-contact" and "Post-contact" periods. In some areas, such as Mokapu, change was slow to appear, and traditional lifeways continued for several decades after initial contact (MCB Hawaii, 2018).

At the beginning of the 20th century, the population of Mokapu Peninsula was sparse and the area was dominated by grazing, farms, and fishponds. The first military land use began on the peninsula with the establishment of the U.S. Army's Kuwaaohe Military Reservation in 1918. It was not extensively developed and was deactivated and leased for ranching after World War I (MCB Hawaii, 2018).

With the construction of the installation known as NAS Kaneohe Bay in 1939, a new military presence on the peninsula began in response to the looming threat of WWII. The Navy first acquired the Heleloa tract (former Heleloa *'ili*) for a seaplane base, followed by the Mokapu tract (former Mokapu *'ili*) for a land-based airfield. Much of the initial work of constructing the base was dredging and filling; on the bay side, these activities deepened the water landing zone and expanded the peninsula by 280 acres, transforming much of the western coastline. Figure 3-6 shows the historic coastline prior to the 1939 development and expansion of the installation. Most of Bravo Ramp and associated hangars (Hangars 101, 102, 103 and a portion of 104) are located on fill material placed after 1928. In addition, these fill materials are in an area that was nearshore waters of the bay, so subsurface archaeological deposits are unlikely in this area.

Between 1941 and 1945, the Army and the Navy substantially expanded operations and installations in Hawaii. In tandem with the Navy's development of what was then known as NAS Kaneohe Bay, the Harbor Defenses of Kaneohe Bay were established as a new command of the U.S. Army's Coast Artillery Corps. Part of an internationally significant event that changed the course of world history, NAS Kaneohe Bay was targeted in the 7 December 1941 Japanese attack on Oahu, suffering substantial damage, especially to its hangars and aviation areas. The U.S. entry into WWII immediately after the attack accelerated construction of NAS Kaneohe Bay with rapid construction of additional aviation facilities and cantonment areas. Expansion focused on accommodating units that were transiting to the Pacific front near Japan.

Major military construction ceased at the end of WWII. NAS Kaneohe Bay was decommissioned in 1949. As Cold War tensions rose in the Pacific, in January 1952, NAS Kaneohe Bay was reactivated as MCAS Kaneohe amid the U.S. military's renewed focus in the Pacific theater in response to the Korean War. Both NAS Kaneohe Bay and the Army's Fort Hase were incorporated into one installation covering the entire peninsula as MCAS Kaneohe Bay.

The Marine Corps consolidated their property and commands under MCB Hawaii Kaneohe Bay on 15 April 1994. This became the headquarters for MCB Hawaii, a single command that includes seven other noncontiguous installations in the state (MCB Hawaii, 2018).

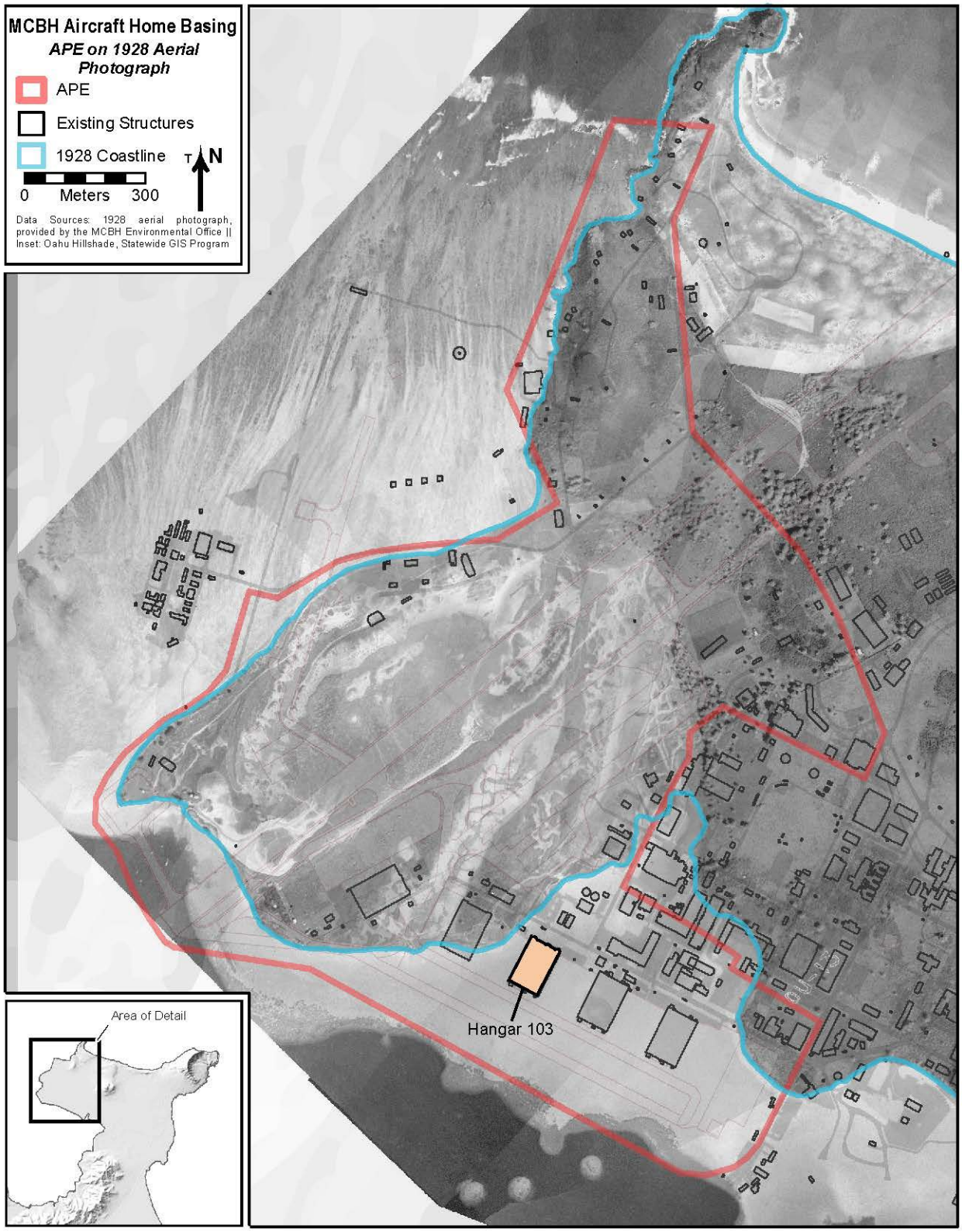


Figure 3-6 Historic Coastline at MCB Hawaii Kaneohe Bay

3.4.1.2 Archaeological Resources

MCB Hawaii has conducted numerous inventories of cultural resources to identify properties that are eligible for listing in the NRHP. The results of these studies are summarized in MCB Hawaii's *Integrated Cultural Resources Management Plan* (Tomonari-Tuggle and Clark, 2021), and *Cultural Landscape Report* (MCB Hawaii, 2018). Within the APE boundary are 31 documented archaeological sites. They can be divided into three age and functional categories: traditional Hawaiian, non-military historic, and military historic. Typical of the Mokapu Peninsula, most sites are traditional Hawaiian in association, including six surface sites identified by their Hawaii State Inventory of Historic Properties site numbers: (50-80-11-365, 367, 4616, 4619, 4620, and 4622) and eight subsurface sites (50-80-11-2883, 4453, 4933, 5733, 5829, 7722, 7723, and 7724). Twelve sites (50-80-11-4610, 4611, 4612, 4613, 4614, 4617, 4618, 4621, 4624, 4625, 5968, and 7725) are associated with non-military historic-period activities. Finally, five are military sites associated with WWII (50-80-11-2884, 4615, 4623, 5969, and 7726). Additionally, two traditional subsurface sites (50-80-11- 1017 and 4891) are located outside, but within 60 meters of the APE.

These sites generally cluster in two locations:

- The northern cluster is centered on the slopes of Pali Kilo and includes sites from all three periods, both subsurface and aboveground. Relatively little development or land modification has occurred in this area in comparison to the flightline and aviation areas in the APE. At least 16 sites in this area are considered contributing to the NRHP-eligible Mokapu House Lots Archaeological District (Table 3-6).
- The southern cluster of archaeological sites within the APE includes three subsurface traditional Hawaiian cultural deposits (50-80-11-4453, 4933, and 5829, which also contains non-military historical materials) east of the runway near Kaneohe Bay. These sites are below the fill land that underlays much of the flightline. While previous surface components of these sites were destroyed during early 20th-century land reclamation and the construction of the runway, archaeological monitoring of construction projects has encountered several areas of intact subsurface cultural deposits southeast of the runway. These sites, in sandy deposits of a former estuary, represent traditional Hawaiian habitation and contain firepits, post molds, shell midden and artifacts, charcoal, and intact burials. More than 1,500 sets of human remains have been uncovered across Mokapu Peninsula, with two primary burial areas within the northern dunes (Mokapu Burial Area, Site 1017), and Ulupau Dune along the peninsula's East Coast (Tomonari-Tuggle and Clark, 2021:II-60). These are outside the APE, though the Mokapu Burial Area is near the northeastern edge of the APE.

Table 3-6 Archaeological Sites Within the APE

SIHP Site No. 50-80-11-	District/ Area	Period	Site Description	NRHP Status (Significance Criterion)	References
365	MHLAD; MPPA (Proposed)[b]	TH	Possible remnants of *heiau*; on southern slope of Keawanui; location of St. Catherine's Catholic Church in 1840s; O'Day, 2007 suggests that Sites 4619, 4620, 4622, and Temp Site 1 could define two sides of *heiau*	NRE-yes (Criterion D) [b]	Thrum, 1915; MacCaughey, 1917; McAllister, 1933; Ruzicka and O'Day, 2005; O'Day, 2007; Nickelsen and Kirkendall, 2008a
367	MHLAD; MPAA (Proposed)	TH	Hina Stone; elongated waterworn boulder; one of three features including a fishing shrine with two uprights representing Kāne and Kanaloa, a fish trap (Pa Ohua), and shrine with two stones representing Ku and Hina; damaged in 2009	NRE-yes (Criteria B, C, D)	MacCaughey, 1917; McAllister, 1933; Drolet et al., 1996; Schilz et al., 1996; Ruzicka and O'Day, 2005; Nickelsen and Kirkendall, 2008b
2883	MHLAD; MPAA (Proposed)	TH; NM	Subsurface cultural deposits from pre- and post-Contact periods and pre-WWII house sites; pre-Contact deposit possibly continuous with 5733	NRE-yes (Criterion D)	Barrera, 1982; Tuggle and Hommon, 1986; Drolet et al., 1996; Anderson, 1998; Ruzicka and O'Day, 2005; O'Day, 2007; Nickelsen and Kirkendall, 2008c
2884	--	M	Four concrete house foundations, ca. WWII	NRE-yes (Criteria not given)	Tuggle and Hommon, 1986; Drolet et al., 1996; Prishmont et al., 2001
4453	MPAA (Proposed)	TH	Subsurface cultural deposit with pit features, postmolds, shell midden, charcoal; intact burials	NRE-yes (Criterion D)	Charvet-Pond and Rosendahl, 1992a, 1992b; Prishmont and Anderson, 2000; Prishmont et al., 2001; Gosser et al., 2002; Rasmussen, 2007; Nickelsen and Kirkendall, 2008d; Walker et al.,2022
4610	MHLAD	NM	House terrace/complex	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005; Gosser et al., 2015
4611	MHLAD	NM	House site; pre-WWII	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005
4612	MHLAD	NM	House site; pre-WWII to 1943	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005; Allen, 2013
4613	--	NM	Stone wall and historic walkway	NRE-yes (Criterion D)	Drolet al. al, 1996; Allen, 2013

Table 3-6 Archaeological Sites Within the APE

SIHP Site No. 50-80-11-	*District/ Area*	*Period*	*Site Description*	*NRHP Status (Significance Criterion)*	*References*
4614	MHLAD	NM	House site; pre-WWII	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005; Allen, 2013
4615	--	M	Underground storage room; exterior door labeled "Paint Locker;" probable post-WWII	NRE-yes (Criteria not given)	Drolet et al., 1996; Allen, 2013
4616	MPAA (Proposed)	TH	Low basalt cobble and boulder wall	NRE-yes (Criterion D)	Drolet et al., 1996; Nickelsen and Kirkendall, 2008e
4617	MHLAD	NM	House site; pre-WWII	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005
4618	MHLAD	NM	Building cluster; pre-WWII	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005
4619	MHLAD; MPAA (Proposed)	TH	Pavement w/ 2 waterworn uprights; on slope of Keawanui Hill; may be	NRE-yes (Criteria C, D)	Nickelsen and Kirkendall, 2008f; Ruzicka and O'Day, 2005
4620	MHLAD	TH	Enclosure; circular; on upper east facing slope of Keawanui Hill; may be part of Site 365 *heiau*	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005; O'Day, 2007; Nickelsen and Kirkendall, 2008g
4621	--	NM	Building foundation	Not applicable	Drolet et al., 1996
4622	MHLAD; MPAA (Proposed)	TH	Rock and coral piles; may be part of Site 365 *heiau*	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005; O'Day, 2007; Nickelsen and Kirkendall, 2008h
4623	MPAA (Proposed)	M	C-shaped structure; corrugated tin and glass bottles on surface; probable military	NRE-yes (Criterion D)	Drolet et al., 1996; Ruzicka and O'Day, 2005; O'Day, 2007; Nickelsen and Kirkendall, 2008i; Allen, 2013
4624	MPAA (Proposed)	NM	Enclosure; low walls, rectangular, 11 x 7 m; concrete slab fragment on surface; probably historic-period house	NRE-yes (Criterion D)	Drolet et al., 1996; O'Day, 2007; Nickelsen and Kirkendall, 2008j; Allen, 2013
4625	MHLAD	NM	House site; pre-WWII	NRE-yes (Criterion D)	Ruzicka and O'Day, 2005

Table 3-6 Archaeological Sites Within the APE

SIHP Site No. 50-80-11-	*District/ Area*	*Period*	*Site Description*	*NRHP Status (Significance Criterion)*	*References*
4933	MPAA (Proposed)	TH	Subsurface cultural deposit with pits, postholes, firepits; bone arrow point	NRE-yes (Criterion D)	Schilz and Allen, 1996; Rechtman and Wolforth, 2000; Allen, 2000; Prishmont et al., 2001; Gosser et al., 2002; Nickelsen and Kirkendall, 2008k
5733	MPAA (Proposed)	TH; NM	Subsurface cultural deposits; traditional Hawaiian and 19th century; 20th century house and yard; in dune on west-facing slope of Pali Kilo	NRE-yes (Criterion D)	Rosendahl, 1999; O'Day, 2007; Nickelsen and Kirkendall, 2008l; Gosser et al., 2015
5829	MPAA (Proposed)	TH	Subsurface cultural deposit, burials; around Building 6470, north of Hangar 104	NRE-yes (Criterion D)	Prishmont et al., 2001; Roberts et al., 2002; Dixon et al., 2002; Nickelsen and Kirkendall, 2008m; Allen and Rieth, 2014; Allen, 2015; Barna et al., 2017
5968	--	NM	Historic basalt retaining wall, possibly associated with the Mokapu Experimental Game farm	TBD [b]	Roberts et al., 2002
5969	--	M	Concrete foundation; immediately west of Keawanui	TBD	Roberts et al., 2002
7722	MHLAD	TH	Subsurface cultural deposit	NRE-yes (Criteria C, D)	Gosser et al., 2015
7723	--	TH	Intact but disturbed human burial remains; sparse traditional Hawaiian artifacts	Not applicable	Gosser et al.,2015
7724	MHLAD	TH	Disturbed subsurface cultural deposit (including one human tooth)	NRE-yes (Criteria C, D)	Gosser et al., 2015
7725	MHLAD	NM	Retaining wall	NRE-yes (Criteria C, D)	Gosser et al., 2015
7726	--	M	Concrete foundations; WWII-era	NRE-no	Gosser et al., 2015

Notes: [a] Site descriptions and period designations are reproduced from the updated ICRMP (Tomonari-Tuggle and Clark, 2021:Table II-7).

[b] MHLAD: Mokapu House Lots Archaeological District; MPAA (Proposed): Mokapu Peninsula Archaeological Area (Proposed). M: Military. NM: Non-military Historic. TH: Traditional Hawaiian. NRE: National Register Eligible; TBD: to be determined (no eligibility evaluation).

[c] Site is located within 60 meters of the APE.

[d] Site is located within 5 meters of the APE.

Archaeological sensitivity varies across the peninsula. Sensitivity zones at MCB Hawaii Kaneohe Bay, including the area of the current APE, are described in the Integrated Cultural Resources Management Plan (ICRMP) (Tomonari-Tuggle and Clark, 2021). As shown in Figure 3-6, land in the western and southern portions of the APE consist of fill deposited on marine sediments and has the potential for intact archaeological resources. Parts of the APE in the original extents of Mokapu Peninsula prior to land reclamation range from low to high archaeological sensitivity, with the highest sensitivity areas at, and north of, Pali Kilo; and near the former estuary along Kaneohe Bay. In the latter area, fill often overlays intact natural sediments that may include archaeological deposits. Land modification was less intensive in the northern portion of the APE (at Pali Kilo), and both surface and subsurface archaeological resources may be encountered. In the event of inadvertent discoveries of *iwi kupuna* (Native Hawaiian human remains) or associated objects, established Native American Graves Protection and Repatriation Act (NAGPRA) regulations direct the response. MCB Hawaii takes stewardship of these archaeological resources seriously and has established and disseminated processes to follow in the event of an inadvertent discovery of *iwi kupuna*. Currently, a Standard Operating Procedure in the 2021 MCB Hawaii ICRMP is followed if human skeletal remains are found (ICRMP Standard Operating Procedure 6, Tomonari-Tuggle and Clark, 2021). Moving forward, MCB Hawaii is developing a NAGPRA Comprehensive Agreement, which will supersede this Standard Operating Procedure.

3.4.1.3 Architectural Resources

The APE encompasses historic architectural resources that are NRHP listed or eligible (Figure 3-7; Table 3-7). These include buildings and structures that are both individually eligible or contribute to one or both of two historic districts: the NRHP listed NAS Kaneohe NHL District and the NRHP-eligible NAS Kaneohe Aviation District. The NHL was listed due to its exceptional significance for its association with the 7 December 1941 Japanese attack on Oahu. As summarized in the NHL nomination form, the "historic district includes the following nationally significant features: hangar no. 1 [Hangar 101], the parking area between the hangars and Kaneohe Bay [a portion of this area is referred to as Bravo Ramp], and the five [seaplane] ramps." Hangars 102 and 103, built in 1941, the three ancillary aircraft spares storage buildings (Buildings 159, 160, and 161) built in 1942, and Buildings 183 and 184 (built in 1942-1943) are individually NRHP-eligible and are also contributing resources to the NRHP-eligible Aviation District. Although not part of the proposed action, the historic Hangars 104 and 105 complete the line of historic hangars between 1st Street and Bravo Ramp. All the hangars (101 through 105) are contributing resources to the Aviation District. The NAS Kaneohe Aviation District is significant for its association with the buildup of the airfield prior to and during WWII.

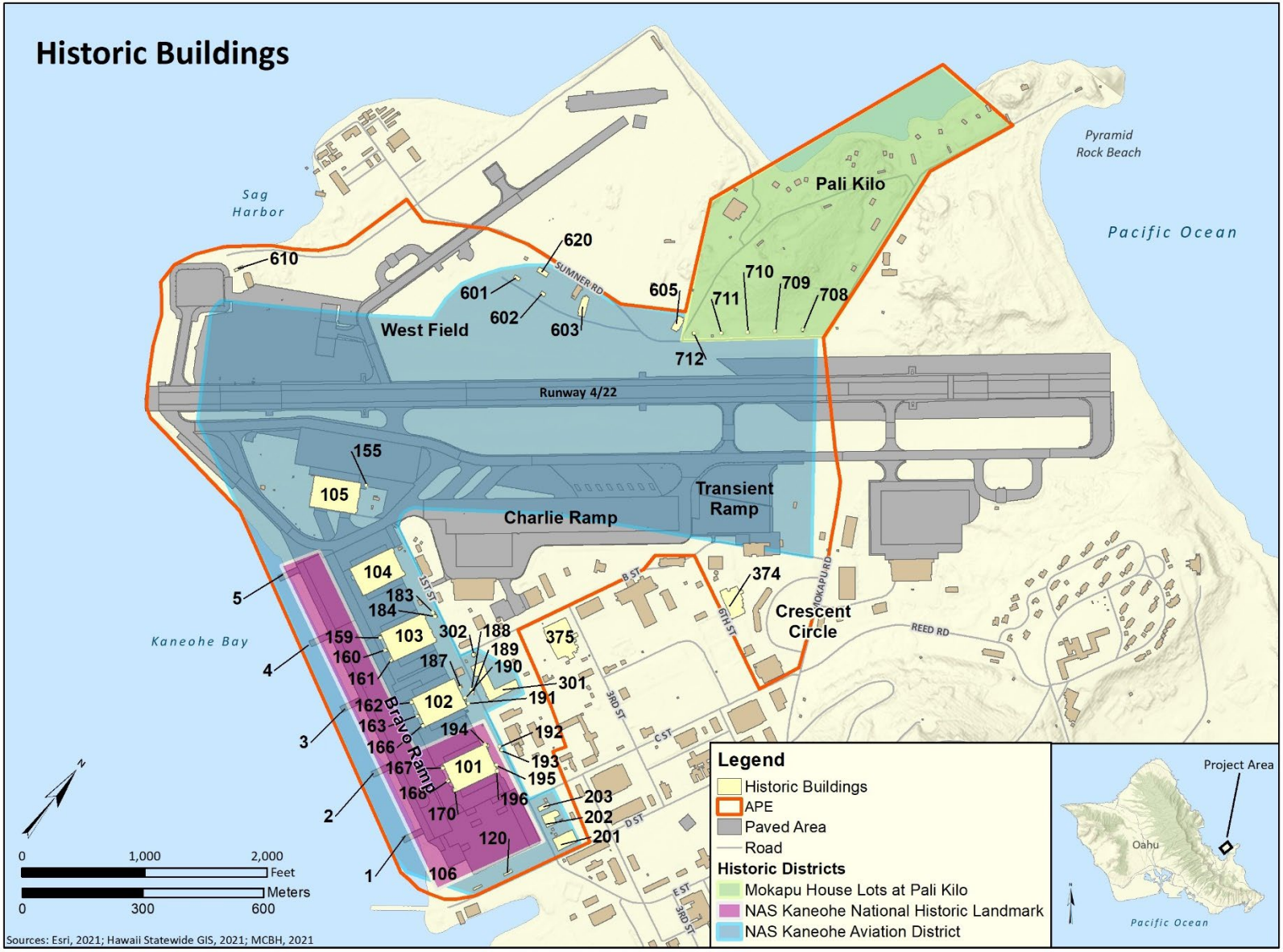


Figure 3-7 Historic Properties, Including Architectural Resources and Historic Districts, Within the APE

Table 3-7 Summary of Existing Architectural Resources Within the APE

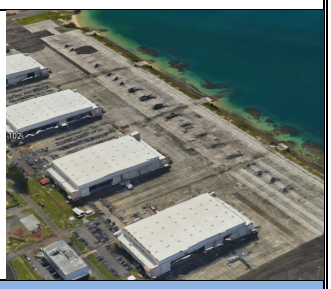
Name/Building #	*Year Built*	*Evaluation of Significance*	*Status*	*Photo*
NHL and Aviation District				
Seaplane Ramps (5) Facilities 1-5	1940	Contributing resource to the Kaneohe NAS NHL District and the Aviation District. Existed at the time of the 7 December 1941 attack and came under fire during the attack. Part of the 1939 initial proposed base layout and critical to the primary purpose and mission of the original base.	Extant	
Hangar 101 / Maintenance Hangar 1 Building 101	1941	Contributing resource to the Kaneohe NAS NHL District and the Aviation District. Existed at the time of the 7 December 1941 attack. Bombed and strafed during the attack. Designed by the architectural firm of Albert Kahn.	Extant	
Bravo Ramp and Parking Apron No Building #	1939	Contributing resource to the Kaneohe NAS NHL District and the Aviation District. One of the primary targets of the 7 December 1941 Japanese attack. Strafing marks from the attack remain.	Extant Repaving work as part of Home Basing project	
Aviation District				
Hangar 102 / Maintenance Hangar 2 Building 102	1939/ 1941	Contributing resource to the Aviation District. One of the first buildings built on the NAS (the original 1939 portion is approximately one-fourth the size of the current footprint). Original version existed at the time of the 7 December 1941 attack. Mostly undamaged by surrounding bombing and strafing during the attack. Designed by the architectural firm of Albert Kahn.	Extant Renovation work as part of Home Basing project	

Table 3-7 Summary of Existing Architectural Resources Within the APE

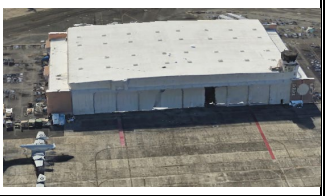
Name/Building #	*Year Built*	*Evaluation of Significance*	*Status*	*Photo*
Hangar 103 / Maintenance Hangar 3 Building 103	1941	Contributing resource to the Aviation District. Existed at the time of the 7 December 1941 attack. Sustained minor damage from the bombing and strafing during the attack. Designed by the architectural firm of Albert Kahn.	Proposed demolition and replacement as part of Home Basing project	
Hangar 104 / Maintenance Hangar 4 Building 104	1941	Contributing resource to the Aviation District. Under construction at the time of the 7 December 1941 attack. Designed by the architectural firm of Albert Kahn.	Extant	
Hangar 105/ Maintenance Hangar 5 Building 105	1943	Contributing resource to the Aviation District. Built as a land plane hangar during WWII. Designed by the architectural firm of Albert Kahn.	Extant Currently located in runway clear zone	
Aircraft Spares Storage Buildings 159-163, 166-168, 170, 183, 184, 187-196	1942-1943	Contributing resources to the Aviation District. Part of WWII base build-up. Concrete hangar support buildings located primarily near Hangars 101 through 104. Originally stored aircraft armament and supplies.	Facilities 159-161, 183-184 Proposed demolition as part of the Home Basing project Facilities 162-163, 166-168, 170, 187-196 Extant	
Shop Maintenance Elect-Refrig/Public Works Shop Building 201	1941	Former Utilities Shop and Parachute Loft Stowage Building. Contributing resource to the Aviation District. Existed at the time of the 7 December 1941 attack. Part of a group of three associated early base support buildings (with Buildings 202 and 203). Part of the 1939 initial proposed base layout. Designed by the architectural firm of Albert Kahn.	Extant	
Shop, Maintenance Machine/Public Works Shop Building 202	1941	Former Torpedo Workshop Building. Contributing resource to the Aviation District. Existed at the time of the 7 December 1941	Extant	

Table 3-7 Summary of Existing Architectural Resources Within the APE

Name/Building #	*Year Built*	*Evaluation of Significance*	*Status*	*Photo*
		attack. Part of a group of three associated early base support buildings (with Buildings 201 and 203). Part of the 1939 initial proposed base layout. Designed by the architectural firm of Albert Kahn.		
Public Works Shop, Grounds/Jan/Pest Control/Public Works Shop Building 203	1941	Former Bombsight Workshop and Storage Building. Contributing resource to the Aviation District. Existed at the time of the 7 December 1941 attack. One of three associated early base support buildings (with Buildings 201 and 202). Part of the 1939 initial proposed base layout. Designed by the architectural firm of Albert Kahn.	Extant	
MAG HQS/Photo Lab/ Academic Classroom Building 301	1941	Former Squadron Offices and Storage Building. Contributing resource to the Aviation District. Existed at the time of the 7 December 1941 attack. Part of the 1939 initial proposed base layout. Designed by the architectural firm of Albert Kahn.	Extant	
Aircraft Recovery Operations GSE Shop Building 620	1945	Last extant intact Quonset Hut on MCB Hawaii Kaneohe installation. Former Aircraft Engine Salvage Shop. Contributing resource to the Aviation District.	Extant	
Community Storage Buildings 708-712	1942	Underground Structures. Five former Fuse and Detonator Magazines. Contributing resources to the Aviation District.	Extant	

Table 3-7 Summary of Existing Architectural Resources Within the APE

Name/Building #	*Year Built*	*Evaluation of Significance*	*Status*	*Photo*
Pali Kilo District				
Small Magazine and Inert Storehouses Buildings 701-707	1941	WWII-period earth-sheltered munitions magazines located along the roads throughout the Pali Kilo area. These are like the historic magazines 708–712 located within the NAS Kaneohe Aviation District.	Extant	
Flammables Storehouse Building 995	1942	Built as a splinter-proof paint locker, is a good example of this type of WWII construction. It is built of cast concrete, with an exterior of smoothly finished stucco. Individually NRHP eligible.	Extant	

Legend: GSE = Ground Support Equipment; MCB = Marine Corps Base; NAS = Naval Air Station; NHL = National Historic Landmark; NRHP = National Register of Historic Places; WWII = World War II.

3.4.2 Environmental Consequences

Potential impacts to cultural resources may result from (1) physically altering, damaging, or destroying all or part of a resource; (2) changing the character of the property's use or physical features within the property's setting that contribute to its historic significance; (3) introducing visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features; (4) neglecting the resource to the extent that it deteriorates or is destroyed; or (5) removing property from its historic location.

Under NEPA, the significance of an impact on cultural resources is based on the potentially affected environment and the degree of effects of the action. While a proposed action (the Section 106 proposed undertaking) could be determined under the NHPA Section 106 process to have an adverse effect on historic properties, that adverse effect under NHPA may not constitute a significant impact under NEPA. Measures implemented during the NHPA Section 106 process to avoid, minimize, or mitigate adverse effects to historic properties would reduce the impact of the action under NEPA.

Early in the planning process, MCB Hawaii determined that Alternative 1 is expected to affect cultural resources. MCB Hawaii initiated the NHPA Section 106 process in January 2022 and consultation has concluded with a MOA signed by the Marine Corps, the SHPD, and the ACHP.

3.4.2.1 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur, and there would be no change to cultural resources.

3.4.2.2 Alternative 1

Alternative 1 construction projects include the following activity types: demolishing existing buildings and structures, constructing new buildings and structures, renovating buildings, repaving, installing aircraft tie-downs, adding fencing, installing underground utilities and fuel lines, and staging construction equipment.

Under NHPA Section 106, MCB Hawaii determined that implementation of Alternative 1 would result in adverse effects to historic properties including:

- Demolition of Hangar 103, one of five historic hangars. It is a contributing element of the Aviation District and individually eligible for listing in the NRHP.
- Demolition of Buildings 159, 160, 161, 183, and 184 which are small aircraft spares storage buildings located adjacent to Hangar 103. The buildings are contributing elements of the Aviation District and individually eligible for listing in the NRHP.
- Alteration, including possible removal or paving over of Bravo Ramp paved area bomb craters and strafing damage from the 7 December 1941 attack, and removal of historic paving elements, such as tie-downs. Bravo Ramp is a contributing element of the NHL and the Aviation District.

These proposed project activities also have the potential to diminish the integrity of the NAS Aviation District and the NAS Kaneohe NHL District. Project activities such as repaving, installation of tie-downs, fencing, utilities, storm water management features and fuel lines have the potential to disturb unidentified subsurface archaeological resources. The adverse effects associated with the implementation of Alternative 1 would be mitigated due to proposed mitigation measures developed as part of NHPA Section 106 consultation process. Alternative 1 would not affect the Mokapu House Lots Archaeological District.

The following sections analyze and describe effects on cultural resources by project activity type for archaeological and architectural resources.

Archaeological Resources

Demolition activities requiring ground disturbance have the potential to disturb or destroy subsurface archaeological resources, including known sites as well as those not yet identified (Allen, 2000; Walker et al., 2022; Gosser et al., 2002; Prishmont et al., 2001; Rechtman and Wolforth, 2000; Schilz and Allen, 1996). Buildings and structures proposed for demolition include Hangar 103; the small aircraft spares storage buildings (Buildings 159, 160, 161, 183, and 184) adjacent to Hangar 103; Buildings 4000 and 5068 to the east of the transient ramp; and Building 5069 to the east of Hangar 6886.

The most substantial demolition proposed in Alternative 1 is Hangar 103. This activity, however, has minimal potential to encounter archaeological resources because the hangar is located on reclaimed land, approximately 20–30 meters offshore from the original coastline (Tomonari-Tuggle and Clark, 2021) (see Figure 3-6). While the potential for disturbance to intact archaeological resources or *iwi kupuna* in this fill land is low, redeposited and disturbed cultural materials (including *iwi kupuna*) may still be encountered.

The propeller maintenance facility would be located adjacent to the recently constructed Hangar 6886. During construction and excavation of the hangar, no archaeological resources were discovered, evidencing that additional discoveries are unlikely.

Proposed construction of the KC-130J Aircraft Direct Refueling System would involve ground disturbance to install fuel lines and storm water retention and drainage systems. The extent and depth of the disturbance related to this construction has not been defined, and the activity is in an area that is not fill or reclaimed land. Therefore, there is a potential to disturb unidentified subsurface archaeological resources.

For all such construction activities, should construction activities encounter unknown subsurface archaeological resources, the contractor would immediately cease activities and notify base personnel, who would proceed pursuant to NAGPRA and applicable standard operating procedures described in the 2021 MCB Hawaii ICRMP (see Section 3.4.2.2).

Effects on archaeological resources are not anticipated from installation of GDTs because they consist solely of a trailer and antenna with stabilizing cables tied to surface-mounted blocks. This equipment can be placed on the ground with only a few inches of ground disturbance. This would not affect subsurface archaeological sites such as those on or near Keawanui Hill (Sites 0365, 4619, 4620, and 4622) or adjacent to Hangar 105 (Site 4453). Aboveground archaeological features on Keawanui Hill, including upright and pavement stones and rock and coral piles, are outside the area proposed for the GDT and would not be affected. No other construction projects besides the GDT location are proposed within the Mokapu House Lots Archaeological District.

Interior renovations of Hangar 102 would have no effects on known or not-yet-identified archaeological resources because the proposed renovations do not include ground disturbance.

Repaving activities are expected to involve replacement of existing material in some areas with new, stronger paving material with a thicker base that would extend below the current paving depth. However, the anticipated depth of ground disturbance for repaving would not exceed 18 inches below the existing ground surface within existing coral fill layers. In addition, Bravo Ramp is in an area of fill that was previously disturbed during initial construction in the 1920s and 1940s, so the potential for discovery of archaeological resources is low. Unlike repaving, restriping paved surfaces on Charlie Ramp and Bravo Ramp would not include ground disturbance and would have no potential to disturb archaeological resources.

Installation of tie-downs at Bravo Ramp near Hangar 105 is close to the known NRHP-eligible archaeological site 4453. However, all previous documentation indicates site 4453 lies under coral fill layers extending more than 3 feet below the surface (Walker et al.,2022), and the anticipated depth of ground disturbance for installation of tie-downs would not exceed 18 inches. Ground disturbance in or above the coral fill layers is not anticipated to affect the known archaeological site or the layer where unidentified archaeological deposits are most likely to occur. Therefore, this construction project has minimal potential for damage to known or unidentified archaeological sites.

The addition of security fencing on the north side of Runway 04/22, southeast of Charlie Ramp, and east of transient ramp would result in minimal ground disturbance due to post hole excavation. This activity is unlikely to disturb subsurface archaeological resources due to the small size and shallow depth of the disturbance area for fencepost installation.

Temporary construction laydown areas are proposed for Crescent Circle. This short-term activity does not include ground disturbance. No known archaeological sites are located at Crescent Circle.

Under Alternative 1, MCB Hawaii Kaneohe Bay aircraft operations would not affect archaeological resources.

For the reasons identified above, the likelihood of discovering previously unknown archaeological deposits in the APE is low. However, as documented in the MOA, archaeological monitoring during construction ground disturbing activities would occur (see Appendix C); should such deposits be encountered, the ICRMP and the requirements of NAGPRA identify appropriate processes for managing such discoveries. The low probability of discovery coupled with base processes for managing inadvertent discoveries would result in Alternative 1 having less than significant impacts to archaeological resources.

Architectural Resources

Construction projects that may affect historic architectural resources include demolition of existing buildings and structures and construction of new buildings and structures. Demolition of individually National Register Eligible (NRE) buildings and structures, or those that contribute to a historic district, would be an adverse effect.

Demolition of non-historic buildings would also occur but would not affect historic architectural resources. These include Buildings 4000 and 5068, which would be demolished to accommodate the proposed KC 130J Aircraft Direct Refueling System construction, and Building 5069, which would be replaced by a wash rack east of Hangar 6886.

Installing tie-downs and adding pavement striping west of Hangar 105 would not result in an adverse effect on architectural resources. The paved area is within the NRE NAS Kaneohe Aviation Historic District and helps define the spatial relationships of its contributing resources, but restriping and new tie-downs would not alter this. The addition of new security fencing, which would be similar to and continue the alignments of existing security fencing, would not affect historic architectural resources. Temporary construction staging and laydown would not affect historic architectural resources. The area proposed for this temporary activity, Crescent Circle, is outside of the historic district boundaries and is not on or adjacent to the Kaneohe NAS NHL or the NAS Kaneohe Aviation Historic District.

Alternative 1 includes interior renovations to Hangar 102 and non-historic Hangar 6886. While building renovations could alter the character of a historic building, the proposed alterations to Hangar 102 are interior only and would follow Secretary of the Interior's Standards for the Treatment of Historic Properties with guidelines for preserving, rehabilitating, restoring, and reconstructing historic buildings. Therefore, the proposed renovations at Hangar 102 would not have an adverse effect on historic architectural resources.

Activities on Bravo Ramp have the potential to remove or alter character-defining historic materials because Bravo Ramp is a contributing resource of the Kaneohe NAS NHL District. The repaving design may remove historic materials including bomb and strafing damage from the 7 December 1941 Japanese attack and historic aircraft tie-downs and other hardware. The adverse effect on the NHL district would be mitigated through proposed mitigation measures that include documentation of the affected Bravo Ramp features.

Demolition of Hangar 103 and five ancillary storage buildings (Buildings 159, 160, 161, 183, and 184) would result in an adverse effect to the buildings themselves, the NRE NAS Kaneohe Aviation Historic District to which they contribute, and to the NHL. These adverse effects on architectural resources would be mitigated through measures contained in the MOA, included in Appendix C.

The demolition, renovation and new construction proposed in this action would not have a significant effect on the NHL because the adverse effect would be mitigated through proposed mitigation measures contained in the MOA (see Appendix C). The impact to the historic setting would be further mitigated by

the fact that the design for the new Type II Hangar would be reflective of defining characteristics of the Aviation Historic District to the greatest extent practicable, noting that the mission requirements limit some of the design options.

The adverse effect to the NRE Aviation Historic District due to the demolition of six historic buildings (including Hangar 103 and Buildings 159, 160, 161, 183, and 184) and new construction within the NRE Aviation Historic District (including construction of the new Type II hangar and supporting infrastructure) would be mitigated through proposed mitigation measures contained in the MOA (see Appendix C). The demolition of the NRE buildings would have an adverse effect on those buildings. However, this adverse effect would be mitigated below the threshold of significance under NEPA through the proposed mitigation measures discussed below and contained in Appendix C, which were negotiated between the Marine Corps, the SHPD and the ACHP. The impact to the historic setting would be further mitigated by the fact that the design for the new Type II Hangar would reflect defining characteristics of the Aviation Historic District to the greatest extent practicable, noting that the mission requirements limit some of the design options.

Therefore, even though the project would have an adverse effect to the six eligible structures, as well as to the Kaneohe NAS NHL and the NRE NAS Kaneohe Aviation Historic District, these impacts would be mitigated through the measures detailed in the MOA. The Aviation Historic District and the NHL will retain sufficient integrity to convey their significance and qualify for listing on the National Register. The proposed mitigation measures contained in the MOA would minimize and mitigate the adverse effect on historic properties to a less than significant impact under NEPA. Moreover, with the implementation of these proposed mitigation measures, the proposed undertaking would allow for continued effective use of MCB Hawaii Kaneohe Bay as an operational military airfield while ensuring that the affected historic districts retain significant association with their historic use. In summary, with implementation of proposed mitigation measures developed through the NHPA Section 106 process and resulting MOA, Alternative 1 would not result in significant impacts to architectural resources.

Proposed Mitigation Measures

The proposed minimization and mitigation measures identified in the MOA are in Appendix C. They were developed with consulting parties through the NHPA Section 106 consultation.

3.5 Biological Resources

Biological resources include living, native, or naturalized plant and animal species and their habitats. This analysis focuses on species that are important to the function of ecosystems or are protected under federal or state law at MCB Hawaii Kaneohe Bay. Habitat is defined as the resources and conditions present in an area that support a plant or animal. Biological resources are divided into the following categories: *Vegetation, Wildlife, and Special-Status Species.*

- *Vegetation* includes plant associations and dominant constituent species that are known or potentially occurring in the project area and region of influence. Potential "stressors" (i.e., potential project-related effects) to existing vegetation on MCB Hawaii Kaneohe Bay may be caused by direct and indirect sources, such as construction-related removal of vegetation, disturbance to vegetation, and indirect effects such as changes to storm water volumes and pollutant loads.
- *Wildlife* includes the characteristic animal species that are known or potentially occurring in the project area and region of influence. Special consideration is given to bird species protected under the Migratory Bird Treaty Act (MBTA) and Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds.* Potential stressors to wildlife may include those described above for vegetation (direct disturbance, vegetation removal, and impacts to habitat through increased storm water volumes), lighting related to construction and operations, nesting/breeding season disturbance, potential bird-aircraft strikes, new personnel using natural resources and recreational areas on the installation, and changes in the noise environment during operations.
- *Special-Status Species* are defined in this EA as species that are listed, have been proposed for listing, or are candidates for listing as threatened or endangered under the federal ESA and other species of concern as recognized by state or federal agencies. Stressors for special-status species are similar to those described above for vegetation and wildlife but can vary by species (see impact analysis for Special-Status Species later in this section).

The region of influence for biological resources includes the project area as well as the regions near the project area boundaries that may experience noise, visual, other physical, or indirect impacts. The region of influence for vegetation consists of only the project area since direct and indirect effects would be limited to that area. The region of influence for wildlife is larger because of the noise footprint associated with proposed aircraft operations.

Two ESA-listed marine species are addressed in the analysis for potential indirect impacts while they are on shore: the Hawaiian monk seal (ʻilioholoikauaua*, Neomonachus schauinslandi*) and green sea turtle (honu, *Chelonia mydas*). These species occasionally haul-out on the beaches of MCB Hawaii Kaneohe Bay. As described in Section 3.1.3.2, the operational noise over marine waters of Kaneohe Bay would be virtually the same as existing conditions. Takeoffs and landings could startle monk seals or green sea turtles if they are present; however, these events only produce noise at any given location for a very brief period as the aircraft climbs to cruising altitude. While the potential exists for some animals to be subjected to multiple overflights per day, aircraft pass quickly overhead and studies have shown that aircraft noise causes only small temporary changes in the behavior of marine mammals such as the Hawaiian monk seal (Navy, 2018). Based on this limited interaction time and the minor increase in over-water noise acreage, the potential effects to monk seals from the proposed military readiness activities of the MQ-9 and KC-130J (sound from take-off and landings) would not rise to a point where a monk

seal's behavioral patterns are abandoned or significantly altered. Therefore, potential impacts to marine species would be less than significant, and there would be no effect to ESA-listed marine species. Also, proposed activities occurring near the shoreline would consist of demolition, renovation, and construction on impervious surfaces, and, as such, be subject to the permit and conservation measures discussed in Section 3.3, *Water Resources*, minimizing the potential for any water runoff into Kaneohe Bay. For these reasons, potential impacts to in-water marine species (except for Hawaiian monk seal and green sea turtle discussed in Section 3.5.2.3) are not further analyzed in this EA.

3.5.1 Affected Environment

Figure 3-8 shows general biological resources features in the project area and region of influence. The following describes the existing conditions for the three categories of biological resources at MCB Hawaii Kaneohe Bay.

3.5.1.1 Vegetation

The project area and region of influence consists entirely of built or modified landscape with no notable ecological communities on or adjacent to the construction sites. Historically, the project area was cleared with heavy equipment and lacks native vegetation cover. Within the region of influence, there are a few scattered native species on the beach such as naupaka (*Scaevola taccada)*. Landscaping within the project area and region of influence consists of non-native trees, shrubs, and grasses that are irrigated and maintained. There are no known natural occurrences of plants pending or listed as threatened or endangered under the ESA within the project area or region of influence. The existing non-native vegetation consists of planted landscape material (typically Bermuda grass and a variety of native and non-native planted trees and shrubs), non-native koa haole (*Leucaena leucocephala*), kiawe (*Prosopis pallida*), and Guinea grass (*Megathyrsus maximus)* shrubland. Low manicured turf grass typically grows between the runway and taxiway as well as in areas around the airfield. No wetlands are located within the project area.

3.5.1.2 Wildlife

Wildlife found in the project area consists of mammalian and bird species consistent with those found in a developed and urbanized environment.

Mammalian Species. Mammalian species in the project area consist of invasive species that are a constant concern at MCB Hawaii Kaneohe Bay including domestic/feral cats (*Felis catus*), rats (*Rattus* spp.), and mongoose (*Herpestes javanicus*).

MBTA-listed Bird Species. Nearly all migratory and resident birds present in the Hawaiian Islands, and all resident seabirds, are protected under the MBTA. Of the seabirds and migratory species, the migratory Pacific golden plover (kolea, *Pluvialis fulva*) utilizes the project area (in grassy regions), as well as the bulwer's petrel ('ou*, Bulweria bulwerii*) which nest in adjacent rocky shorelines. The ruddy turnstone ('akekeke*, Arenaria interpres)* is a shorebird found mainly in wetland areas, but it has been observed on the airfield in the project area. The indigenous wedge-tailed shearwater ('ua'u kani, *Puffinus pacificus chlororhunchus*) and great frigatebird (*'*iwa, *Fregata minor*) are not known to utilize the project area; however, they have been recorded flying through the area.

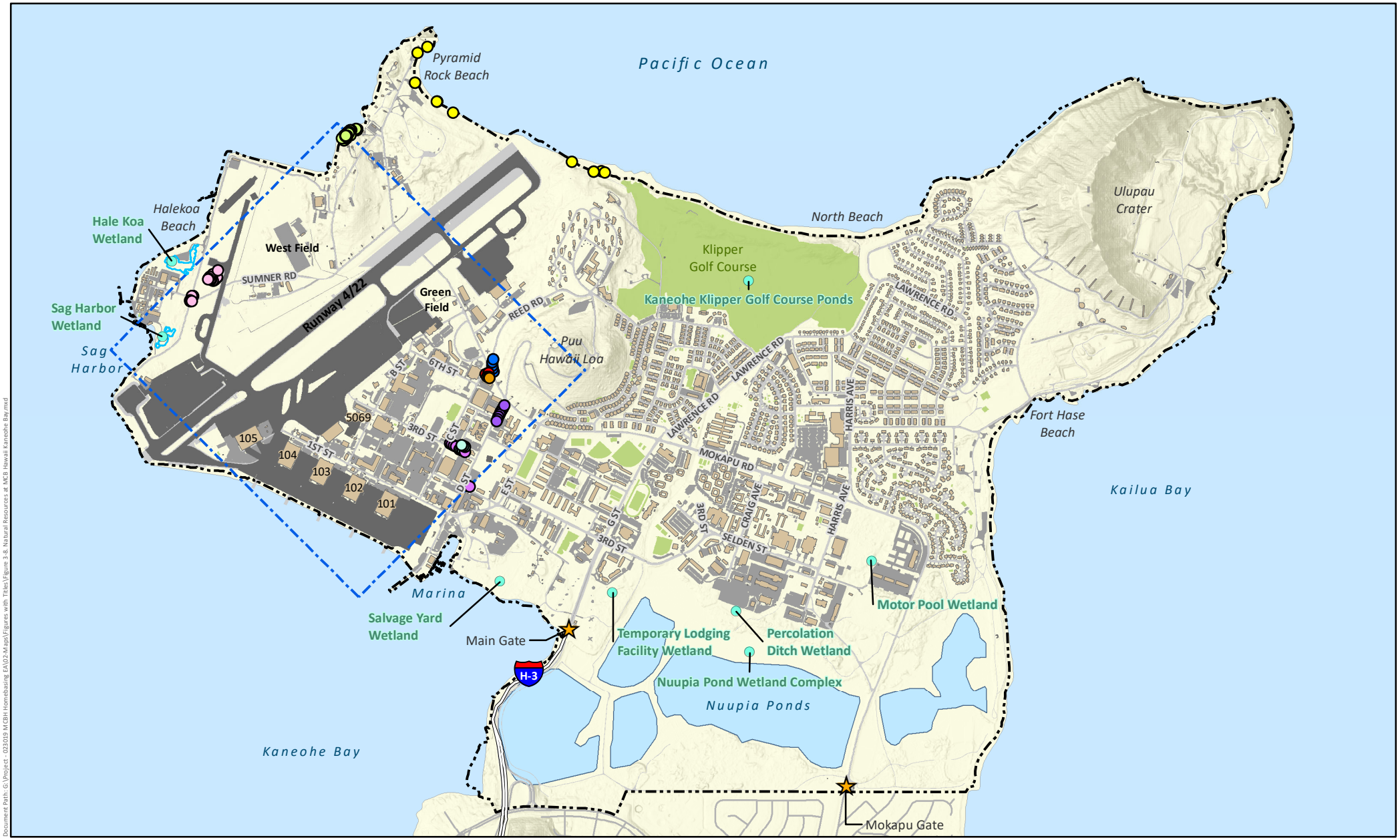


Figure 3-8. Natural Resources at MCB Hawaii Kaneohe Bay

MCB Hawaii Kaneohe Bay Boundary
Gate
Interstate
Road
0 1,000 2,000 Feet

Airfield Pavement/Apron
Airfield Road
Building
Nesting Area for Hawaiian Birds
Parking Area
Recreation Area

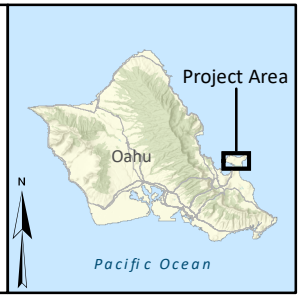
Wetland Point

Vegetation Observations
- Blue jacaranda tree (*Jacaranda mimosifolia*)
- Fountain grass (*Pennisetum setaceum*)
- Hao (*Rauvolfia sandwicensis*)
- Koa oha (dwarf koa, *Acacia koaia*)
- Maiapilo (caper bush, *Capparis sandwichiana*)
- Milo (portia tree, *Thespesia populnea*)
- Ohe (*Reynoldsia sandwicensis*)
- Pua keni keni (perfume flower tree, *Fagraea berteriana*)

Wildlife Observations
- Nalo meli maoli (Hawaiian yellow-faced bee, *Hylaeus anthracinus*)

Proposed Action
- Approximate Project Location

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021



Certain MBTA-listed bird species in the airfield portion of the region of influence regularly require management in partnership with the U.S. Department of Agriculture (USDA) Wildlife Services due to pervasive populations. These species include the cattle egret (*Bubulcus ibis*), barn owl (*Tyto alba*), northern red cardinal (*Cardinalis cardinalis*), and house finch (*Carpodacus mexicanus*). Occasionally, these birds attempt to nest within or around the facilities at the project area. Non-ESA-listed MBTA birds with the potential to occur in the region of influence are listed in Table 3-8 and are identified by their common name, Hawaiian name, and origin (native or introduced).

Table 3-8 Non-ESA-Listed MBTA Species Known to Occur or with Potential to Occur in the Region of Influence

Scientific Name	*Common Name*	*Hawaiian Name*	*Origin*
Anas platyrhynchos	Mallard	-	Introduced
Anas wyvilliana	Hawaiian duck-mallard hybrid	Koloa moali	Native
Bubulcus ibis	Cattle egret	-	Introduced
Fregata minor palmerstoni	Great frigatebird	ʻIwa	Native
Puffinus pacificus chlororhunchus	Wedge-tailed shearwater	ʻUaʻu kani	Native
Phoebastria immutabilis	Laysan albatross	Mōlī	Native
Bulweria bulwerii	Bulwer's petrel	ʻOu	Native
Arenaria interpres	Ruddy turnstone	ʻAkekeke	Native
Sula sula rubripes	Red-footed booby	ʻĀ	Native
Sula leucogaster	Brown booby	ʻĀ	Native
Anous minutus	Black noddy	Noio	Native
Onychoprion fuscatus	Sooty tern	Ewa ewa	Native
Onychoprion lunatus	Grey-backed tern	Pakalakala	Native
Phaethon lepturus	White-tailed tropicbird	Koaʻe kea	Native
Tyto alba	Common barn owl	-	Introduced
Cardinalis	Northern red cardinal	-	Introduced
Carpodacus mexicanus	House finch	-	Introduced
Pluvialis fulva	Pacific golden plover	Kolea	Native

<u>*Non-MBTA Listed Bird Species*</u>. Birds found in the project area and region of influence that are not protected under the MBTA include the common myna (*Acridotheres tristis),* zebra dove (*Geopilia striata*), rock pigeon (*Columba livia*), red-crested cardinal (*Paroaria coronata*), spotted dove (*Streptopelia chinensis*), red-vented bulbul (*Pycnonotus cafer*), chestnut munia (*Lonchura atricapilla*), and gray francolin (*Francolinus pondicerianus*).

<u>*Waterbirds*</u>. Wetlands, including mudflats, shallow ponds, estuarine and coastal wetlands exist within the region of influence and provide some habitat for waterbirds (see Figure 3-4), including the mallard (*Anas platyrhynchos)* and Hawaiian duck-mallard hybrid (*Anas wyvilliana)*. The mallard and Hawaiian duck-mallard hybrids are frequently observed within the project area, particularly when ponding occurs on developed surfaces.

Seabirds. Although not reported within the project area, several additional species of seabirds are known to occur at MCB Hawaii Kaneohe Bay and may occur in the region of influence, such as the permanent colony of red-footed booby (ʻā, *Sula rubripes*) in the Ulupau Head Wildlife Management Area on the base range training facility approximately 2.5 miles away from the project area. Other common seabird species known from Kaneohe Bay and the surrounding waters and islets include the Laysan albatross (mōlī, *Phoebastria immutabilis*), brown booby (ʻa, *Sula leucogaster*), black noddy (noio, *Anous minutus*), sooty tern (ewa, *Onychoprion fuscatus),* grey-backed tern (pakalakala*, Onychoprion lunatus*), and white-tailed tropicbird (koaʻe kea*, Phaethon lepturus*), which may overfly the project area on occasional, seasonal, or temporal basis.

3.5.1.3 Special-status Species – Federal

ESA-listed species with the potential to occur in the region of influence are listed in Table 3-9 and are identified by their common name, Hawaiian name, and regulatory status.

Table 3-9 Special-Status Species Known to Occur or with Potential to Occur in the Project Area and Region of Influence

Scientific Name	*Common Name*	*Hawaiian Name*	*Regulatory Status*
Birds			
Anas wyvilliana	Hawaiian duck	Koloa moali	FE, SE
Fulica alai	Hawaiian coot	ʻAlae keʻokeʻo	FE, SE
Gallinula galeata sandvicensis	Hawaiian gallinule	ʻAlae ʻula	FE, SE
Himantopus mexicanus knudseni	Hawaiian stilt	ʻAeʻo	FE, SE
Oceanodroma castro	Band-rumped storm petrel	ʻAkē ʻAkē	FE, SE
Pterodroma sandwichensis	Hawaiian petrel	ʻUaʻu	FE, SE
Puffinus auricularis newelli	Newell's shearwater	ʻAʻo	FT, ST
Asio flammeus sandwichensis	Hawaiian short-eared owl	Pueo	SE
Terrestrial Mammals			
Lasiurus cinereus semotus	Hawaiian hoary bat	ʻŌpeʻapeʻa	FE, SE
Arthropods			
Danaus plexippus	Monarch butterfly	-	C
Hylaeus anthracinus	Anthricinan yellow-faced bee, Hawaiian yellow-faced bee	Nalo meli maoli	FE, SE
Marine Mammals			
Neomonachus schauinslandi	Hawaiian monk seal	ʻIlioholoikauaua	FE, SE
Marine Reptiles			
Chelonia mydas	Green sea turtle	Honu	FT, ST

Notes: Selections for Listing Status Column include: C = candidate species for federal ESA listing, FE = federal endangered, SE = state endangered, FT = federally threatened, ST = state threatened.

Waterbirds. Wetlands in the region of influence provide potential habitat for ESA-listed waterbirds. These waterbirds include the endangered Hawaiian stilt (*ʻae ʻo*, *Himantopus mexicanus knudseni*), endangered Hawaiian duck (koloa moali, *Anas wyvilliana*), endangered Hawaiian gallinule (*ʻalae ʻula*, *Gallinula galeata sandvicensis*), and endangered Hawaiian coot (ʻalae keʻokeʻo, *Fulica alai*). Due to the proximity of wetlands, the Hawaiian stilt and Hawaiian duck have been observed in the project area, particularly when ponding occurs on developed surfaces. The Hawaiian coot and Hawaiian gallinule occur in wetlands at MCB Hawaii Kaneohe Bay, primarily at the freshwater influenced portions of the Nuupia Ponds (MCB Hawaii, 2017); however, they are also known to occur within the region of influence at Sag Harbor Wetland (Navy, MCB Hawaii, 2021).

Hawaiian stilts and Hawaiian ducks can be found along shoreline, estuarine, and freshwater habitats. The Hawaiian stilt breeding season normally occurs from mid-February through late August, with peak nesting occurring from May to July. Nests are shallow depressions lined with stones, twigs, and debris in mudflats (USFWS, 2011). The Hawaiian duck was common in the 19th century, but populations are now largely reduced (Center for Biological Diversity, 2022). The Hawaiian duck has largely been replaced with a hybrid between the Hawaiian duck and mallard on Oahu (USFWS, 2011). The Hawaiian coot populations at MCB Hawaii Kaneohe Bay have increased in recent decades (250+ documented annually since 2018) with activity observed primarily at the Nuupia Ponds. Hawaiian coot are no longer commonly seen at the Percolation Ditch Wetland or Klipper Golf Course Ponds (Navy, MCB Hawaii, 2021). An average of 20 Hawaiian gallinules have been documented annually at the Nuupia Ponds and have also been observed at the Percolation Ditch Wetland, Klipper Golf Course Ponds, and Sag Harbor Wetland. Hawaiian coots nest primarily in fresh or slightly brackish shallow water with robust wetland plants, while Hawaiian gallinules construct floating nests in freshwater with dense vegetation.

There is suitable foraging and nesting habitat for Hawaiian duck and Hawaiian stilt within the project area and region of influence. Infrequently, individuals attempt to nest within or around the facilities in the project area. To reduce the hazards of bird strikes, MCB Hawaii Kaneohe Bay has a Biological Opinion from USFWS that authorizes hazing of ESA-listed species from the airfield (USFWS, 2020). USDA Wildlife Services personnel use pyrotechnics, propane cannons, hand clapping, air horns, train horns, rattles, cattle flags, firearms, and vehicles to disperse wildlife from critical areas of the airfield as part of the installation's Bird/Wildlife Aircraft Strike Hazard (BASH) Plan (Marine Corps, 2011). Hazing of Hawaiian ducks and Hawaiian stilts on and near the airfield reduces the potential hazard to aircraft in the project area and reduces the likelihood of injury and/or mortality to ESA-listed birds. For instance, between January and October 2021, 153 Hawaiian stilts and 126 Hawaiian ducks were intentionally dispersed from MCBH Kaneohe Bay with no reported aircraft strikes to either of these species (USDA, 2021). Programs implemented under the Integrated Natural Resources Management Plan (INRMP) (MCB Hawaii, 2017) and the BASH Plan are currently in place to protect and monitor ESA- and MBTA-listed species (see Section 3.6, *Public Health and Safety*).

Seabirds. Of the ESA-listed seabirds that have the potential to occur, the endangered band-rumped storm petrel (ʻakē ʻakē, *Oceanodroma castro*) has not been observed in the project area; however, its call has been heard on base around Ulupau crater, which is on the northeast side of the installation and outside of the region of influence. The endangered Hawaiian petrel (ʻuaʻu*, Pterodroma sandwichensis*) and the threatened Newell's shearwater (*ʻaʻo*, *Puffinus auricularis newelli*) have been detected by sound meter surveys around the Koʻolau range; however, they have not been detected or observed in the project area or region of influence (or anywhere on MCAS Kaneohe Bay).

Hawaiian Hoary Bat. The endangered Hawaiian hoary bat (ʻōpeʻapeʻa, *Lasiurus cinereus semotus*) has been seen on the Mokapu Peninsula on a transitory basis, but no permanent colonies or nests have been identified. While areas along the northwestern and northeastern sides of the runway have substantial tree cover that may be utilized by the Hawaiian hoary bat, no bats have been documented within the project area. The base was recently surveyed for the endangered Hawaiian hoary bat using an acoustic sound recorder (Pinzari et al., 2021). Four bat monitoring stations surrounding the project area did not detect any bats during the recent 2-year survey.

Monarch Butterfly. The monarch butterfly (*Danaus plexippus*) is currently a candidate for federal listing and is seen in the project area and region of influence in search of desired vegetation such as the crown flower (*Calotropis gigantea*). Because there is no crown flower planted within the project area or region of influence, the monarch butterfly has only transited through the area and has not been observed foraging or utilizing vegetation within the region of influence.

Hawaiian Yellow-faced Bee. The Hawaiian yellow-faced bee (nalo meli maoli, *Hylaeus anthracinus*) is known to occur in coastal regions of Oahu in narrow rocky corridors along the shoreline (Magnacca and King, 2013). The largest populations of this species on Oahu have been documented on the coast north of the airfield but outside the project area and region of influence (Magnacca, 2017). The Hawaiian yellow-faced bee is not known to occur in the project area or region of influence.

Hawaiian Monk Seal. Hawaiian monk seals occasionally come to shore (haul-out) on the beaches within the region of influence at MCB Hawaii Kaneohe Bay. An average of 45 seals per year hauled-out on the beaches between 2017 and 2021 (MCB Hawaii, 2017). This can occur at any of the beaches on base. Approximately 30–60 monk seal sightings annually are reported to MCB Hawaii Environmental Compliance and Protection Division (MCB Hawaii, 2021).

Green Sea Turtle. Green sea turtles also occasionally haul-out on the beaches within the region of influence at MCB Hawaii Kaneohe Bay. Nesting has been documented along the Fort Hase and North Beach shorelines (MCB Hawaii, 2022b). Approximately 7–30 green sea turtle sightings annually are reported to MCB Hawaii Environmental Compliance and Protection Division (MCB Hawaii, 2021).

3.5.1.4 Special-status Species – State

The land-dwelling Hawaiian short-eared owl or pueo (*Asio flammeus sandwichensis*) is state-listed endangered and has been documented near the project area and in the region of influence at MCB Hawaii Kaneohe Bay. The vegetation around the airfield provides suitable nesting habitat for this ground-nesting raptor, and it has been observed traversing, roosting, and foraging within and near the project area (MCB Hawaii, 2017; Price Lab, 2022). No nests are documented in the region of influence; the only ones documented on base are near Nuupia Pond (L. Bookless, personal communication, 13 July 2022).

3.5.2 Environmental Consequences

3.5.2.1 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and there would be no impact to biological resources.

3.5.2.2 Alternative 1

Vegetation

Potential impacts to vegetation are described for construction and operational activities. Approximately 4.25 acres of landscaped vegetation would be cleared and developed. Vegetated portions of the project area consist of mostly planted landscape material; no notable ecological communities occur on or adjacent to the construction sites. Site preparation and construction activities would involve the clearing of non-native shrubs and grasses. Operational activities would include vegetation maintenance. Vegetation restoration would include ground preparation, planting, temporary irrigation, and maintenance. Restored turf grass vegetation would be installed over a bio-degradable erosion-control fabric and would incorporate at least 50% native plant species. To prevent manmade erosion over time, Alternative 1 also includes landscape treatment consisting of planting, protective fencing, and walkways. The project design features in Table 2-5 (such as bioretention, vegetated swales, and pervious pavement) would be implemented to manage storm water volumes and avoid any potential flooding or ponding at and near the project area. Therefore, there would be minimal change to the type and volume of water affecting vegetation in the project area. Proposed native plant vegetation restoration and landscape repair would result in minor beneficial impacts to vegetation in the project area. There would be no vegetative impacts to the region of influence. For these reasons, Alternative 1 would have less than significant impacts to vegetation.

Wildlife

Potential impacts to wildlife are described for construction and operational activities. The impacts identified for birds applies to all species present. Unique impacts specific to an individual species or group of birds are further detailed where necessary.

Construction

Habitat. Approximately 4.25 acres of disturbed, manicured/landscaped vegetation would be cleared and developed into impervious ground cover or facilities. The proposed new impervious surfaces impact only landscaped areas that provide minimal habitat for ground-nesting and foraging bird species. There are no shrubs or trees in this area that provide suitable habitat for wildlife. In addition, interior portions of the hangars would be designed with netting or slanted surfaces to keep birds from nesting in the hangar. Impacts to mammalian species would be minimal as domestic/feral cats, rats, and mongoose are mobile and would leave the immediate area of construction and can find habitat elsewhere on the installation. Therefore, Alternative 1 construction would have less than significant construction impacts to bird and other wildlife habitat.

Water. Standing water attracts birds such as waterbirds and cattle egrets. To minimize this attraction, construction activities would be managed to avoid creating temporary ponding in the project area, including covering storm water detention basins. With regard to water quality, construction activities would comply with NPDES permit requirements under the existing Storm Water Management Plan thereby minimizing impacts to water quality in the region of influence. In addition, conservation measures identified in Section 2.3, *Conservation Measures*, such as the use of bioretention techniques, vegetated swales and filter strips, and retention basins (see Table 2-5 for complete water-related conservation measures) would be required to further minimize impacts. Given the absence of new water attractions and preservation of existing water resources and water quality during construction, Alternative 1 construction would have less than significant impacts to water resources used by birds and other wildlife.

Fallout. Seabird fallout can occur when unnatural lighting at night attracts and disorients birds to areas that may place them in dangerous conditions leading to their injury or death, as well as increased risk for potential bird-aircraft strikes. For example, in the project area, every year during fledging (15 September through 15 December), wedge-tailed shearwaters and bulwer's petrels require rescuing because of being impacted by light from aircraft hangars (USDA, 2021; L. Bookless, personal communication, 2 June 2022). Many bird species are attracted to facilities with lights, so lighting use during nighttime construction is a potential stressor to nocturnal or light-sensitive seabird species. To minimize this potential impact, construction is proposed only for daytime hours. If limited unplanned nighttime construction must occur, or lighting is required for safety during non-construction hours, all exterior lights would meet or exceed USFWS, National Oceanic and Atmospheric Administration (NOAA), and/or International Dark-Sky Association standards for the type of work to be undertaken. Additional conservation measures to further reduce risk of fallout (see Table 2-5) include use of tinted windows, elimination of lighting on the top of the buildings, relocating lights as close to the ground as possible, use of solid hangar doors that do not allow any interior light to pass through, and closing doors when activity is not in progress. In addition, all on-site contractors would be briefed on how to conduct construction in the presence of light-sensitive bird species (L. Bookless, personal communications, 6 March 2022). With implementation of these measures to reduce lighting impacts, Alternative 1 construction would have less than significant impacts to birds due to fallout.

Strike. There is a very slight risk of injury or death to birds due to vehicle or equipment collisions during construction. The base has a bird hazing protocol at the airfield/project area that is approved by the USFWS to reduce the possibility of impact, and this would continue under Alternative 1. In addition, conservation measures described above to prevent temporary ponding and excess lighting would minimize attraction of birds to the construction area. Collectively, these measures would result in the construction having less than significant impacts to birds due to vehicle or equipment collisions.

Noise. Construction noise would result in temporary impacts to birds and other wildlife. Multiple bird species (e.g., northern red cardinals and house finches) often occur within and around the hangars. Construction-related noise may temporarily displace such wildlife from habitat in the immediate vicinity of the project area. However, because construction would occur at previously developed and actively used areas where aircraft and machinery are in regular use around the airfield creating a noise environment consistent with a construction area, birds have either adapted to the general noise of the flightline and other construction areas or would temporarily relocate from the construction areas to adjacent similar habitats. Given the frequency of transient fighter aircraft operations, as well as frequent MV-22 operations on the flightline, any temporary construction noise impacts would not result in new or unique impacts. Considering the temporary nature of the construction impacts, its similarity to ongoing operational noise levels, and the high degree to which wildlife at MCB Hawaii Kaneohe Bay have habituated to high levels of noise associated with current activities, Alternative 1 construction would have less than significant noise impacts to wildlife.

Air Emissions. Exhaust emissions (including gases and particulates) from proposed construction-related activities are presented in Section 3.2 (*Air Quality*). These calculations indicate no significant impact to air quality. In addition, emissions associated with the proposed action would be like those generated daily at the base and throughout Oahu and are not known to cause impacts to wildlife. Therefore, Alternative 1 construction air emissions would have less than significant impacts to wildlife.

Operational Impacts

Habitat. Many non-listed and MBTA-listed birds are observed flying in the region of influence (e.g., cattle egret, Pacific golden plover) and some have been documented nesting within hangars (e.g., house finch). As described above, there are minimal changes to the habitat resulting from the proposed project's construction. With regard to operations, the two squadrons would occupy hangars and function in a similar manner to the existing aircraft at MCAS Kaneohe Bay operations. Consistent with current operations, interior portions of the new hangar would be designed with netting or slanted surfaces to keep birds from nesting in the hangar, and current hazing management efforts conducted in partnership with the USDA Wildlife Services would continue to deter birds from utilizing the airfield. The absence of any new or increased operational impact to habitat results in Alternative 1 operations having less than significant impacts to bird and other wildlife habitat.

Water. Possible operational impacts resulting from impacts to water are increased ponding of water on developed surfaces and contamination of water sources frequented by birds or mammalian species. With regard to ponding, applicable LID techniques such as vegetated swales established during construction would remain beyond the construction period (see Table 2-5 for complete water-related conservation measures). In addition, the MCB Hawaii Environmental Compliance and Protection Division and USDA Wildlife Services personnel manage ponding issues via bird hazing if there is increased potential for bird-aircraft strikes. The two new squadrons would operate similarly and in similar locations and be similarly managed as existing aircraft. Regarding possible contamination of water resources used by birds, design features would capture and contain any potential spills from the wash rack and refueling operations to prevent water contamination. Additional LID features for water management beyond the construction period (see Table 2-5) would be implemented to further minimize potential pollutants entering storm water flows. As a result of these existing and proposed measures, Alternative 1 operations would have less than significant impacts to water resources used by birds and mammalian species.

Fallout. Fallout could occur from operational lighting in the project area from hangar lights, interior lighting through windows, and exterior lighting. As noted above, the operation of the two new squadrons is consistent with existing operations at the airfield, and the base has comprehensive procedures to minimize the potential for fallout from aircraft operations. Equipment to reduce fallout include installation of down-shielded lights, tinted windows, and a full cutoff feature that minimizes backlight, uplight, and glare. This feature also includes automatic motion sensor switches and controls on all lights visible to the outdoors (see Table 2-5 for complete lighting conservation measures). Procedures such as closing doors when activity is not in progress and limiting use of lights during the seabird fledging period further reduce instances of fallout. Therefore, Alternative 1 operations would have less than significant fallout impacts to birds.

Strike. As with all airfields, there is a risk of strike to birds by aircraft. Certain bird species (e.g., cattle egret) are known to pose a potential hazard to aircraft in the project area and region of influence. MCB Hawaii Kaneohe Bay has a comprehensive BASH Plan and a corresponding Biological Opinion (USFWS, 2020) to minimize the potential for impacts to all bird species (see Section 3.6, *Public Health and Safety*). As noted previously, the two new squadrons would operate in a similar manner to current base aircraft. Annual bird count data evidence that migratory birds returning to the peninsula have adapted and are able to sustain populations among operations; however, new birds visiting the area do pose increased risk of strike and could cause temporary setbacks in overall bird counts (L. Bookless, personal communications, 21 June 2022). Conservation measures identified in prior sections would be

implemented to reduce the potential to attract seabirds, such as wedge-tailed shearwaters, to the airfield. These conservation measures would also reduce the potential presence of birds and, therefore, minimize potential bird strike impacts associated with the proposed action. In accordance with existing permits, bird hazing would continue to be conducted regularly in partnership with the USDA Wildlife Services to discourage birds from the airfield where they may be at risk of strike. The proposed action would cause no appreciable change in the timing of daytime flights and flight patterns from current operations, where birds have adapted to airfield conditions. Since the two new squadrons would not introduce any new strike hazards and the base has comprehensive well-established procedures to minimize strike potential associated with aircraft operations, Alternative 1 operations would have less than significant impacts to birds in flight.

Noise. Aircraft operations, particularly low-level flights and landings/takeoffs have the potential to cause behavioral disturbance to wildlife due to noise. Studies have shown that birds can habituate to noise following frequent exposure and cease to respond behaviorally to the noise (Larkin et al., 1996; National Park Service, 1994; Plumpton, 2006). Wildlife at MCB Hawaii Kaneohe Bay have already habituated to high levels of aircraft noise and other operational noise associated with current activities in the project area and region of influence, and the two new squadrons would operate in a manner like existing operations. In many cases, individuals exposed to noise would return to a stable equilibrium almost immediately after exposure (Navy, 2018). Natural resource staff conduct bird counts three times annually, and numbers are consistent from year to year. This data supports the conclusion that noise from operations do not result in population decline nor impact breeding or nesting success of resident bird species on MCB Hawaii Kaneohe Bay. (L. Bookless, personal communications, 21 June 2022). Aircraft operations would be the dominant noise contributor under Alternative 1. Average noise levels would be like current aircraft activities (see Section 3.1, *Noise*).

The addition of the MQ-9 and KC-130J squadrons to MCB Hawaii Kaneohe Bay results in a slight expansion in the average noise contours throughout the region of influence when compared to existing conditions, most notably at the very north end of the airfield (see Figure 3-2). The proposed action would result in less area (approximately 11%) inside the 65 DNL contour than had been previously recorded in the 2016 Air Installations Compatible Use Zone (AICUZ) noise modeling (MCB Hawaii, 2016). The proposed area within the 75+ DNL contour lines, which includes the 80+ and 85+ DNL acreage, would collectively increase by 38 acres (less than 2%) from existing conditions. All of the increase would occur over water or on the flightline with minimal populations of wildlife as identified above. In areas of the region of influence that support greater populations of wildlife due to increased tree canopy, such as at the Sag Harbor Wetland at the northwestern end of the airfield, the potential increase in area affected by noise (75 dB DNL and above) would be approximately 75 feet (see Figure 3-2). The sand dunes directly northwest of the airfield and on the flightline would see no greater than 250 feet of contour extension for the 75 DNL boundary. Wildlife species currently existing in the region of influence have been exposed to aircraft noise and are habituated to operational noise that currently occurs at MCB Hawaii Kaneohe Bay. Because the proposed aircraft operations would be similar to historical aircraft operations, and only a slight (less than 2%) increase in areas of the flightline and open water affected by noise at 75 dB DNL would result from the proposed action, Alternative 1 operations would have less than significant noise impacts to wildlife.

Air Emissions. Exhaust emissions (including gases and particulates) from proposed aircraft operations are presented in Section 3.2 (*Air Quality*). These calculations indicate no significant impact to air quality. In addition, emissions associated with the proposed action would be like those generated daily on the base and throughout Oahu and are not known to cause impacts to wildlife. Therefore, Alternative 1 operations air emissions would have less than significant impacts to wildlife.

3.5.2.3 Special-status Species – Federal

There is no federally designated critical habitat for any ESA-listed species on, or close to, the project area. As identified in Table 2-5, all construction contractors and aircraft squadron personnel would participate in MCB Hawaii Kaneohe Bay's existing natural resources education program. This would minimize potential effects from personnel accessing other parts of the installation for recreation. A detailed analysis for each special-status species is described below.

Birds. ESA-listed birds would be subject to the same potential construction and operational impacts listed above for all birds including habitat, water, fallout, strike, and noise. No unique risk has been identified for ESA-listed bird species. Therefore, the impact analysis described above is equally applicable to ESA-listed birds including the Hawaiian duck, Hawaiian coot, Hawaiian gallinule, Hawaiian stilt, band-rumped storm petrel, Newell's shearwater, and Hawaiian petrel (refer to species listed in Table 3-8). Natural resource staff conduct bird counts three times annually for endangered birds and have found the number and types of ESA-listed birds are consistent from year to year, evidencing that operations have not resulted in population decline nor impacted breeding or nesting success. In addition, there has been ongoing construction on the airfield over the last several years with no observable population change (L. Bookless, personal communications, 21 June 2022). For these reasons, Alternative 1 may affect, but is not likely to adversely affect, ESA-listed bird species, and there would be less than significant impacts to the species.

Hawaiian Hoary Bat. As discussed above, the project area is mostly developed. The proposed action would result in the conversion of 4.25 acres from landscaped to impervious surfaces, less than a 2% change from existing conditions. Few trees are currently located at that portion of the project area and tree and vegetation removal is not anticipated as part of site preparation due to the developed nature of the project area. There has been no recorded presence of the Hawaiian hoary bat within the project area. Given the absence of the species in the project area, the proposed action would not affect individual Hawaiian hoary bats. Sparsely occurring landscape trees are not suitable for Hawaiian hoary bats based on the lack of a closed canopy system, which Hawaiian hoary bats seek for protection from environmental factors (i.e., rain, wind, sun). If tree trimming/removal is required, it would be done outside of the hoary bat pupping season (1 June – 15 September).

With regard to the region of influence, bats are sensitive to noise; however, due to the current use of airspace, bats are already discouraged from use of the area (Voigt et al., 2018). As described above, there would only be a slight increase in average aircraft noise over the existing flightline and over water away from any potential bat habitat. This would not be a noticeable change to the acoustic environment for any bats that might potentially be within the region of influence. Conservation measures detailed above for regulation of artificial lighting, as well as those measures targeting sediment control to reduce negative impacts from airborne particles during construction, would further reduce potential impacts to bats. Alternative 1 would incorporate a design feature to avoid the addition of barbed wire fencing that could entangle foraging Hawaiian hoary bats. Conservation measures to avoid adverse impacts during

the pupping season are further detailed in Table 2-5. Therefore, Alternative 1 would have no effect on the Hawaiian hoary bat, and there would be no significant impacts to the species.

Monarch Butterfly. There is no known presence of desired vegetation (i.e., crown flower) for the monarch butterfly in the project area or region of influence. The only known host plants are crown flower bushes planted at the MCB Hawaii Kaneohe Bay Environmental Compliance and Protection Division building on the north side of the runway near Mokapu Road, which are approximately 770 feet away from the only component of the proposed project, the extendable antenna for the proposed GDT atop Keawanui Hill. The proposed GDT's proximity to host plants would not pose a threat to butterflies that would potentially use these host plants. In addition, the species has only been observed traversing the region of influence to reach desired vegetation outside of the project area and region of influence. The risk of monarch butterfly strike would not be increased from current conditions, as the antenna placement would not require construction, nor would it increase the current level of traffic near the Environmental Compliance and Protection Division building. No suitable habitat, food source, or area of known utilization is expected to be disturbed or changed from existing conditions and, therefore, Alternative 1 would have no effect on the monarch butterfly.

Hawaiian Yellow-faced Bees. A large population of Hawaiian yellow-faced bees is known to exist in the coastal regions of the region of influence north of the project area, but this species has not been documented within the project area or region of influence. Some suitable habitat could potentially occur along vegetated sand dunes in coastal regions adjacent to the project area; however, no construction or new operations are planned along the shoreline that would affect potential habitat for the Hawaiian yellow-faced bees. Therefore, Alternative 1 would have no effect on the Hawaiian yellow-faced bee.

Hawaiian Monk Seal and Green Sea Turtle. Hawaiian monk seals and green sea turtles occasionally haul-out on the beaches at MCB Hawaii Kaneohe Bay. As described in Section 3.1.3.2, noise changes associated with proposed aircraft operations in the region of influence where monk seals and sea turtles can occur would be minimal. Though the change in noise contours include approximately 38 additional acres of surface area under the 75 dB DNL, most of this new area is over the runway and surface waters and represents less than a 2% increase in area over existing conditions. Although the number of overflights that would occur in this area could increase in a typical day or week, in-water species included in this area would not experience a change in type or magnitude of single-event noise levels at or below the surface of the water due to the MQ-9's and KC-130J's operational similarity to other propeller aircraft that use the airfield. While the potential exists for some animals to be subjected to multiple overflights per day, aircraft pass quickly overhead, and studies have shown that aircraft noise causes only small temporary changes in the behavior of marine mammals such as the Hawaiian monk seal (Navy, 2018). Based on this limited interaction time and the small proportional increase in over-water noise acreage, the potential effects to marine mammals from the proposed military readiness activities of the MQ-9 and KC-130J (sound from take-offs and landings) would not rise to a point where a marine mammal's behavioral patterns are abandoned or significantly altered. Therefore, impacts to marine species would be less than significant, and there would be no effect to ESA-listed marine species.

The proposed action would include an increase in military personnel and dependents from baseline conditions; however, as explained in Section 2.1.2, the proposed action represents a reduction of 165 personnel plus dependents from historical base populations. Potential indirect impacts to monk seals and sea turtles could potentially occur from recreational use of beaches on the installation where these species occasionally haul-out. Currently, the potential threats to this species due to disturbance from beach visitors are mitigated through existing education efforts, reporting requirements, and placement

of temporary barriers to keep the public away from the individuals (MCB Hawaii, 2017). The MCB Hawaii Environmental Compliance and Protection Division would continue current education and signage procedures to minimize the potential for these types of interactions. Under the proposed action, all associated personnel and contractors would be required to complete a natural resources education program that details measures to protect ESA-listed species they may encounter (see conservation measures in Table 2-5). In addition, the MCB Hawaii INRMP (MCB Hawaii, 2017) requires that any incidents of basking/nesting sea turtles or hauled-out seals be reported to the NOAA hotline and the military police, barriers be erected and monitored around the animal, and that people and pets remain at least 50 feet away. Implementation of these current and proposed conservation measures would minimize the potential disturbance impacts from the public. Therefore, Alternative 1 is not likely to adversely affect the Hawaiian monk seal and green sea turtle, and there would be less than significant impacts to these ESA-listed species.

ESA Section 7

The Marine Corps conducted informal consultation with USFWS, Pacific Islands Office under section 7 of the ESA for the proposed action's potential impacts to ESA-listed species (see Appendix D for correspondence). Species included in the informal consultation include the Hawaiian duck, Hawaiian coot, Hawaiian gallinule, Hawaiian stilt, band-rumped storm petrel, Hawaiian petrel, Newell's shearwater, Hawaiian monk seal, and green sea turtle. The USFWS concurred with the Marine Corps determination that Alternative 1 would have no effect on the hoary bat, monarch butterfly, and Hawaiian yellow-faced bees, and may affect, but is not likely to adversely affect, other ESA-listed species (see Appendix D). The USFWS based their analysis and decision on the Biological Assessment (see Appendix D) and other pertinent data. The USFWS concluded that by incorporating conservation measures, effects to ESA-listed species are either too small to be meaningful or measurable, or extremely unlikely to occur. Therefore, effects are expected to be insignificant and discountable.

3.5.2.4 Special-status Species – State

There is suitable pueo foraging habitat in the project area. The project area is within the outer home range of pueos resident to Nuupia Pond, and the vegetated area adjacent and northwest of the airfield within the region of influence has been documented as territory where pueo occur (MCB Hawaii, 2017; Price Lab, 2022). To reduce risk to pueos in tall grasses, project construction and operational maintenance would adopt conservation measures that require halting any potentially harmful activity if nests, eggs, or chicks are observed. If adults/nests/chicks are found and/or flushed out during construction or operational activity, contractors must stop work and inform MCB Hawaii natural resources staff of the species presence (Price Lab, 2022). Noise effects to pueos within the region of influence are like those described above for birds. Therefore, Alternative 1 would have less than significant impacts to the species.

3.6 Public Health and Safety

Public health and safety evaluates whether the proposed action has the potential to affect the safety, well-being, or health of members of the public and MCB Hawaii Kaneohe Bay. Health and safety issues include impacts from aircraft noise (addressed in Section 3.1, *Noise*), potential groundwater effects (addressed in Section 3.3, *Water Resources*), aviation safety related to the operation of aircraft, and the potential for BASH.

3.6.1 Affected Environment

The region of influence is the project area within the boundaries of MCB Hawaii Kaneohe Bay and the airfield environment within which aircraft patterns, landings, and takeoffs would occur. MCB Hawaii Kaneohe Bay is a secure military installation with access limited to military personnel, civilian employees, contractors, and military families. The general public is allowed access only for specific public events; base access for non-public events requires either a background check or escorted access with an authorized sponsor.

Certain bird species are known to pose a potential hazard to aircraft in the project area. Programs implemented under the INRMP, and the BASH Plan are currently in place to minimize the potential for strike hazards (Marine Corps, 2011). MCB Hawaii Flight Operations is responsible for clearing birds from the runways and taxi approaches. Additionally, birds are regularly hazed from the flightline area by USDA Wildlife Services staff, under permits from the USFWS (USFWS, 2020). Aircraft pilots are instructed to not fly over the islets (where birds have not adapted to such conditions), and the existing airfield office manager has documented this instruction within the BASH Plan to avoid unintended contact.

3.6.2 Environmental Consequences

3.6.2.1 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and there would be no change to public health and safety.

3.6.2.2 Alternative 1

Construction activities could pose a safety risk to personnel in the area. However, the construction zone would be physically secured from and monitored for unauthorized entry, and appropriate measures would be employed to ensure that individuals are not able to gain access to the site during non-work hours.

MCB Hawaii Flight Operations would continue to implement the BASH Plan to minimize the potential for aircraft/bird strikes. Propeller aircraft similar to the MQ-9 and KC-130J aircraft regularly conduct operations at the airfield, so there would be no change in BASH procedures at the airfield. Current instructions to aircraft pilots would continue to apply to all aircraft using the airfield. Furthermore, timing of proposed flights and flight patterns would be similar to the existing operational use of the project area, where birds have adapted to airfield conditions. Therefore, the potential for bird/wildlife aircraft strikes under Alternative 1 would not have significant impacts to public health and safety.

The MQ-9 squadron unmanned aircraft are regulated by Federal Aviation Regulations Part 91 and operate in accordance with Naval aviation procedures. Launch and recovery of unmanned aircraft occurs from the military runway at MCB Hawaii Kaneohe Bay within designated accident potential zones

located outside populated areas. Proposed aircraft operations for both the MQ-9 and KC-130J aircraft would be conducted in existing military operating areas, with no operations conducted over populated areas.

A Class A mishap is an accident that results in direct costs of $2,000,000 or more, loss of aircraft, a fatality, or permanent total disability. Based on the most recent 10 years of data, average Class A mishap rates within the DoD for MQ-9 aircraft is 1.98 Class A mishaps per 100,000 hours (U.S. Air Force, 2022a, b). The MQ-9 has reported no midair collisions over the last 10 years over a total of approximately 2.6 million flight hours (U.S. Air Force, 2022a). For the KC-130J, the most recent 10 years of data evidence an average Class A mishap rates for the C-130 aircraft at 0.55 Class A mishaps per 100,000 hours (U.S. Air Force, 2022a, b). This rate reflects all C-130 aircraft platform variations, including the KC-130J. The C-130, which has been upgraded continually since the 1950s, has one of the lowest Class A mishap rates of any aircraft in the DoD inventory.

A variety of safety measures are incorporated into flying unmanned aircraft to ensure the uninterrupted command and control of the MQ-9. The MQ-9 is a remotely piloted aircraft flown by a trained and certified Marine Corps Unmanned Aircraft Systems Pilot who has undergone a minimum of 2 years of training on a variety of manned and unmanned aircraft. The pilot controls the aircraft from a GCS, which serves as the "cockpit" for the aircraft. Functionally, the pilot's control of the aircraft is the same as if they were sitting in the cockpit of the aircraft. In addition to manned operation, the aircraft has the capability to fly on "autopilot" using manually entered inputs such as global positioning system coordinates and flight paths. Pilots operate and monitor the aircraft's systems to maintain positive control, while adhering to the laws and procedures outlined by the FAA. In addition to the redundant satellite and line-of-sight communication links between aircraft and ground control, the MQ-9 aircraft has several failsafe mechanisms designed into the aircraft in the event of an interrupted signal. If the aircraft loses contact with the GCS, it enters a "lost link" profile, remaining in its established flight pattern, while communications are restored. In the unlikely event communication between ground control and the aircraft cannot be restored, the aircraft maneuvers itself to a safe and predetermined location offshore in accordance with FAA regulations and within a designated military operational area away from persons and property.

The pilot instruction, redundant communications systems, programmed failsafe mechanisms, and the operating area of the proposed aircraft help ensure safe operations of MQ-9 aircraft. Furthermore, the AICUZ program establishes safety areas at the airfield and in the immediate vicinity as well as land use controls in areas surrounding the installation to ensure safe operation of all aircraft (MCB Hawaii, 2016). This includes specific zones over and around the airfield to allow suitable activities and facility heights to help ensure safe airfield operations. For these reasons, Alternative 1 would not have significant impacts to public health and safety.

3.7 Transportation

This discussion of transportation involves impacts of the proposed action to off-base roadways, bus routes, bikeways, and the two access gates into MCB Hawaii Kaneohe Bay.

3.7.1 Affected Environment

Figure 3-9 shows the transportation network immediately outside the installation and the two access gates to the installation.

3.7.1.1 Roadway Characteristics

Motor vehicle traffic into MCB Hawaii Kaneohe Bay is controlled by two security gates. The main gate is located at the north end of the H-3 highway (Figure 3-9). It has two inbound and two outbound lanes, and is normally open 24 hours a day, 7 days a week. On a typical weekday, approximately 950 vehicles enter the main gate in the morning peak hour of traffic, and approximately the same number depart via the main gate in the afternoon peak hour of traffic (MCB Hawaii, 2021). The Mokapu gate is located on Mokapu Road, has one inbound and one outbound lane, and is open between 5:00 a.m. and 10:00 p.m. The roadways that provide access to MCB Hawaii Kaneohe Bay are identified in Table 3-10. Current level of service (LOS) data is not available for roadways outside the base; however, the 2010 LOS data indicated H-3 was LOS A (i.e., free flowing traffic) for most hours of the day, with LOS B (reasonably free flowing traffic) for the peak morning and afternoon traffic hours at H-3 outside the main entry gate. Considering U.S. Census data for on-base population showed a population of 9,517 in 2010 decreasing to 9,483 in 2020 (U.S. Census Bureau 2022a, b), it is reasonable to assume the 2010 LOS information is representative of existing conditions.

3.7.1.2 Bus Routes

"The Bus" is the County of Honolulu's public bus transportation service. There are several bus routes serving the Kailua community in the vicinity of the base; however, there are no bus stops at MCB Hawaii Kaneohe Bay. The nearest bus stop is located at Aikahi Park Shopping Center, which is about 3,000 feet from the Mokapu gate (Figure 3-9). The distance from the bus stop to the nearest MCB Hawaii Kaneohe Bay residential quarters is about 1.2 miles.

3.7.1.3 Bikeways

The existing bikeway network near MCB Hawaii Kaneohe Bay consists of shared use paths, bike lanes, and bike routes shared with roadways (City and County of Honolulu, 2019). Bike facilities near MCB Hawaii Kaneohe Bay include a shared use path along the east side of H-3 between Kaneohe Bay Drive and MCB Hawaii Kaneohe Bay main gate and a shared roadway along Kaneohe Bay Drive between Mokapu Road and H-3, which connects to other facilities within the Kailua community. Planned city bikeway improvements include a protected bike lane along Mokapu Road from Kaneohe Bay Drive to MCB Hawaii Kaneohe Bay Mokapu gate. In the vicinity of Mokapu Elementary School, striped bike lanes are provided on both sides of Mokapu Road from G Street to Harris Avenue (City and County of Honolulu, 2019).

3.7.2 Environmental Consequences

Impacts to ground traffic and transportation are analyzed by considering the possible changes to existing traffic conditions and the capacity of area roadways to operate at an acceptable LOS.

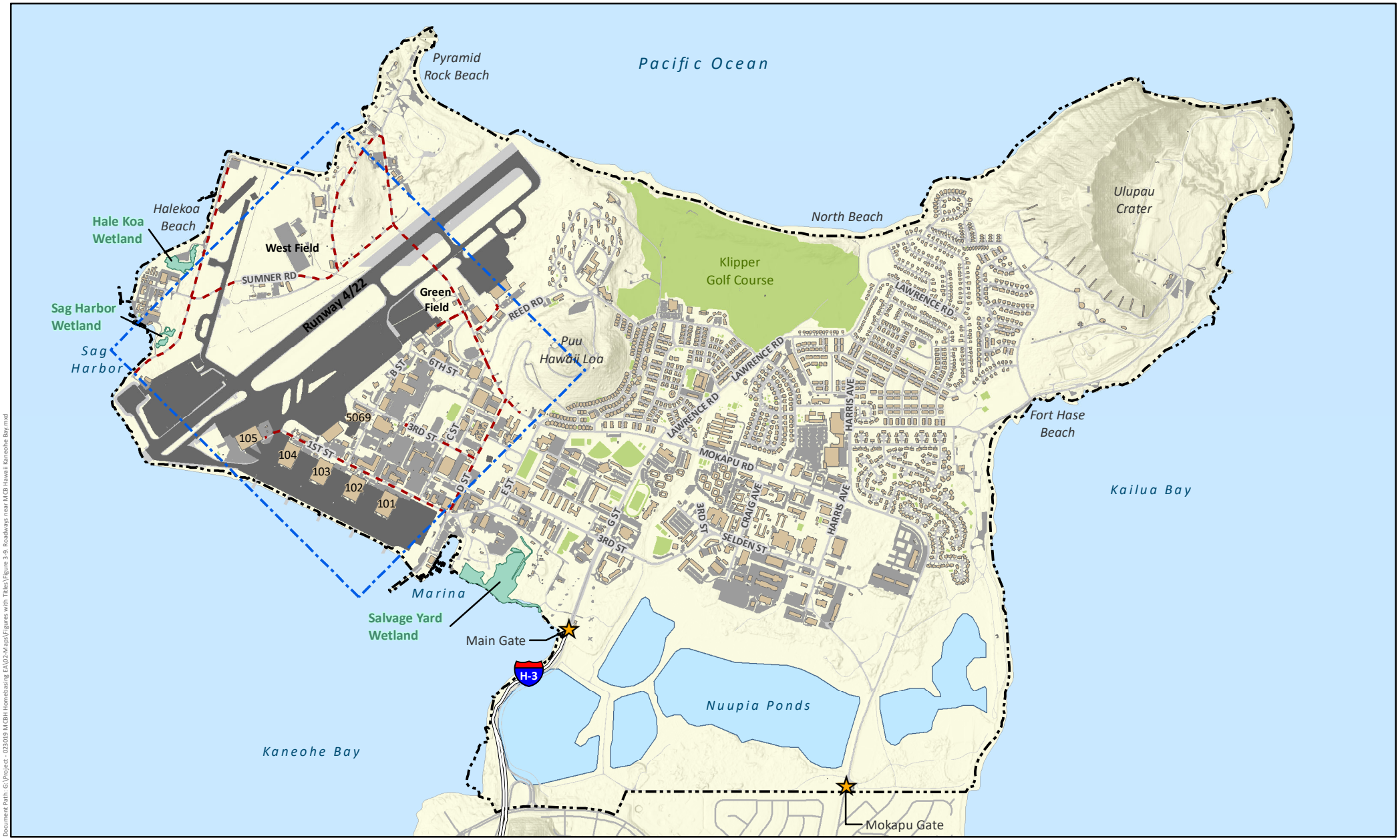


Figure 3-9. Roadways near MCB Hawaii Kaneohe Bay

MCB Hawaii Kaneohe Bay Boundary

Gate

Explosive Transportation Route

Interstate

Road

Airfield Pavement/Apron

Airfield Road

Building

Parking Area

Recreation Area

Wetland

Proposed Action

Approximate Project Location

0 1,000 2,000 Feet

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021

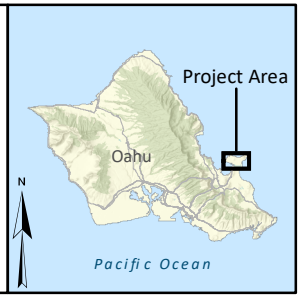


Table 3-10 External Roadway Characteristics

Roadway	*Description*	*Road Type*	*# of Lanes*	*2020 AADT (HDOT, 2022)[1]*
H-3	From Halawa, around Kaneohe, and to MCB Hawaii Kaneohe Bay	Interstate	Four – six (two-three in each direction)	13,400[2]
Mokapu Road	North Kalaheo Ave to MCB Hawaii Kaneohe Bay	Major Collector	Four (two in each direction)	9,400
Mokapu Blvd	North Kalaheo Avenue to Kaneohe	Principal Arterial	Four (two lanes in each direction)	10,000[3]
Kaneohe Bay Drive	North Kalaheo Ave to Mokapu Saddle Road	Major Collector	Two (one lane each direction)	7,300[4]
North Kalaheo Avenue	Mokapu Road/Blvd to Kailua Road	Major Collector	Two (one lane each direction)	11,900

Notes: [1]HDOT Federal-Aid Classification Update (HDOT, 2012). No updated guidance provided as this document was based on the 2010 census figures; AADT is a basic measurement that indicates vehicle traffic load on a road segment. AADT estimates the mean traffic volume across all days for a year for a given location along a roadway.
[2]Route H-3 Between MP 14.86 and 15.316 (HDOT, 2022).
[3]Route 65 Between MP 3.29 and 4.148 (HDOT, 2022).
[4]Route 6511 between MP 0.00 and 2.58 (HDOT, 2022).

Legend: AADT = Annual Average Daily Traffic; HDOT = Hawaii Department of Transportation; MCB = Marine Corps Base.

3.7.2.1 No-Action Alternative

Under the No-Action Alternative, the proposed action would not occur and there would be no change to transportation.

3.7.2.2 Alternative 1

Traffic

Construction Impacts

Construction traffic would occur on the segment of the H-3 freeway between the Mokapu Interchange and the MCB Hawaii Kaneohe Bay main gate. Construction traffic would be required to enter and exit the installation through the main gate. The Marine Corps estimated construction traffic using a recent comparable construction project (Mokapu Elementary School improvements) would be approximately 68 additional vehicle trips per day entering and exiting the installation at the main gate in the morning and afternoon peak periods, representing a 7% increase over normal conditions if all traffic were to occur in the same hour. While such an increase could cause minor delays in entering the base, it is similar to fluctuations that occur with other construction projects at MCB Hawaii Kaneohe Bay and are accommodated without affecting H-3 traffic (MCB Hawaii, 2021). The entrance to the main gate is at the end of the H-3 and approximately 0.5 mile from the last H-3 exit. Construction traffic (68 trips/day) would be less than 1% of average daily traffic volume on H-3 and have no effect on H-3 traffic, which averages 13,400 trips per day. As such, only traffic entering MCB Hawaii Kaneohe Bay would be minimally affected by the proposed action and would not change the LOS of H-3 off base during peak or non-peak hours.

Construction vehicles and equipment would be limited to entering the installation through the main gate, so project construction would not impact the off-base neighborhood near Mokapu gate. An HDOT permit would be required to transport oversized equipment and overweight vehicles on state roadways, such as the H-3.

Considering the relatively small increase in construction traffic at the main gate, the temporary nature of the construction traffic, and the main gate's distance from the H-3, Alternative 1 construction would have less than significant impacts to traffic outside the installation.

Operational Impacts

The proposed action would add 676 active-duty personnel on base along with dependents in a gradual increase between FY 2023 and FY 2027. While additional aircraft operations at the airfield could cause traffic delays on base for personnel crossing the airfield, this proposed action results in 165 less personnel on base as compared to the base population before 2022. All such traffic would continue to be managed by a security guard stationed at the airfield to ensure traffic and aircraft safety. Squadron personnel and their dependents are anticipated to live on and off base in levels consistent with existing conditions; as such, no impacts to off-base road networks are anticipated. As a result, the change in traffic for personnel commuting or for personnel and dependents driving in the community would not change the LOS of H-3 average daily traffic volumes. As a result of the 165 less personnel compared to 2022 conditions, future traffic conditions are expected to be slightly better under the proposed action. Consequently, Alternative 1 operations would have less than significant impacts to traffic outside the installation.

Bus Routes

Alternative 1 would not impact bus operations on county and state right-of-way during the construction or operational periods, because there are no bus routes to MCB Hawaii Kaneohe Bay. Therefore, Alternative 1 would have no impacts to bus routes.

Bikeways

During the construction and operational periods, no changes would occur to bike facilities on county and state rights-of-way. Bikeways and access to bikeways would remain unchanged. Therefore, Alternative 1 would have no impacts to bikeways.

3.8 Summary of Potential Impacts to Resources

A summary of the potential impacts associated with Alternative 1 is presented in Table 3-11.

Table 3-11 Summary of Potential Impacts

Resources	*Alternative 1*
Noise	• Less than significant impacts. No increase of the 65 A-weighted decibel (dBA) Day-Night Average Sound Level (DNL) contour acreage in populated areas off base.
Air Quality	• Less than significant impacts. Construction and operational activities would only minimally increase GHG emissions and would not substantially contribute to global warming.
Water Resources	• Less than significant impacts to groundwater, surface water, wetlands, and floodplains.
Cultural Resources	• Less than significant impacts to archaeological resources. Impacts to archaeological sites would be minimized through archaeological monitoring. • Less than significant impacts to historic resources. Impacts to these resources would be mitigated through incorporation of proposed mitigation measures developed in the NHPA Section 106 process.
Biological Resources	• Less than significant impacts to vegetation, wildlife, critical habitat, and ESA-listed species. The preferred alternative (Alternative 1) either may affect, but is not likely to adversely affect, ESA-listed species, or has no effect on other ESA-listed species.
Public Health and Safety	• Less than significant impacts.
Transportation	• Less than significant impacts.

Key: dBA = A-weighted decibel; DNL = Day-Night Average Sound Level; ESA = Endangered Species Act; GHG = greenhouse gas; NHPA = National Historic Preservation Act.

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4 Cumulative Impacts

This section (1) defines cumulative impacts; (2) describes past, present, and reasonably foreseeable future actions in the project area; (3) analyzes the incremental interaction the proposed action may have with other reasonably foreseeable actions; and (4) evaluates cumulative impacts potentially resulting from these interactions.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of NEPA, CEQ regulations, and CEQ guidance. Cumulative impacts are defined in 40 CFR 1508.1(g) as "effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time."

In addition, CEQ and USEPA have published guidance addressing implementation of cumulative impact analyses to include *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ, 2005), and *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (USEPA, 1999). The CEQ guidance *Considering Cumulative Impacts Under NEPA* (1997) which says cumulative impact analyses should "…determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

Cumulative impacts arise when a relationship exists between a proposed action and other actions expected to occur in a similar location and/or during a similar time period. To identify cumulative effects, the analysis addresses the following three fundamental questions.

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

4.2 Scope of Cumulative Impacts Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the timeframe in which the effects could be expected to occur. Cumulative impacts assess the impact of the proposed action when viewed in context with other past, present, and reasonably foreseeable actions. Past actions are considered part of the "baseline" analysis, unless they are incomplete or ongoing, and future actions are included where they are sufficiently certain to occur. The timeframe for cumulative impacts centers on the timing of the proposed action. Effects of past actions are reflected in current baseline conditions.

4.3 Past, Present, and Reasonably Foreseeable Actions

Actions included in the cumulative impacts analysis are shown in Table 4-1 and Figure 4-1.

Table 4-1 Past, Present, and Reasonably Foreseeable Actions at MCB Hawaii Kaneohe Bay

Index #	*Action*	*Year*	*Description*
1	Regimental Consolidated Communications/Electrical Facility	2018–2022	• Consolidation of facilities (20,423 square feet) in over seven facilities around the base.
2	Mokapu Gate Entry Control AT/FP Compliance	2018–2022	• Demolition: Building 1188, under construction (2,800 square feet)
3	District CHW and DHW Plant for Buildings 7046, 6047, and 7057-7059	2020	• Centralize water production to eliminate redundant chiller. New facility for the chiller pad, along with water lines (900 square feet).
4	Corrosion Control Hangar	2019–2023	• Support paint stripping activities for tilt rotor and rotary wing aircraft (31,904 square feet).
5	Bachelor Enlisted Quarters (Aviation Support)	2020	• Demolition: Walkways 1003, 1004, and 1005; Buildings 227, 228, 3000 and cooling plant (341,001 square feet).
6	Waikulu Family Housing	2018	• Redeveloped into 375 three- and four-bedroom duplexes and multiplexes.
7	Hana Like Family Housing	2018	• Redeveloped into 182 three- and four-bedroom duplexes and multiplexes.
8	Mokapu Elementary School Campus Improvements	2023	• Redevelopment of existing school campus for classrooms, administration, library, and cafeteria facilities, along with a covered play court, playfield, and surface parking lots (162,000 square feet).
9	Helicopter Squadrons Deactivation	2021-2022	• AH-1/UH-1 squadron (27 aircraft) and the CH-53E squadron (15 aircraft) were deactivated, and the RQ-21 squadron was divested from the VMU squadron. Resulted in a decrease of approximately 841 personnel plus family members.
10	3rd MLR in Hawaii	2023	• Construction of required supporting facilities, and associated training.
11	Dog Kennel	2021	• Demolition of Building 5090, reconstruction in place (larger than Building 5090).
12	Rappel Tower and Gas Chamber	2021	• Demolition: Building 6042. Reconstruct in place, total of 3,700 feet (larger than Building 6042).
13	Bachelor Enlisted Quarters	2022–2026	• 180-person quarters. Buildings 1655 and 1656 (48,470 square feet).
14	Phase 1 Electrical Distribution Modernization, Base-wide	2022–2026	• Repair and upgrade various components of the electrical distribution system, including substations, switching stations, and addition of SCADA System. Renovates primary substations 1125, 5033, 820, 5092 (13,681 square feet).
15	Bachelor Enlisted Quarters	2024–2028	• 200-person quarters. Demolition: Building 386, 1634, and 1635 (47,620 square feet).

Table 4-1 Past, Present, and Reasonably Foreseeable Actions at MCB Hawaii Kaneohe Bay

Index #	*Action*	*Year*	*Description*
16	Wastewater Treatment Plant Redundancy and Modernization	2025–2031	• Upgrade the Base WWTP to provide redundant treatment systems to address State of Hawaii recommendation and for contingency operations in case of failure of critical components. Demolition: Sludge Beds 977 and 978.
17	Nuupia Main Gate Entry Control AT/FP Compliance	2025–2028	• Demolition: Buildings 1636 and 1637. Reconstruct in place.
18	Maintenance Facility	2026–2030	• New consolidated maintenance facility and warehouse storage, and replacement van pads. Demolition: Van Pads C and D (53,733 square feet).
19	Phase 2 Electrical Distribution Modernization	2026–2030	• Repair and upgrade various components of the electrical distribution system. Demolition: Buildings 1274 and 1628.
20	3rd MLR Regiment Operations Complex	2027–2031	• Demolition: Buildings 1284, 6765CE (shelter that looks like a building). Possible change to Oil/Water Separators 6085 and 6786 (27,997 square feet).
21	Multi-purpose Training Complex	2027–2031	• Facility to support training using simulators that are housed in temporary and semi-permanent facilities. Includes new rappel tower and gas chamber. Demolition: Building 6076; Temporary Facilities 6757C3, 6758C3, 6756C3, 6755C3, 6708C3, 6710C3, 6781C3, 6771C3, Rappel Tower 6042, Gas Chamber 6006, and Leadership Reaction Course 6075 (36,231 square feet).
22	Bachelor Enlisted Quarters	2027–2031	• 200-person Bachelor Enlisted Quarters to support new Aviation Squadrons and MWSS. This is third part of original 608 Bed P-886. Demolition: Buildings 1604 and 1632.
23	MAG-24 Armory Expansion MV-22 EIS	2028–2030	• Expands Building 4054 (Armory) to meet the needs of MWSS, VMU and MV-22. Demolition: three existing modular armories and one concrete armory (11,905 square feet).
24	New Operational Pier	2028–2032	• New pier for ordnance loading and offloading.
25	3rd LCT Complex Part of MLR project.	2028–2032	• Construct new vehicle maintenance facility, armory, field maintenance shop, electrical/communications maintenance shop, warehouses, and headquarters. Replaces tension fabric structures that in place since 2009.
26	Regimental Headquarters Part of MLR.	2029–2031	• Demolition: Building 1088. Reconstruct in place.
27	Bachelor Enlisted Quarters Part of MLR.	2029–2032	• 111-person quarters. Demolition: Buildings 1633 and 1654.

Table 4-1 Past, Present, and Reasonably Foreseeable Actions at MCB Hawaii Kaneohe Bay

Index #	*Action*	*Year*	*Description*
28	Ordnance Storage Magazine	2029–2032	• Replace existing modular ammunition magazines at Ulupau Ammunition Storage Facility with a permanent aboveground, earth-covered magazine to meet requirements of SAFER Site Approval. Removes: aboveground steel magazines 6168, 6169, and 6170 (4,747 square feet).
29	CISD and MITSC Facilities	2029–2033	• New facility for use by the Directorate of Communications and Information Systems. Includes administrative, storage, shop, and computer equipment spaces. Relocate: Building 1089 ADN (25,629 square feet).
30	CLB-3 Maintenance Complex and Warehouse Part of MLR	2029–2033	• Consolidated CLB-3 maintenance complex and warehouse. Affected: Buildings 250, 269, 388, 3013, 3014, 3015, 3017, 3018, 3019, 1565, 1677, and 6039.
31	Fire Station	2030–2033	• Larger fire station in new location. Provides replacement dance/gymnastics facility that would be displaced as well as temporary fire station during construction (30,860 square feet).
32	Alternate Communications Feeder	2030–2034	• New communications ductbank, renovates Building 213, and upgrades Building 276A (5,016 square feet).
33	Physical Fitness Center	2031–2035	• Replace existing fitness center.
34	Consolidated Classroom Facility (Operations and Training)	2032–2036	• Associated with P-843. Demolition: Building 6709C3 (32,442 square feet).
35	C-40 Aircraft Maintenance Hangar and Parking Apron	TBD	• Demolition of Hangar 104 and construction of a new Type III hangar to accommodate two C-40 aircraft

Notes: Project locations are shown by index number in Figure 4-1.
ADN = Area Distribution Node; AT/FP = Anti-Terrorism/Force Protection; CHW = Chilled Water; CLB = Combat Logistics Battalion; CISD = Communications & Information Systems Division; DHW = Domestic Hot Water; LCT = Littoral Combat Team; MITSC = Marine Air-Ground Task Force Information Technology Support Center; MLR = Marine Littoral Regimen;, MWSS = Marine Wing Support Squadron; SAFER = Safety Assessment for Explosive Risk; SCADA = Supervisory Control and Data Acquisition; TBD = To Be Determined; VMU = Marine Unmanned Aerial Vehicle Squadron; WWTP = Waste Water Treatment Plant.

Source: MCB Hawaii, 2022c.

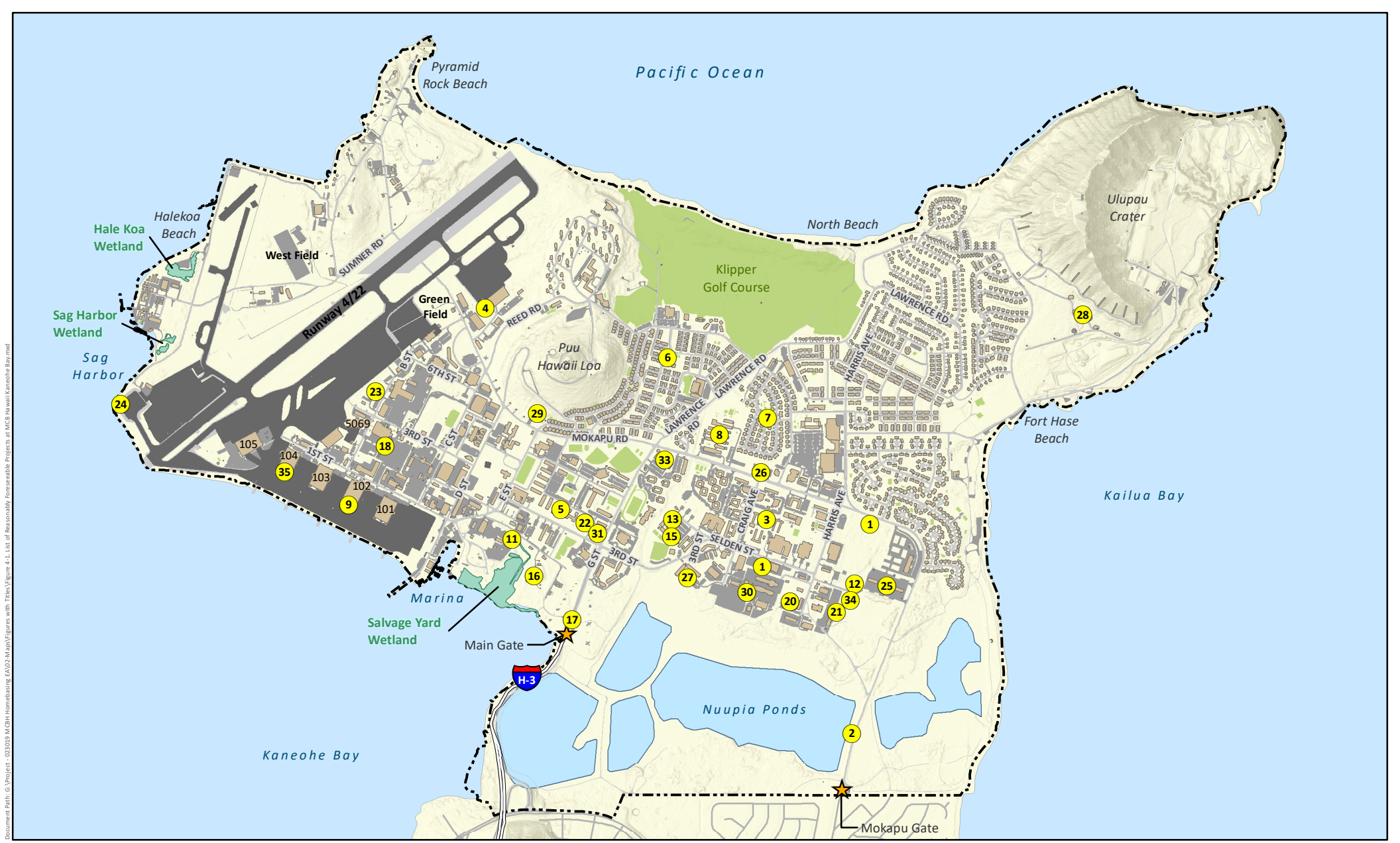


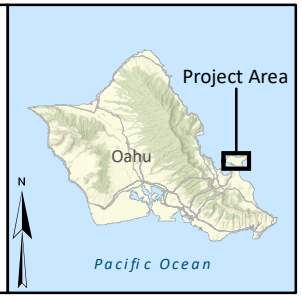
Figure 4-1. List of Reasonably Foreseeable Projects at MCB Hawaii Kaneohe Bay

MCB Hawaii Kaneohe Bay Boundary
Gate
Reasonable Foreseeable Projects
Interstate
Road
Airfield Pavement/Apron
Airfield Road
Building
Parking Area
Recreation Area
Wetland

0 1,000 2,000 Feet

Note: Projects are listed by Index Number in Table 4-1.

Sources: Esri, 2021; Hawaii Statewide GIS, 2021; MCBH, 2021



4.4 Cumulative Impact Analysis

Noise. The past, present, and future actions would include the use of construction equipment that would result in increased temporary intermittent noise levels within the region of influence. The timing of some future projects may overlap temporally and geographically with the construction period of the proposed action. However, noise level increases would be temporary and typical of standard construction activities as identified in the noise resource section. While individual construction activities would temporarily increase noise levels in the construction area, the varied scale, location, and timing of future construction, and the relatively short duration of noise effects, would result in less than significant cumulative impacts.

The projects identified in Table 4-1 would have minimal operational noise impacts. Long-term aircraft operations would continue to be the dominant sources of noise at MCB Hawaii Kaneohe Bay. The cumulative impact analysis considers recent actions such as the deactivation of the helicopter squadrons that was completed in 2022. When considering the deactivation of helicopter squadrons cumulatively with the proposed addition of two aircraft squadrons under the proposed action, there is a decrease in aircraft operations that results in less noise in the region of influence. With regard to future projects, distinct from the proposed action — which is adding two new aircraft squadrons — future projects are improvements or additions to existing infrastructure and are not introducing new noise sources. As such, in the absence of any new, permanent operational noise sources, implementation of the proposed action would not result in significant cumulative noise impacts within the region of influence.

Air Quality. The past, present, and future actions within foreseeable projects would include the use of construction equipment that would result in increased temporary air emissions in the region of influence from construction equipment similar to that identified in the Air Quality resource section. The timing of some future projects may overlap temporally and geographically with the construction period of the proposed action. Considering the minor increase to air emissions and negligible impact to GHGs identified for the proposed action, applying the same BMPs to future construction projects would result in less than significant cumulative effects to air quality. With regard to GHGs, construction activities for reasonably foreseeable projects would temporarily increase GHG emissions. The statewide GHG projection is 12.85 million tons of GHGs for 2020 (DOH, 2021a), and the estimated annual average GHG increase of the proposed action would be less than 0.002 percent of the 2020 GHG projection. The magnitude of each project in Table 4-1 on average would be the same or less than the proposed action, so even a conservative estimate would result in reasonably foreseeable actions being less than 0.01 percent of the 2020 GHG projection. Such a temporary and small annual increase over the 2020 projection level results in a less than significant impact to GHG emissions. As future projects consist principally of updated infrastructure with little new air emissions, operational air pollutant emissions would not substantially change from existing conditions, and thus the proposed action would not result in significant cumulative air quality impacts within the region of influence.

Water Resources. With regard to future construction in the region of influence, conservation measures identified in Table 2-5 for the proposed action would be equally applicable to all future projects, thereby avoiding or minimizing the transport of project-related sediments or pollutants to water resources in the region of influence. All projects would include appropriate storm water quality and LID features similar to the proposed action to reduce the potential for off-site transport of pollutants. As most of the projects consist of updated infrastructure and construction in developed areas, minimal increases in impervious surfaces is expected, and the location of future projects within the highly developed base would result in only minor increases in storm water runoff, which would be managed in accordance with

the SWPPP for industrial activities, as required by the NPDES General Permit Waste Discharge Requirements for Discharges of Storm Water Associated with the Industrial General Permit. No jurisdictional wetlands within the region of influence would be impacted. Therefore, implementation of the proposed action would not result in significant cumulative water quality impacts within the region of influence.

Cultural Resources. The NAS Kaneohe Aviation District has been impacted over time with the demolition of 15 of the total 57 historic buildings, structures, and objects since nomination of the district in 2006. There is only one additional building (Hangar 104) proposed for demolition in connection with future projects beyond the six included in the proposed action (Hangars 103 and support buildings 159, 160, 161, 183, and 184). As described in Section 3.4, the Marine Corps has entered into an MOA to mitigate for any adverse effects resulting from the proposed action, resulting in less than significant impacts to cultural resources. With regard to the one additional historic building that would be adversely affected (replacement of Hangar 104), the Marine Corps is currently conducting NHPA Section 106 consultation with the SHPD, NPS, and consulting parties. The Marine Corps anticipates that, like with the proposed action, any adverse effect on architectural resources including the proposed demolition of Hangar 104 would be mitigated through proposed mitigation measures developed during the NHPA 106 consultation process. Past, present, and future projects have and would adversely impact both the Kaneohe NAS NHL and the Aviation Historic District; however, with proposed mitigation, the impacts would not be significant enough to remove the listing eligibility of the Aviation Historic District or the Kaneohe NAS NHL. For these reasons, cumulative impacts to cultural resources would be less than significant.

Biological Resources. While construction-related noise may temporarily displace such wildlife from habitat in the immediate vicinity of the project areas, future construction would occur predominantly at previously developed and actively used areas, construction noise would be temporary and in many cases would be similar to operational activities that currently occur throughout the installation, and conservation measures identified in Table 2-5 would be applied to future projects to further avoid or minimize potential effects to wildlife (including ESA-listed species) during the construction. Conservation measures to educate contractors and military personnel about natural resources and ESA-listed species would also continue to be implemented. For operations, considering the projects are largely upgrades to or replacement of existing infrastructure, the nature of the projects would not introduce new noise sources, nor significantly change the amount of impervious surfaces. As such, implementation of the proposed action would not result in significant cumulative impacts to biological resources in the region of influence.

Public Health and Safety. Future construction activities would consist of activities similar to the proposed action and occur entirely within installation boundaries. All future operations would similarly occur only on base. No changes to safety plans, AICUZ, or BASH Management Plan at MCB Hawaii Kaneohe Bay is anticipated because of the proposed action and future projects. Considering all actions would occur on base and are consistent with present operations, implementation of the proposed action would not result in significant cumulative public health and safety impacts within the region of influence.

Transportation. Cumulative impacts to transportation for construction projects that may overlap may contribute to some on-base traffic growth on the H-3 and accessing the installation through the main gate. However, any increase, even from multiple projects, is not anticipated to be significant. The proposed action would increase average daily traffic volume on H-3 less than 1%. At any given time, no

more than three projects would be underway including the proposed action. As such, assuming the construction impacts are similar among projects, at a 3% worse-case scenario, any increase would not result in a significant cumulative impact. With regard to operations, because of deactivation of the two helicopter aircraft squadrons completed in 2022, by the time the proposed action is fully operational in FY 2027, there would be a net decrease in personnel of 165 personnel plus dependents. Most of the future projects are upgrades to the existing infrastructure and are therefore not anticipated to significantly increase base personnel. Consequently, the proposed action would not contribute to significant cumulative impacts to traffic outside the installation.

5 References

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